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OF THE EXPERT GROUP MEETING ON CREATION OF INDIGENOUS ENTREPRENEURSHIP AND OPPORTUNITIES FOR SMALL- AND MEDIUM-SCALE INDUSTRIAL INVESTMENT

DAMASCUS, 11-13 APRIL 1993

United Nations Economic and Social Commission for Western Asia (ESCWA)

Friedrich Ebert Stiftung (FES), Germany

Arab School of Science and Technology (ASST), Syrian Arab Republic

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PREFACE

These Proceedings are a compilation of the papers presented at the Expert Group Meeting on Creation of Indigenous Entrepreneurship and Opportunities for Small- and Medium-Scale Industrial Investment, held in Damascus from 11 to 13 April 1993. The Meeting was attended by more than 50 participants, including experts, consultants, and representatives of private companies and national, regional and international organizations.

The Meeting was co-sponsored by the United Nations Economic and Social Commission for Western Asia (ESCWA), Friedrich Ebert Stiftung (FES) of the Federal Republic of Germany, the International Development Research Centre (IDRC) of Canada, and the Arab School of Science and Technology (ASST)/Scientific Studies and Research Centre (SSRC) of the Syrian Arab Republic. The Meeting was hosted by the Arab School of Science and Technology.

The objectives of the meeting were defined as follows: (1) to review the prevailing situation in countries of the ESCWA region, highlighting the various perspectives on (and obstacles to) entrepreneurship development; (2) to identify the necessary support services and a number of innovative schemes that could promote entrepreneurial motivation in the area of small-scale technology-based industries; (3) to discuss the ways and means of promoting technical innovation and strengthening the technological capabilities of small firms; and (4) to discuss the need for regional and international support for small-scale technology-based industries.

It should be noted that the views expressed in these Proceedings are those of the individual authors and do not necessarily reflect those of the Meeting's co-sponsors.

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I. INTRODUCTION

The papers presented to the Expert Group Meeting on Creation of Indigenous Entrepreneurship and Opportunities for Small- and Medium-Scale Industrial Investment focus on specific experiences and cases, on innovative schemes, and on a number of issues not adequately covered in earlier research in the region.

Before these papers are introduced, however, entrepreneurship should be defined. The term "entrepreneur" is derived from the french word entreprendre: to undertake. The entrepreneur generates a business idea, then transforms his idea into reality through the creation of an enterprise. By doing so, the entrepreneur involves himself in idea generation, risk-taking, management, creative thinking and innovation. An indigenous entrepreneur may therefore be defined as "an indigenous person who shows practical creativity and managerial ability in effectively combining resources and opportunities in an effort to produce goods and services ..."*

The functions just described can best be carried out by those with certain traits or characteristics: a great desire for achievement, self-motivation, flexibility and the ability to adapt to changes. The characteristics associated with the entrepreneur are not totally innate; entrepreneurs are made, not born. Potential entrepreneurs can be attached to enterprise creation by various inducements which increase self-motivation and promote a more positive orientation towards entrepreneurship. In other words, they can be created.

The creation of indigenous entrepreneurship constitutes the bulk of the Proceedings. The other major area, as indicated by the Meeting's title, involves opportunities for small- and medium-scale industrial investment. These two areas are, in fact, interrelated.

The creation of indigenous entrepreneurship involves the assessment of factors that affect the formation of entrepreneurs. It reviews the role of the various institutions that provide financial and non-financial support to the entrepreneurs of the region, and considers a number of innovative schemes that are likely to promote entrepreneurship.

Opportunities in small- and medium-scale industrial investment, representing the second major focus of the Proceedings, are closely linked with entrepreneurship since the first priority of the entrepreneur is to identify, locate and exploit new opportunities. The papers included in these Proceedings discuss the main instruments and mechanisms available to assist the entrepreneur in identifying new opportunities, especially in technology-based small-scale industries. Particular emphasis is placed on the following: the business and technology incubator as an innovative means of entrepreneurship development; the role of universities and scientific research centres and of community support in promoting small businesses; and finally, the potential of these businesses to carry out product and process innovation.

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* John Hailey, "The politics of entrepreneurship-affirmative-action policies for indigenous entrepreneurs", Small Enterprise Development (June 1992).

The first part of the Proceedings deals with a number of issues related to the creation of indigenous entrepreneurship. These papers discuss and evaluate the major economic, sociological, psychological and managerial factors affecting the formation of entrepreneurship.

While economists concentrate on the entrepreneur's ability to mobilize resources, to identify and exploit opportunities, to develop new markets and to promote technological innovation, sociologists focus on the sociological factors that affect the formation of entrepreneurship, such as ethnic and religious origins, family background, social values and community support. Psychologists lay emphasis on self-motivation and the other behavioural attributes of potential entrepreneurs, while those with a management-science background focus on the managerial functions of the entrepreneurs and their ability to perform the day-to-day managerial activities of the firm successfully. It will be argued that the formation of entrepreneurship is related to all these (socio-economic, cultural, and psychological) factors. It is important to note that in many circumstances, cultural traditions and community support are crucial to the promotion of the entrepreneurial spirit and the acquisition of expertise. The characteristics of entrepreneurs in Arab countries in general, and in Jordan in particular, are presented in these Proceedings.

Besides community support and prevailing cultural traditions, policy environment and legislative regulations are important factors in the creation and promotion of entrepreneurship. The promotional inducements -- fiscal and financial incentives -- that are provided to small enterprises by many countries of the region cannot have any positive impact on the promotion of entrepreneurship if government economic policies are not sound. Steps towards improving these regulations involve reducing government regulations (especially import and foreign exchange regulations), and simplifying all administrative and bureaucratic procedures (licensing, registration, labour permits, customs documents, tax forms, etc.). Potential entrepreneurs in the region are reluctant to start and run a business while such significant barriers exist.

In several ESCWA countries, government assistance in small-industry and entrepreneurship promotion is not yet well developed. There is a newly established government-owned institution in Egypt called the Social Fund for Development, but its impact on the promotion of small industries is still not clear. Although a few government institutions provide extension and support services to entrepreneurs, these services are far from being adequate or effective. Actually, quality support and advisory services to small enterprises can best be provided by entrepreneurs themselves, and by those with entrepreneurial attitudes such as private-sector associations. These organizations have the advantage of being close to the beneficiaries, they truly represent the entrepreneurs, and they have the capacity to adapt to changes in the socio-economic and political environment.

The Proceedings papers related to the above discuss the role and experience of particular private-sector associations in providing extension and support services to aspiring and existing industrialists; these associations include the Association of Lebanese Industrialists in Lebanon, the Damascus Chamber of Industry in the Syrian Arab Republic, and the Alexandria Businessmen's Association in Egypt. In addition, the role of non-governmental organizations (NGOs) in supporting and promoting projects for women in

Jordan are reviewed. The papers elaborate on selected constructive proposals for private-sector self-help initiatives, and discuss the possibilities of establishing -- or improving -- counselling and mutual support systems.

One innovative scheme in the area just mentioned has been introduced by the Alexandria Businessmen's Association, which has proven itself capable of combining credit provision to small entrepreneurs with non-financial assistance. The Association has established a service centre to act as a technical support facility, designed to address the technical needs of entrepreneurs through the improvement of technology and marketing practices and through the provision of training in areas such as costing, pricing, accounting and production planning.

Another feature of the programme launched by the Alexandria Businessmen's Association is its provision of loans without collateral. It is rare to find private associations or financial institutions in the region willing to provide financing without some sort of guarantee; the levels of collateral sought by commercial, development and industrial banks are excessive, and most projects are heavily dependent on personal equity. Access to credit facilities is difficult for small and medium-sized enterprises, despite the advantageous financial terms (i.e., subsidized interest rates) that are extended by some industrial and development banks, including the Oman Development Bank. The paper on the lending policy of the Oman Development Bank provides a good example of the traditional role played by most development and industrial banks in the region in the financing of small- and medium-scale enterprises.

Another interesting report describes the experience of informal lending institutions in the occupied Gaza Strip. These institutions operate under severe political and economic constraints, and in the absence of an adequate financial and banking system.

The paper relating the role and experience of a relatively new specialized financial institution, the Credit Guarantee Corporation for Small-Scale Enterprises (Egypt), constitutes an important contribution to these Proceedings. The Credit Guarantee Scheme was designed to overcome both the perceived high risks of lending to small enterprises and their inability to provide collateral. The Corporation guarantees up to 50 per cent of each loan granted by commercial banks to small enterprises.

The experience of an unconventional credit guarantee scheme that is in force in Kenya is also reviewed. The Double Credit Guarantee Scheme, run by the Friedrich Ebert Foundation in Kenya, is a good example of a programme that tackles the common problem of insufficient security/collateral among small and medium-sized enterprises. Another unconventional scheme that increases credit availability for small-scale businessmen is a project of an official German development organization in Indonesia which is designed to establish links between formal and informal financial institutions.

Entrepreneurship promotion is also tackled through a model developed by the German Agency for Technical Cooperation (GTZ) called "New business creation through the competency-based economies, formation of entrepreneurs". This model promotes the creation and upgrading of small- and medium-scale enterprises through the systematic

development of entrepreneurs -- specifically, through the provision of adequate technical and managerial inputs. The model is based on an action-learning methodology by which potential entrepreneurs are developed and stimulated through appropriate interventions. A major lesson to be learned from the GTZ model is that small-industry development institutions should not work for entrepreneurs, but with them.

The second part of the Proceedings covers several issues related to the promotion of entrepreneurship and to opportunities in technology-based small-scale enterprises.

In most developing countries, entrepreneurs encounter numerous obstacles at the economic, social, cultural and organizational levels, and support systems are inadequate for promoting entrepreneurial businesses. A new form of promoting entrepreneurial activity within technology-based small-scale enterprises is the business or technology incubator. By providing an integrated, affordable package of advisory services, rented space, shared facilities and access to community support and seed capital, incubators lower the costs and time needed for start-up businesses and increase their chances of success. The concept, forms and objectives of incubators, their relevant experiences, and their successes and failures are presented in two separate papers. Operations in the United States and Ireland are reviewed, together with recent developments in China, Mexico, Poland and Indonesia. The applicability of this new concept to the ESCWA region is also discussed.

Innovation, another important issue, is in fact an essential quality of entrepreneurship, and is a crucial factor in the search for opportunity. The concept of innovation has been stressed by Schumpeter, who considers that the entrepreneur is a catalyst of change, able "to carry out new combinations" and instrumental in discovering new opportunities, and therefore able to carry out innovations. Process needs, industry or market changes and other unexpected occurrences may provoke innovation within a firm. In this context, small enterprises have the capability and potential to undertake process and product innovation. The relevant paper discusses the opportunities offered by new and evolving technologies to enhance the competitiveness and productivity of small industrial enterprises, as well as their technological potential. Finally, the paper examines the obstacles to technological innovation.

The constraints on upgrading the technical capabilities of small firms also arise from the absence of links among universities, scientific research institutes and small-scale industries. The issue of technology transfer from universities and other sources of innovation to small businesses is reviewed and discussed. Two case-studies deal with this issue: (a) the Outreach-Consultation Project (OCP) at the University of Jordan aims at promoting the principles of industrial engineering within the industrial sector, establishing links with the industrial sector and identifying and solving problems facing industrial enterprises. The strategy of the OCP emphasizes the fieldwork approach, where the university reaches out to industry, not vice-versa; and (b) the role of universities and research institutes in promoting cooperation with small businesses in the fields of informatics and microelectronics is discussed. Specific areas where small businesses could develop competitive advantage are identified. This paper also discusses some of the suggestions related to improving the qualifications of personnel -- also required for enhancing the competitiveness of small firms.

II. ENTREPRENEURSHIP IN SMALL INDUSTRIES IN THE ARAB COUNTRIES

by Naila Haddad*

A. Entrepreneurship and development

"The economic history of the period just makes no sense unless innovation played a major role ... innovation being by definition, the output of initiating entrepreneurship."[1/] Indeed, ever since Joseph Schumpeter accorded entrepreneurship a central role in his theory of development, the study of entrepreneurs and entrepreneurship and their role in the economy in general -- and in economic development in particular -- has been given increased attention. Joseph Schumpeter considered entrepreneurship a major factor of production, together with capital, labour and rent. According to him, the entrepreneur is conceived of as the innovator, the initiator of new combinations of resources, or the introducer of new products to new markets. Schumpeter also viewed the entrepreneur as a person who, owing to exceptional personal traits, carried through innovations important to both industry and the economy.

Post-Schumpeter literature tended to ascribe to entrepreneurs and entrepreneurship a wide range of potential or real contributions -- methods through which they could affect the economy and the development process. These range from their role in raising productivity through technical and other forms of innovation, to their role in job creation, the transfer of technology and the commercialization of new inventions and products. They are also able to help in the restructuring and transformation of economies, and in reducing the "ossification" of established social institutions and the concentration of economic power by making markets more competitive. Moreover, inter alia, they stimulate the redistribution of income, wealth and power; create new markets; and facilitate the expansion into international markets. It is argued, however, that the most important contribution of entrepreneurship to development is that it is a low-cost strategy for economic development, job creation and technical innovation.[2/] Entrepreneurs tend to bear the costs and risks of launching a new venture, developing a new product, commercializing an invention, adapting a new technology and developing a new market; thus, they either succeed, contributing to development, or fail and disappear from the market.[3/]

Affected as they are by the circumstances mentioned above, entrepreneurs are more sensitive to the discipline of the market-place. They also tend to find resources and fill market gaps that would be missed by larger, more bureaucratic organizations.

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Moreover, the owners/managers and their families tend to put more effort into their work than the hired labour in large firms. And finally, they offer a cost effective strategy for development because they are an integral part of their economy -- unlike foreign firms, which tend to be attracted only by the provision of special investment incentives and arrangements, thus increasing development costs.

Entrepreneurs and entrepreneurship are affected, by and large, by the state of the economy. One can argue that there is a dialectical relationship between the level of development the economy has achieved and entrepreneurship; however, this relation is not yet very well-defined and continues to be immeasurable. According to some writers, entrepreneurial activity tends to expand with economic development; but which affects what and in what sequence and by what mechanisms is not defined or measured. The same writers claim that the entrepreneurial function varies according to the level of economic development -- in terms of both quantity and quality. While some place more emphasis on pure innovation and early imitation in a well-developed economy, others emphasize the importance of management skills in the developing countries.[4/] It is argued that the mere introduction of an innovation adapted to suit local conditions in a developing country is by itself a creative and innovative mechanism; "Perhaps, more important than a creative or primary form of innovation introduced only infrequently and in a few isolated cases, is a much more frequent and more widely diffused introduction of derivative innovations -- indeed, of mere adaptation to local conditions and imitation of innovations generated outside the underdeveloped locale".[5/] Hence, more emphasis may be placed on the adoption of new combinations and effective organizations, rather than limiting innovation to the narrow definition supplied earlier by Schumpeter.

Based on this broader definition, innovation includes a wide range of decisions and responsibilities that a business leader must consider; these are related to technology, organization, market research, public relations, employment, coordination of productive inputs and management.[6/]

Another point to consider is where the entrepreneurial spirit is likely to manifest itself in the economy, and whether its range of activities tends to fall within the productive sectors of the economy or not. Entrepreneurship is sometimes practised in ways that are unproductive -- if not downright destructive; much of this is unnecessary. The directions and manifestations it assumes are largely dependent on the incentive/reward structure available, as well as on the social, economic and technological setting it functions within.[7/] Combined, these tend to direct entrepreneurship towards specific activities within the various sectors of the economy (productive as well as non-productive), depending on the strength of the positive or negative factors and incentives provided by these sectors and activities.

Acknowledging the relevance of the environmental setting as a determinant, one might suggest that the final outcome depends on the combination of (a) the set of rewards and incentives provided by the environment, and (b) the set of motivational and personal traits of the entrepreneur himself,[8/] these being very complex, individual and possibly strongly related to his/her background and upbringing, among other things.

There are two relevant questions at this juncture: first, which factors are the more important determinants in entrepreneurship (e.g., social or economic); and second, are the personal traits that Schumpeter referred to innate or acquired, and to what extent does society help shape them? Scholars have expressed a number of different opinions on these matters; some emphasize the economic factors, while others stress the socio-psychological factors, assigning different weights to each, and accordingly suggesting a different set of measures to enhance entrepreneurship in a given society, depending on the focal points of their initial premises.[9] It seems safe to assume that a combination of both social and economic factors (and the outcome of their interaction) affect entrepreneurship in a certain way at a given time and place, for "reality is an unbroken totality ... and is not compartmentalized into social and economic spheres". It thus becomes very difficult to isolate the factors that affect entrepreneurship in an absolute manner. Acknowledging this, the impact of these factors on reshaping personal traits, whether innate or acquired, becomes self-evident, though not in a quantifiable manner.

B. Initiation of the private manufacturing sector in the Arab world: a historical review

The creation of modern industries in the Arab countries is not as recent as some might claim. Arab industrialization began with Mohammed Ali, who ruled Egypt during the first half of the nineteenth century. He was greatly impressed, affected and motivated by the European Industrial Revolution, and considered the industrialization of Egypt as a means of achieving political and economic independence from the Ottoman Empire. For this purpose, cotton, wool and silk mills were set up (Egypt being a major producer of cotton), as were sugar and glass factories, iron foundries, paper mills and printing works, tanneries, rice and oil mills, and even arms and ammunition factories and shipyards. He also provided support services, setting up technical schools and arranging for training scholarships to send students to Europe to acquire the modern technical and managerial skills needed to run these industries. Even though the industries he set up were State industries, he can be said to have captured the spirit of entrepreneurship, with his introduction of industrialization and new forms/modes of production, and with his motivational aspirations. His industrial empire witnessed a collapse after the British arrived in 1838 and forced him to end his monopoly over the industries he had established. His immediate successors were not as enlightened and qualified as he was, and this led to the decline of these industries and of industrial progress in Egypt.

The 1920s witnessed the revival of the industrial sector in Egypt and in other Arab countries such as the Syrian Arab Republic and Lebanon, though forms of ownership within this sector differed from one country to another. In Egypt, for example, industrialization was initiated to a large extent by Banque Misr -- specifically, by its founder (Talaat Harb) and its director (Ahmed Abboud). Banque Misr was for four decades the only wholly owned Egyptian finance house, but more importantly, it functioned during that period and even afterwards as a progressive industrializer in Egypt. Banque Misr was behind the establishment of many affiliate industries -- textiles, mining, pharmaceuticals, building materials, etc. -- as well as other affiliates in the services sector. Ahmed Abboud purchased the electricity company and set up sugar and fertilizer industries. He also purchased the commercial Khedive Shipping Company. It is said that many of today's

Egyptian industries are successors of these enterprises. Despite this, private investment in the industrial sector in Egypt remained low compared to public investment during the 1940s and 1950s. During the period 1945-1958, the public sector provided around 45 per cent of the capital for the companies that were established by the Permanent Council for Production (Al-Majlis Al-Da'em lil-Intaj). Capital invested in these industrial projects was estimated at 37.7 million Egyptian pounds (LE) -- LE 17.3 million from the public sector, LE 2.3 million from the industrial bank, and the rest in the form of public shares. By contrast, the private capital invested in the industrial sector and outside the range of these companies did not exceed LE 5.08 million during the period 1945-1956.[10/] This figure is decidedly low when compared to the private investments made in construction -- amounting to LE 40 million in 1954, LE 52.3 million in 1955, and LE 51.4 million in 1956.[11/] According to the literature on the subject, the hesitation of private entrepreneurs or "capitalists" in Egypt to invest in the manufacturing sector was attributable mainly to their social origins and class; most were non-Egyptian by origin, with acquired nationality (al-Mutamasireen), and there were also some Lebanese, Syrians and Palestinians. These groups awaited the net result of the battle with the colonizers before deciding on their course of action, and preferred to invest in real estate.[12/]

Lebanon and the Syrian Arab Republic, on the other hand, possessed some effective resources in the industrial sector prior to the aftermath of World War II. This was especially true in Lebanon, where entrepreneurship was a phenomenon that characterized the country, though not necessarily in the industrial sector.[13/] Lebanon also attracted many industrialists from neighbouring countries, especially after the introduction of State capitalism into the region.[14/]

The Maghreb (North African) countries are reported to have witnessed some entrepreneurial activities during the above-mentioned period, but these were mainly initiated by the Europeans, who were part of the ruling entities then, rather than by national entrepreneurs.[15/]

Entrepreneurial activity in Iraq was sadly lacking, as a result of the major upheavals within the country during the period just discussed.[16/]

In the 1960s and 1970s, two major events curbed private entrepreneurial expansion: the adoption of socialist systems in some Arab countries (including Egypt, the Syrian Arab Republic, Iraq, the Libyan Arab Jamahiriyah and Algeria, and to a lesser extent Tunisia and Sudan); and the discovery of oil in some Arab countries. These two events greatly impeded the growth and expansion of entrepreneurial activity in the region. The former group of countries adopted certain ideologies which did not support large-scale entrepreneurial activity; although it allowed for small-scale activities, the investment climate was not encouraging.

In Egypt, the nationalization process did not take place overnight, but rather occurred in stages. The Suez nationalization in 1956 was a measure taken against the colonial powers -- and the buying-off of foreign companies was not necessarily undertaken by the public sector. It was rather the nationalization of Banque Misr, its affiliates and other national enterprises, as well as the passing of new legislation pertaining to taxes,

rents, foreign exchange, etc., that led to the shrinking of private investment -- especially in the manufacturing sector, where high levels of uncertainty prevailed.

The discovery of oil in some countries most often led to increased State and public-sector roles, mainly because of the accumulation of oil revenues and the subsequent huge increases in public spending and investment. Although some of these countries such as Saudi Arabia and the Gulf States have undertaken measures -- and even offered incentives -- to encourage the private sector to take advantage of investment opportunities in the industrial sector,[17/] industrial entrepreneurial activity continues to lag behind in these areas. Some of the socio-economic factors responsible for this situation will be discussed later.

C. The current state of entrepreneurship in the Arab countries

In most of the Arab countries at present, the manufacturing sector is dominated by the public sector and a public entrepreneurial spirit, especially in heavy and large-scale industries. Notwithstanding the different political and economic conditions the various Arab countries have experienced, the private sector in general tends to engage in small-scale industrial activities. These small-scale enterprises are best characterized by the continued dominance of the production of food and textile products; by obsolete technology; and by high rates of capacity underutilization in many areas, including the cement, iron and steel, and food industries. They also suffer from low overall productivity (especially with respect to labour), exacerbated by generally limited business and marketing skills. It is also reported that they tend to suffer from high investment and operating costs and a huge dependence on foreign markets for the provision of both capital goods and spare parts.

During the last two decades, however, the manufacturing sector has witnessed some structural changes, manifested in the decline of the share of food industries in total manufacturing value-added (MVA), from 24.9 per cent to 20.7 per cent, and of textiles, from 26.4 per cent to 21.1 per cent, during the period 1975-1986. On the other hand, basic metal products and the production of machines and tools witnessed an increase from 10.4 to 14.6 per cent and from 8.8 to 12.0 per cent, respectively. Despite these changes, the share of food products, textiles and chemicals continue to dominate the Arab manufacturing sector. Moreover, the share of consumer goods in MVA dropped from 59.5 to 48.5 per cent, compared with 33.0 per cent and 30.2 per cent in developed countries during 1975 and 1985, respectively.[18/]

It is important to note that the manufacturing sector's general contribution to gross domestic product (GDP) did not exceed 10.7 per cent during the period 1984-1989. Keeping in mind that the Arab manufacturing sector includes industries related to oil refining, natural gas, petrochemicals, fertilizers and cement -- which are most often considered large-scale industries and/or are owned by the public sector -- one can infer the range of activities left for small-scale industries and private businesses, and consequently, their contribution to gross national product (GNP). No clear-cut data on the contribution or participation of the private sector are available to reflect the share of its contribution to MVA. Even if these data were available in some countries, they would not necessarily

reflect the size of companies, capital invested, forms of activity, manpower and technology employed, or the type of ownership (for example, single proprietor, partnership, or corporation).[19/] Moreover, information is not available on the degree to which these industries are of an entrepreneurial nature -- manifested in the new modes of production employed, the adaptation of new technologies, and the existence of modern organizational forms and structures.

One can easily conclude that industrial actifity in the Arab world is dominated by the public sector, both in the oil and non-oil countries. Scholars tend to differ on the reasons for the private sectors' failure to invest in the manufacturing sector, and especially in activities of an entrepreneurial nature. Many blame the increased public-sector role and its varied implications within the different Arab economies. However, a question might be asked at this point: had the private sector been given a wider margin to participate in the economy, would it have invested more readily and/or more heavily in the manufacturing sector, and would this have been coupled with an entrepreneurial spirit? The question becomes increasingly relevant, now that many Arab countries have introduced restructuring policies which place more emphasis on the importance of the private-sector role and are calling for their increased participation in the productive sectors.

D. Some socio-economic aspects of entrepreneurship

Scholars have disputed the determinants of entrepreneurship, its supply and its success. Some give more credence to social factors, others to economic factors; there are two major hypotheses:

(a) Entrepreneurship in manufacturing arises in response to powerful economic incentives;

(b) Entrepreneurship in manufacturing arises in response to socio-psychological changes.[20/]

Those who stress economic factors tend to focus more on the size and sophistication of the market, the effectiveness of the distribution system, the availability of raw materials, and government policies concerned with decentralization and protection.

Others, however, emphasize socio-psychological factors in explaining entrepreneurial activity; these are exemplified in child education and rearing, resulting in the development of a society with a generally strong need for achievement or urge to improve.[21/] This society tends to produce more energetic entrepreneurs that bring about more rapid economic change. Some scholars attach more relevance to social change, evaluating psychological, sociological and anthropological factors to explain how technical progress occurs in a traditional society.[22/]

No matter how much weight is attached to any of these factors, it is important to remember that the net impact of any of these taken alone tends to change with time and place. It might rather be a package or a combination of these socio-economic factors that forms the right prescription for inducing entrepreneurship in a certain society or at a given

time. This prescription, however, might not necessarily be the right one for other societies at other times.[23/]

In general, the heavy reliance on the public sector's role in economic activity in the (oil and non-oil) Arab countries has discouraged private entrepreneurship. Furthermore, economic and institutional ideologies and attitudes have not been very conducive to the formation of private industrial entrepreneurship or to its expansion, especially in the small-scale industrial sector. Industrial activity, whether on a large or small scale, usually demands a certain willingness and ability to plan for the long run, to make long-term investments, and to await the flow of returns. It also demands the acceptance of low profit margins on annual returns in preference to something larger but probably much shorter-lived. It also calls for advanced technology, organization and coordination. Needless to say, political upheavals and change in the area have made long-range planning difficult, it not impossible, and have also made businesspeople unwilling to take calculated risks or to await returns in the far future. Investors, or those with capital, have instead tended to invest in activities characterized by immediate high profits, fewer and shorter-term investments, and little advanced technology.

As was mentioned before, another factor which is likely to have discouraged private industrial entrepreneurship (in both oil and non-oil countries) is the emergence of oil as a strong commercial resource; it has had a profound impact on government spending and investment, and the channels along which the oil revenues have been directed have been greatly affected by the governing social and economic structures and relations of production in the various countries.

Although the Governments in most of the oil countries adopted policies to encourage the private sector, the social and economic incentives provided were not enough to counteract other existing socio-economic factors in redirecting investments towards entrepreneurship. The socio-economic system provided more incentives for employment in the better-paid jobs in the public sector and in large-scale public-sector enterprises than it did for self-employment (starting private businesses). The same factors have also led to a heavy reliance on expatriate labour, particularly in the private manufacturing sector,[24/] thus compounding the disadvantages. The situation has been further aggravated by the dependence on expatriate management and skilled labour.

Furthermore, ownership regulations in the Gulf Cooperation Council (GCC) countries have led to the rise of the sponsorship system, which has discouraged nationals from engaging directly in entrepreneurial activities. These ownership regulations require that at least 51 per cent of a company is owned by a GCC national. "In a proportion of cases the Gulf Cooperation Council national is a so-called sleeping partner, deriving a regular monthly royalty from the enterprise but acting as a sponsor for an expatriate partner.[25/] The sponsor's share of the company's profits is usually in the range of 50-80 per cent.[26/] In addition, the system allows for maintaining a large number of sponsorship arrangements, with benefits generally proportionate to size and profitability; these circumstances do nothing to encourage national participation in activities of an entrepreneurial nature.

Oil has taken its toll on non-oil countries as well. The oil boom generated a huge labour and manpower movement from these countries towards the oil countries -- especially in the Gulf. Job opportunities were open to those in all occupations and at all skill levels. During the 1950s and 1960s the majority of the immigrants were highly skilled professionals such as doctors, engineers, accountants, teachers and professors; however, the removal of immigration constraints led to a formidable increase in immigration, both in size and in the variety of skills, to include new categories of manpower -- unskilled and semi-skilled labour, peasants, and labourers from the informal sector.

It is evident that immigration to the oil countries has played a major role in facilitating social mobility, "for it formed to many the winning lottery ticket, by means of which the immigrant aims at overcoming poverty, economic pressure, and social marginality ... while for the higher educated and professional strata it offers a golden opportunity for the mobility to a higher and a more prestigious status".[27/] This social mobility has become increasingly apparent within the various Arab societies, as class segmentations and barriers have largely been overcome. More importantly, the remittances sent by the immigrants progressively formed the backbone of the economies of their home countries.

Despite the huge amount of savings which resulted from migration, return migrants tended to reinvest their accumulated savings by purchasing agrarian land, building new houses, or refurbishing already owned houses; the remaining resources were directed towards setting up small businesses. These small businesses, however, tended to involve cattle- and chicken-raising; the purchase of irrigation pumps, trucks, or cargo vehicles for those of an agrarian background; the opening of small shops to sell imported goods, ranging from spare parts to food products; or the purchase of a taxi for those of urban origins. Those with middle- or upper-class backgrounds such as ex-government office managers tended to reinvest their savings in small-scale businesses in the trade and services sector, rather than in manufacturing. Skilled labourers tended to work as contractors. Those in professional occupations tended to reinvest their savings in real estate or rental units, or to keep them in the form of bank deposits, bonds, or shares.

The extent to which ethnic, religious/sectarian, class, original occupation, and educational background influence the reinvestment of these savings cannot be quantified. However, available social and anthropological literature informs us that the prevailing cultural norms and values continue to play a role in determining occupational status, despite the fact that Arab societies in general have long been undergoing a process of change. Hence, upon return, the trend for those coming from the lower social classes and strata has been to be self-employed, either by opening small businesses or by acquiring land, depending on their respective urban or rural origins. These moves tended to emphasize the change in their social status, arising from a change in their economic status.[28/]

Religion, cultural norms, and class formation have traditionally influenced -- and continue to affect -- gender issues, preventing women in most Arab countries from engaging in economic activity. Despite the change in attitude in some countries towards the participation of women in such activity, the fact remains that entrepreneurship requires a set of behavioural qualities[29/] that do not necessarily conform with -- and may even

oppose -- the prevailing social norms and conventions. Moreover, it demands mobility in the market which, for women, is highly restricted or even prohibited in most Arab societies.[30/] "Traditionally, only necessity could justify a woman's presence outside the home, and no respect was even attached to poverty and necessity. Respectable women were not seen on the street".[31/] Modernization will likely provide some relief; at this point, female entrepreneurship often exposes women to a great deal of public harassment. Higher education and higher class background may, however, provide something of a cushion.[32/]

The nature of the Arab family further constrains the entrepreneurial spirit. Arab families in general continue to be patriarchal and extended,[33/] affecting both the making and accepting of decisions, and placing a further burden on the dependants affected by these decisions. Although the extended family facilitates entrepreneurship by providing funds for initial capital and apprentice training, it can also divert resources to cover current expenditures, and exert pressure against risk-taking, innovation or the delegation of authority. Moreover, family affiliation demands that the person discard his individuality and sense of individual achievement for the benefit of communal achievement and conformity with the group.[34/]

Although research has established a positive relationship between the spread of education and entrepreneurship, its impact has been rather minimal in the Arab countries. The great strides made in education have not produced many tangible results. Moreover, the human-capital formation that has resulted from higher levels of education has not led to the acquisition or development of technology in the Arab countries.[35/] The inadequacy of the political, social, economic, educational and technological strategies and policies adopted have led to the marginality of scientific research and innovation in Arab societies. Moreover, the lack of appropriate technological policies has resulted in the failure to exploit domestic resources, leading in turn to a huge dependence on imported technology; this is especially true in the case of turnkey projects which do not have conditions requiring subcontracting with national firms, the employment of indigenous experts, or the provision of management skills or other training. These policies have undermined the probable demand for the products that local small-scale industries could have provided through subcontracting; they have also undermined the acquisition of technological know-how and technology transfer, the development of local scientific research and experience, and the development of managerial skills.

E. Some comments on future policy issues for the promotion of industrial entrepreneurship in the Arab region

The private sector has played a minimal role in entrepreneurial activity in the Arab region. The public sector, in both oil and non-oil countries, has dominated most of the industrial activity during this century. Although there were times in recent history when some private entrepreneurial manufacturing activities were carried out, they did not develop into a real economic force; nor were they able to create a "class of entrepreneurs". On the contrary, private entrepreneurship in manufacturing still lags way behind in the region.

If effective policies for the promotion of private industrial entrepreneurship are to be formulated, it is imperative that decision makers consider the reasons that have

prevented or interrupted the evolution and development of private entrepreneurship in the Arab countries. Political, economic, social and psychological factors significantly affect the formation, growth and expansion of entrepreneurship. Hence, any strategy or policy for its promotion must take all of these factors -- and the results of their interaction -- into consideration. Moreover, there is no ready-made prescription for inducing entrepreneurship, despite the fact that there may be great potential in certain societies for its success. Entrepreneurial insight is needed to choose the right combination of measures necessary for its promotion and development.

It is important to assign weights to the various factors that tend to encourage or discourage entrepreneurship in certain societies; however, this would require extensive and in-depth empirical research within the Arab countries themselves. Although much research has been done on the manufacturing sector, basic data on the private manufacturing sector are still lacking in most Arab countries. Moreover, information on the forms of ownership, types of industrial activity, sizes of firms, technology employed, and capital/labour ratios is generally unavailable. A further step would be to evaluate existing data on the type and quality of existing entrepreneurs, as well as social and economic background, class origin, nationality, religion, level of education, and motivational aspirations. A study of their relationship with their economic and social environment is necessary before the forces that affect their functionality -- either positively or negatively -- may be determined.

Two major events can be said to have inhibited the growth of private entrepreneurship in manufacturing throughout the Arab region: the discovery of oil (which has created a unique development situation in the world),[36/] and the coming to power of socialist regimes in some countries. Since 1988, however, there has been a change in the trends and practices that prevailed between 1970 and 1984, as a result of declining oil prices, depressed economic conditions, and growing indebtedness (even in some oil countries). Many Arab countries have resorted to introducing restructuring policies -- guided by the International Monetary Fund (IMF) -- to meet these challenges. It should be kept in mind, however, that a legacy of legislative, economic, and socio-economic deterrents must still be dealt with -- and the impact of external challenges and political stability not forgotten -- if entrepreneurship is to flourish.

There is one last remark to be made regarding the introduction of certain training programmes, based on intervention policies, that are designed to create achievement motivation among a group of trainees.[37/] These could be important, though not necessarily sufficient, especially in developing countries where the political climate is uncertain and the institutional set-up is underdeveloped. The nature of family and social relationships and the inaccessibility to resources could also undermine the effectiveness of such programmes. Locating the appropriate target groups for whom such programmes would be administered thus gains relevance. Control groups should also be formed to evaluate the success of such programmes and to adjust the content and/or venue as necessary through comparison of data and depending upon the progress of the trainees.

Footnotes

1/ William J. Baumol, Is Entrepreneurship Always Productive?, p. 91.

2/ Dennis Ray, "The role of entrepreneurship in economic development", p. 4.

3/ Ibid.

4/ See William J. Baumol, Is Entrepreneurship Always Productive?; and Peter Kilby, "Breaking the entrepreneurial bottle-neck in late-developing countries."

5/ Yusif Sayigh, Entrepreneurs of Lebanon, p. 19.

6/ Ibid., p. 21.

7/ See William J. Baumol, Is Entrepreneurship Always Productive?

8/ These personal traits include having above-average intellect, extraordinary powers of intuition, a capacity to plan and to act, self-confidence and a taste for risk (E. Wayne Nafziger, "Society and the entrepreneur").

9/ See E. Wayne Nafziger, "Society and the entrepreneur".

10/ See Ibrahim Saad-Eddine Abdullah, "Egypt's experience with the public and the private sectors, and future of the experience", p. 232.

11/ Ibid.

12/ Ibid.

13/ According to Yusif Sayigh's study (Entrepreneurs of Lebanon, pp. 52-53), trade dominated the structure of their activities.

14/ Yusif Sayigh, The Determinants of Arab Economic Development, p. 70.

15/ Ibid., p. 70.

16/ Ibid., p. 71.

17/ Through the provision of credit, industrial estates, low rents, etc.

18/ League of Arab States and others, Unified Arab Economic Report, 1991.

19/ Though available data show the form of ownership as being corporate in some cases, it does not necessarily have to be so in reality; in many cases single ownerships are registered in the form of corporations by including the names of wives, brothers, sons, etc.

20/ See E. Wayne Nafziger, "Society and the entrepreneur".

21/ As McClelland and Hagen (see note 20).

22/ See note 20.

23/ Yusif Sayigh argues that it is more reasonable to assume that entrepreneurship is a system of action that changes form as time passes; different countries will be passing through different stages in the evolution of the system at any moment in time. (Yusif Sayigh, Entrepreneurs of Lebanon).

24/ For example, in 1981 the proportion of non-Saudi labour in Saudi Arabia in the private manufacturing sector was 91 per cent of total labour; see United Nations Industrial Development Organization (UNIDO), "Small- and medium-scale industry in the GCC region", p. 14.

25/ Ibid., p. 45.

26/ Mahmoud Abdel-Fadil, "Social patterns and class formations in the Arab homeland", p. 169.

27/ Ibid. (writer's translation), p. 183.

28/ "... many return migrants of Yemen tended to invest their savings in the setting up and management of small businesses such as workshops of car repair, carpentry, and aluminium moulding, etc. ... hence they acquired a new social status resulting from their new economic status". It is worth noting that the bulk of Yemeni immigrants originated from a social class which used to be looked down upon, because they were not descendants of the major tribes and clans of Yemen. They usually engaged in artisan and craft occupations, and that is why they are called "Nukkas: Muzaianah or Sunaa", reflecting their lower class and social status" (Ibid., p. 184).

29/ Characterized by shrewdness, quick judgement, gregariousness and force of personality (see E. Wayne Nafziger, "Society and the entrepreneurs").

30/ Fatima Mernissi, Beyond the Veil, pp. 84-85 and 142-147.

31/ Ibid., p. 43.

32/ Nadia Hijab, Arab Woman -- a Call for Change, pp. 112-113.

33/ Halim Barakat maintains that not only is it patriarchal and extended, but it also forms the nucleus for production and social relations. It is the nucleus of the social system and centre of economic activity ... and forms the medium between the individual and society in general. Moreover, it is characterized by a pyramid structure relative to age and gender (Halim Barakat, "Contemporary Arab society", pp. 171-197).

34/ Ibid., pp. 348-349.

35/ Antoine Zahlan maintains that the Arab world does not lack skilled persons, scientists and engineers; what is lacking is the proper technological policies and economic and social environment to employ and benefit from these available skills (see Antoine Zahlan, "Technology transfer in the Arab world").

36/ See Riad Tabbarah, "Development with unlimited supply of capital: an Arab experience; economic, social and demographic consequences".

37/ To expand on the concept of achievement training, refer to Sabine Hartig, "Entrepreneurship training..."; and Eduardo Canela, "Start your own business: outline of the training concept"; also refer to United Nations, Economic and Social Commission for Western Asia (ESCWA), "Promotion of entrepreneurship...".

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III. CHARACTERISTICS OF ENTREPRENEURS: A PORTRAIT OF JORDAN

by Nasim F. Barham*

A. Introduction

Industrial development in most Arab countries is still limited, and a number of problems exist which involve the development of appropriate technology, adequate financing, and product marketing.

To overcome such obstacles, Arab countries generally concentrate their efforts in the areas of finance and infrastructure, which improves facilities but does not create or promote the spirit of enterprise. The creation of entrepreneurs -- who must be recognized as a vital force in the industrialization process -- must therefore become a priority in the economic development plans of these countries. To achieve this aim, the qualities of existing entrepreneurs should be studied.

This paper attempts to present the characteristics of industrial entrepreneurs who operate in small-scale industries (5-25 employees). It presents the initial findings of a general study on small- and medium-scale industries in Jordan. The study's survey of enterprises includes all of the manufacturing industries in the Amman Industrial Estate in Sahab, as well as those industries located on the main street of Marka-Zarka. Only those industries with between 5 and 25 workers were chosen and analysed for the purposes of this paper.

The study comprises four parts. The first (section B) traces the historical aspects of Jordan's socio-economic development which helped create the conditions for industrial entrepreneurship.

The second part (section C) reviews the characteristics of entrepreneurs in small-scale industries, focusing on occupational mobility (both inter- and intra-generational). The correlation between entrepreneurship and age, education, migration, family status and other factors will also be discussed; this section is based on an analysis of the data collected from the Amman Industrial Estate in Sahab and from various cities in Jordan.

The third part (section D) attempts to analyse the performance of entrepreneurs involved in technology and the product cycle -- specifically, that which affects the ability of industry to compete both locally and abroad. Capacity utilization, marketing and industrial ties will be explained.

The last part of the study (section E) deals with the problems facing entrepreneurs, and is followed by a conclusion.

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B. Socio-economic development of Jordan

The following analysis of socio-economic development in Jordan will outline those basic factors and conditions which constitute the background of industrial entrepreneurs.

Jordan was a peripheral part of the Ottoman Empire until the end of the First World War. Agriculture in the sub-humid and semi-arid areas (a narrow zone extending from Irbid in the north to the area south of Kerak) was the main activity. The arid zone, comprising the Jordan Valley and the eastern part of Jordan and constituting more than 90 per cent of the whole area of Jordan, was dominated by nomads with their livestock. Both agricultural and livestock-holding activities allowed the small population of Jordan to attain self-sufficiency. Urbanization, which normally occurs as a result of industrialization, was very weak; in fact, industrialization in Jordan was a result of urbanization rather than its cause. Small cities located along the border between the desert in the east and the arable land in the west acted as marketplaces for both of the aforementioned activities -- especially in the city of Salt, which had about 20,000 inhabitants in the early 1920s. Handicraft and micro-industries were distributed at rates in line with the population density.

After the establishment of the Emirate of Trans-Jordan in 1921, most economic activities shifted to the tertiary sector -- especially the Government. Thousands of people became State employees, joining the army, educational and administrative institutions, etc. Meanwhile, immigrants from the Syrian Arab Republic and Palestine in the mid-1920s continued to build the potential for developing industrial entrepreneurship. Migration to Jordan increased the population from 586,885 to 2,147,594 by 1979 -- a hike of 266 per cent.

At the beginning of the migration phase, there was neither the market nor sufficient know-how in the country to stimulate industrial development. Therefore, both merchants and agencies for foreign firms assumed a dominant role -- one they retain to this day.

Real industrialization in Jordan began in the 1950s. Large-scale industries such as cement and phosphate mining were run by the Government. Micro-scale industries and handicrafts were very limited and weak; small- and medium-scale industries were almost non-existent. Industrial entrepreneurs were very rare, and investments in manufacturing were avoided. At that time, work in the oil countries became more attractive, and emigration was set up; the chance of earning money there was better, easier, faster and risk-free.

Industries that were established in the last three decades started with and remained at the standardization phase of the product cycle -- characterized by minimal profits, stable technology and the routine work done by unskilled labour. This structure did not create the proper conditions for entrepreneurship, however.

At the end of the 1980s, Jordan faced an economic crisis; large debts ($US 8,000 million), the lack of hard currency, the halting of the remittances of Jordanians working abroad, and the high rate of unemployment were some clear factors. These circumstances

led to the devaluation of the Jordanian Dinar (JD), and to the imposition of some strict import regulations. A new policy was set up to help restructure the Jordanian economy. Investment in the manufacturing industry became more attractive and efficient. Moreover, many merchants shifted to industry, meaning that the undeclared war between trade and industry in Jordan could come to an end. In addition, educated people who had worked abroad or who had graduated in the preceding few years (and whose immigration or employment chances were limited) started their own businesses. It is these developments which will create and promote Jordanian entrepreneurship. In the same manner, the Government of Jordan has developed a rather advanced policy that encourages entrepreneurs (through incentives) to invest in the manufacturing industry.

C. The characteristics of Jordanian entrepreneurs

1. Structure of the labour force

In the last three decades, Jordan has experienced a crucial shift in its sectoral labour-force distribution. Employment in traditional activities such as agriculture has decreased, while the relative importance of the manufacturing industry has increased. Nevertheless, employment in government services has remained dominant. Table 1 reflects these developments.

Nowadays, the manufacturing industry employs more than 80,000 people, or 12.75 per cent of the working population. The role of the manufacturing industry in absorbing additional employees is obvious. The table figures indicate that the economy and the society of Jordan are witnessing a transition towards industrialization.

In the micro-industries (those with less than five employees per enterprise), inter-generation occupational transition is more pronounced; the father was a farmer but the son became a blacksmith. In small, medium-sized and large industries, occupational change has not included the traditional occupations. The father, for instance, was a merchant or carpenter, while the son is an industrial entrepreneur.

A study of the entrepreneurs revealed that inter- and intra-generational occupational changes have indeed occurred. To illustrate, table 2 shows the occupations of the fathers of the entrepreneurs.

The occupational changes from father to son did not reflect any pattern -- the only exception being industrialists and farmers, whose sons chose their first jobs in industry. The dropout rate from farming jobs was remarkable, with this occupation vanishing totally among the farmers' sons. The sons of men in other occupations did not tend towards certain occupations; even among merchants, mobility was not towards the same job as the father or towards industry. Only in handicrafts did sons follow fathers and remain in the same occupation.

The main feature of intra-generational occupational change for the industrial entrepreneurs is that of upward mobility -- much more so for them than for their fathers. Not one of the entrepreneurs, for instance, was engaged in agriculture before shifting to

Table 1. Occupational classification of the working population in Jordan, 1961, 1979 and 1989

Activity	Employees, 1961	Percentage	Employees, 1979	Percentage	Employees, 1989	Percentage
Agriculture	72 977	33.5	46 728	11.5	37 692	7.2
Mining and manufacturing industries	22 278	10.2	34 935	8.6	77 817	13.3
Water and electricity	925	0.4	2 472	0.6	7 329	1.4
Construction	22 187	10.2	52 645	13.0	50 780	9.7
Trade	17 452	8.0	41 541	10.3	53 398	10.3
Transportation	7 624	3.5	28 977	7.2	46 068	8.8
Finance	--	--	8 673	2.1	16 229	3.1
Government services	74 398	34.2	189 203	46.7	275 564	49.2
Total	217 840	100 %	405 274	100 %	523 505	100 %

Source: Jordan, Ministry of Agriculture, and Food and Agriculture Organization of the United Nations (FAO), 1991, p. 6; also, Amman Chamber of Industry, Statistics on Jordan, 1992, p. 1.

Note : "--" signifies that the figure is nil or negligible.

Table 2. Occupations of the fathers of industrial entrepreneurs in Jordan

Occupation	Frequency	Percentage
Merchant	17	21.3
Farmer	14	17.5
Government employee	12	15.0
Handicraftsman	7	8.8
Professional (engineer, banker or the like)	4	5.0
Industrialist	4	5.0
White-collar worker	4	5.0
Blue-collar worker	1	1.2
None	13	16.2

Table 3. Intra-generational occupational mobility of entrepreneurs in Jordan

Occupation	Frequency	Percentage
Farmer	--	--
Professional	25.0	31.0
Industrialist	22.0	28.0
Merchant	10.0	13.0
Government employee	6.0	7.0
None	17.0	21.0

Note: "--" signifies that the figure is nil or negligible.

industry; the majority came from professional occupations or started from the beginning with industry. More than 50 per cent of the entrepreneurs possessed occupational stability, including those who were employed in industry and entrepreneurs who started with an industrial enterprise as a first job. Table 3 reveals the last jobs the entrepreneurs had before starting their own enterprises.

2. Education

In Jordanian society, as in most Arab countries, academic education provided the means for equality between the rural and urban populations and for upgrading social status. Further, higher education enabled the study's respondents to get reasonable jobs both inside the country and abroad. Medicine, engineering, law and teaching were the dominant occupations one aspired to or strove for. Vocational schools and training were (and still are) insignificant in the collective mind of the population. This explains the high level of education in Jordan (see table 4).

It is remarkable that more than half (53 per cent) of all the entrepreneurs surveyed hold university degrees; three of them have Ph.D. degrees. On the other hand, the proportion of vocational school graduates is still very low. University degree holders are more involved in the chemical industries, which indeed require greater theoretical knowledge.

3. Age

Most industrial entrepreneurs in Jordan enjoy a high level of education, which is looked upon as a means of improving one's position in society. Moreover, working in the industrial sector is not the first choice for most Jordanians. For these two reasons, entry into industry occurs rather late. The average age at which entrepreneurs in Jordan established their enterprises was found to be 38. This may be compared to Lebanon or India, where the average age is 32. Table 5 presents the age distribution of the entrepreneurs.

There is no correlation between age and the type of industry or former occupation. A slight difference exists for the holder of a university degree, whose average age is 40. In cases where the son has the same occupation as his father, the entrepreneur (the son) is generally younger and in most cases is under 30. However, there is no correlation between age and entrepreneurship; enterprises can be established at any age. (It should be noted, however, that all entrepreneurs in the industrial sector are men).

4. Migration

The late entry of some societies into industry is related to several factors; one of these is the traditional status of the society. In such cases, the Government often establishes industries just to familiarize the population with the concept and to encourage them to invest in it. Traditionalism can be replaced by more modern thought and methods through training, education, communication, etc. Migration is also an effective means of achieving transition in society and of promoting the creation and development of an industrial sector. Manohar U. Deshpande (1982) states in his book on entrepreneurship in

Table 4. Educational background of the entrepreneurs in Jordan

Educational level	Frequency	Percentage
Compulsory	7	9
Vocational	4	5
Secondary	19	23
College	8	10
University	43	53
Total	81	100

small-scale industries that "The withdrawal of status respect may occur when a traditionally alike group is displaced by force from its previous status by another traditional group, or when any superior group changes its attitude towards a subordinate group or on migration to a new society ...". Status withdrawal has been considered an effective means of promoting creativity and innovation -- both of which are vital to industrial creation and growth.

The majority of the urban population in Jordan are immigrants -- especially in Amman and Zarka, which comprise the main industrial centres. It may thus be said that in Amman but their fathers immigrated to Amman from Damascus, the entrepreneurs in Jordan are the product of migration. The late industrialization of Jordan is due, inter alia, to the time needed for the immigrants to acquaint themselves with their new situation and country.

Of the 80 entrepreneurs included in the study, 38 (47.5 per cent) were born in Palestine (including the West Bank), 4 (5 per cent) of the respondents were born in Amman but their fathers immigrated to Amman from Damascus, Beirut and Baghdad, 14 (17.5 per cent) were born in Amman (but their fathers were immigrants from other Arab countries), 9 (11.3 per cent) were born in Arab countries such as the Syrian Arab Republic, Iraq, and Kuwait, another 9 were born in different Jordanian cities and moved to Amman and Zarka, and 6 (7.5 per cent) were born in Amman and did not migrate. All of those who moved or immigrated to Amman and Zarka (in this study) were born in cities. The role of the urban centre as, inter alia, a marketplace and a centre of finance and information affects the creation of entrepreneurs and generates ideas. This could explain the weak industrial development of the rural areas, even after the development of the infrastructure and the provision of generous incentives in the villages.

D. Entrepreneurial performance

1. Technology as a constraint on entrepreneurial performance

Entrepreneurs in Jordan and even in other developing countries suffer from a number of constraints which prevent them from achieving optimal performance. All

Table 5. Age distribution for Jordanian entrepreneurs

Age (in years)	Frequency	Percentage
Less than 30	28	35.0
30-39	26	32.5
40-49	16	20.0
50-59	6	7.5
60-69	3	3.8
70 and above	1	1.2
Total	80	100 %

entrepreneurs in Jordan imitate a well-known product. Even the high level of education has failed to generate new ideas or innovation by the entrepreneurs. Production begins from the standardization phase, which is characterized, inter alia, by high price competition (Watts, 1987). To achieve reasonable profits, entrepreneurs have to employ cheap labour with poor or no skills (figures I and II).

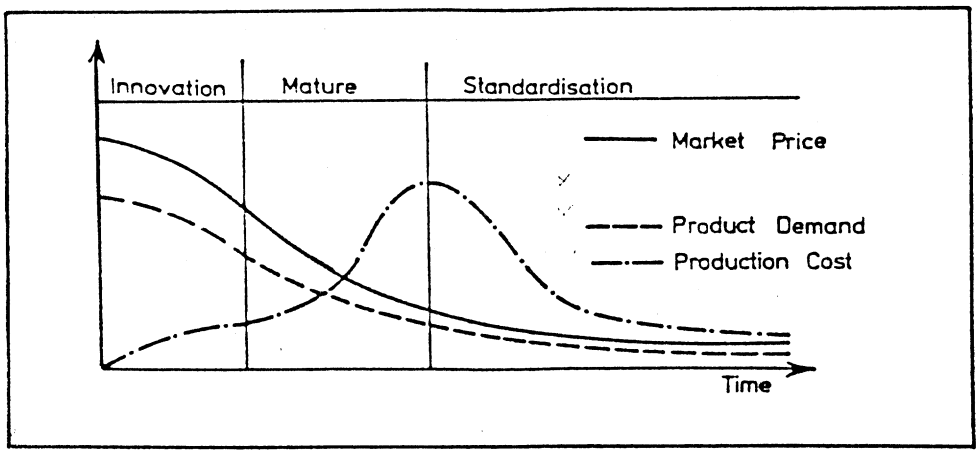
Employment with low wages causes a chain reaction which affects the whole industry negatively; some of the consequences are listed below:

(a) The industrial sector offers almost no motivation for the working population. Young people avoid working in the industrial sector because of its low wages and poor social status. A survey (carried out by the author) of 337 employees in the Amman Industrial Estate reveals that only 22 per cent of them have vocational skills. Their average wages are only 105 Jordanian Dinars (JD) a month -- which is below the poverty line, set at JD 108 by the Ministry of Social Affairs. Some 40.7 per cent of workers receive less than JD 100, while only 22.5 per cent earn JD 100 or more. The Ministry of Education forces pupils who get low marks on their comprehensive exams (50-55 per cent out of 100 per cent) to join vocational industry schools; the outcome of this effort is unsatisfactory, with the result that skilled technicians and specialists are rare. One third of the surveyed entrepreneurs complained about the dearth of skilled labour;

(b) Employees with low wages do not feel any loyalty to their work. Any offer of a slight increase in their wages might move them to change jobs. The entrepreneurs blame labourers for their disloyalty and high mobility. This problem was a common one, felt by all of the entrepreneurs interviewed;

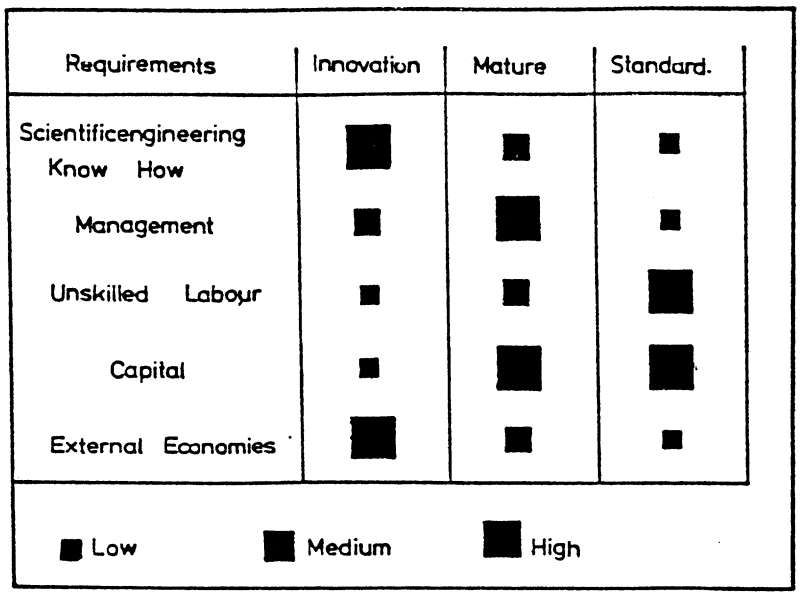
(c) Low wages do not lead to the creation of a middle class in the country. The purchasing power of manufacturing-industry employees and their family members remains weak; only necessary commodities can be bought. This is why food industries comprise the majority of local industries;

Figure I. Cost, demand and profit in the product-cycle stages



Source: Nuhn, 1987.

Figure II. The product-cycle and production inputs



Source: Watts, 1987.

(d) There is a severe contradiction in the structure of small and medium-sized industries in Jordan (as well as in most developing countries) caused by market weakness and its effect on the size of plants. Industries in the standardization phase rely on economies of scale just to achieve a minimum of profit. The weakness of the market, however, forces entrepreneurs to ignore the importance of economies of scale and even to under-utilize their facilities and operate below capacity. Only 20 per cent of the plants of the Amman Industrial Estate operate at full capacity; 30 per cent operate at less than 50 per cent of capacity; and 37 per cent operate at between 50 per cent and 75 per cent of full capacity (Barham, 1990). The raising of wages could tackle the market problem, but would decrease the profit of the entrepreneurs. Furthermore, the high rate of unemployment and rapid population growth make the interference of labour unions impossible;

(e) The standardization phase is characterized by fixed norms with regard to the technology used; there is no innovation or even modification of the products produced. This means that research and development (R and D) units are not necessary within the plants, and for that reason do not exist in Jordanian industries. Furthermore, relations with research centres are minimal. Indeed, research as such has no value in the collective mind of the business community, with the result that there is no linkage or interaction between universities or research centres on one side and the manufacturing industry on the other. The present expansion in the number and scope of universities in Jordan will not affect the manufacturing industry positively; local entrepreneurs will remain imitators rather than innovators. Most small-scale industries (furniture, clothing, etc.) rely on European and American catalogues for their design. Many industries in Jordan and in other developing countries could be described as "catalogue industries";

(f) The standardization phase depends on production lines which mass-produce products with fixed norms. This kind of product is not really required on the international market. Flexible specialization is generally the last change in the industrial structure, though local enterprises are by and large unable to follow recent developments, and thus remain in the standardization phase. Out of the 48 plants studied which employ 5 to 25 workers and are located within the Amman Industrial Estate, only 7 (14 per cent) have the potential to be flexible in their product production if it should become necessary.

2. Entrepreneurs' entry into industry

(a) Ideas and ownership of enterprises

Jordanian entrepreneurs in small-scale industries have a fairly good idea of the market and other circumstances which surround them; these form the basis of their behaviour.

Entrepreneurs get their product ideas from the market (56 per cent), from their experience in former jobs (28 per cent), from their fathers (6.2 per cent), and from their studies and friends (9.8 per cent). Their selection of small-scale industries is based on the limited capital they have and on the limited market.

The type of ownership is directly related to the size of the enterprise. Some 44.7 per cent of the enterprises with 5 to 9 employees belong to a sole proprietor. This proportion decreases to 35.7 per cent in enterprises with 10 to 19 employees and to 11.7 per cent for the plants with 20 or more workers.

The average number of partners varies from 2.2 in plants with 5-9 employees, to 3.6 where there are 10-19 workers, and to 4 partners where there are 20 or more employees. This means that the larger the plant, the greater number of partners.

The partnerships are generally made with close relatives such as a father or brothers. If it extends to friends, then the reasons for forming the partnership are different, and the continuity of the enterprise is doubtful.

The reasons for partnership generally involve a need for financing and lack of experience. Entrepreneurs in Jordan tend to finance their projects from their savings. It seems that entrepreneurs in small-scale industries avoid obtaining loans from banks. In enterprises with 5-9 employees, only 6 out of 38 respondents (15.7 per cent) obtained loans from banks. This proportion rose to 34.4 per cent for entrepreneurs who owned plants with 10-19 employees, and to 29.4 per cent for plants with 20 or more employees. All entrepreneurs -- even those who did not obtain bank loans -- complained about banking regulations, especially with respect to the guarantee system;

(b) Limitation of risk and the small size of enterprises

Entrepreneurs with small-scale industries avoid risk-taking by choosing small-sized plants. The relationship between education and the size of enterprises varies: 41.9 per cent of university degree holders started their businesses in plants with 5-9 employees, 34.9 per cent with 10-19 workers, and 23.3 per cent with 20 or more employees. Those with a vocational or compulsory education take very few risks. Table 6 shows the relationship between the level of education and the size of the enterprise.

In cases of success (after the "teething" period), entrepreneurs prefer to enlarge their plants; 80 per cent of them intend to do so, while 20 per cent intend to keep their plants the same size as when they started. The size of an enterprise is a response to the requirements of its roles of "satisfier" and "optimizer"; this behaviour needs to be further investigated;

(c) Marketing

Small-scale industries in Jordan have features similar to those of handicraft enterprises in terms of marketing. Entrepreneurs of these industries produce mostly custom-made products. Fifty-seven per cent of entrepreneurs produce on order, 8.6 per cent produce without orders (stock items), and the rest (21.4 per cent) employ both methods.

Marketing is carried out in different ways:

Table 6. Size of industries vis-à-vis the educational level of the entrepreneurs

Educational level	Size of the plants (number of employees)			
	5-9	10-19	20 or more	Total
Compulsory				
Number of entrepreneurs[a/]	6	1	--	7
Percentage I (→)[b/]	85.7%	14.3%	--	100%
Percentage II (↓)[c/]	14.6%	4.0%	--	8.6%
Vocational				
Number of entrepreneurs[a]	4	--	--	4
Percentage I (→)[b/]	100%	--	--	100%
Percentage II (↓)[c/]	9.8%	--	--	4.9%
Secondary				
Number of entrepreneurs[a/]	7	7	5	19
Percentage I (→)[b/]	36.8%	36.8%	26.4%	100%
Percentage II (↓)[c/]	17.1%	28.0%	33.3%	23.5%
College				
Number of entrepreneurs[a/]	6	2	--	8
Percentage I (→)[b/]	75.0%	25.0%	--	100%
Percentage II (↓)[c/]	14.6%	8.0%	--	9.9%
University				
Number of entrepreneurs[a/]	18	15	10	43
Percentage I (→)[b/]	41.9%	34.9%	23.3%	100%
Percentage II (↓)[c/]	43.9%	60.0%	66.7%	53.1%
Total				
Number of entrepreneurs[a/]	41	25	15	81
Percentage I (→)[b/]	50.6%	30.9%	18.5%	100%
Percentage II (↓)[c/]	100%	100%	100%	100%

Note: "--" signifies that the figure is nil or negligible.

a/ Number of entrepreneurs per plant size category.

b/ Percentage of entrepreneurs with this educational level who own a plant of this size (read horizontally, towards right margin).

c/ Percentage of plants of this size owned by entrepreneurs with this educational level (read vertically, towards bottom of table).

(i) Buyers coming to the plant (76.5 per cent);

(ii) Entrepreneurs distributing their products directly to the retailers (2.9 per cent);

(iii) Both methods mentioned above (11.8 per cent);

(iv) Through tenders (5.9 per cent);

(v) Through agents (2.9 per cent).

The smaller the plant is, the more localized the marketing framework tends to be. Some 88.8 per cent of the industries surveyed produce for the local market in Jordan; the others produce for both the local and Arab markets.

More than one third (35.3 per cent) of the entrepreneurs participated at least once in a trade fair held in Jordan, and only two of them participated in trade fairs in the Arab countries. The majority (58.8 per cent) of the entrepreneurs depend on their personal relationships in marketing their products; 14.7 per cent employ advertising; 23.5 per cent use both of these methods; and only 3 per cent provide more facilities or enlarge their markets.

E. Conclusion and recommendations

This study has made some relevant findings, summarized as follows:

(a) Jordanian society has been witnessing occupational changes which have led to an exodus from the farming sector and a move towards the services and manufacturing industries;

(b) The Jordanian entrepreneur tends to enter industry rather late (with 40 years of age being the average);

(c) The educational level of the entrepreneurs is high; 63 per cent of them have college or university degrees. However, their education has not been directly utilized or applied;

(d) Labourers in Jordan are abundant and work for low wages, but also possess few or no skills.

Entrepreneurial training such as that which the Economic and Social Commission for Western Asia (ESCWA) has offered in Amman over the last two years could improve the performance of both existing and "would-be" entrepreneurs. Emphasis must be placed, inter alia, on generating ideas, on preparation of the enterprises, and on marketing; this would upgrade the performance of the entrepreneurs and push young people to enter the industrial sector earlier.

Improving the quality of the vocational schools could upgrade the working population's level of skills and specialization.

With the high educational level of the entrepreneurs and the rather low wages paid to the employees, the opportunity exists for Jordan to create an important comparative advantage for itself, and to benefit from its geographical location, security, and well-developed infrastructure, as well as the generous incentives offered by the Government.

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IV. NEW-BUSINESS CREATION THROUGH THE COMPETENCY-BASED ECONOMIES, FORMATION OF ENTREPRENEURS: THE GTZ (GERMAN AGENCY FOR TECHNICAL COOPERATION) MODEL

by Rudolf Guthier*

A. Introduction

The last 10 years have seen a dramatic rise in development institutions' awareness of the need for creating wealth and distributing it more effectively and evenly in order to meet the basic needs of wider segments of the population. Some attention that was until now focused on the agricultural sector and on the promotion of big industries has shifted towards the important role small businesses play in the development of the national economy and as providers of employment opportunities. Small businesses are intermediaries between resources and consumers, and provide a multitude of services.

Entrepreneurs owning and operating small enterprises have taken centre stage in the promotional efforts aimed at small businesses. They generally serve a lower-income bracket and use dormant capital and indigenously available technology and resources.

1. GTZ involvement in small-business development programmes

GTZ has abstracted several lessons from its experience with its programmes in entrepreneurship development in the areas of small-business consultancy, technical training, credit, industrial-estate development, export marketing and appropriate technology:

(a) Do not promote a business just because it is small. More criteria for selection are required if one desires a higher success rate;

(b) Do not believe that the small entrepreneur cannot make it without the promotional institution. Thousands do it alone everyday. Therefore:

(i) Do not grow too large and do not try to provide everything. Some services are needed frequently, other only occasionally;

(ii) Do not work for entrepreneurs but with them. Spoon-feeding is for the sick and creates dependency; entrepreneurs need to be independent and work for themselves.

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Based on the above lessons, a full-fledged assistance package has been developed and successfully tested in the field by the Small-Business Promotion Project (SBPP)/GTZ. The success of the assistance package is built upon basic precepts for policies, strategies and methods that are feasible and adaptable for a variety of very different integrated projects involving rural and/or urban industrialization, rural and urban settlement, off-farm income generation, etc. These are as follows:

(a) Be selective in who is promoted and clarify why a certain target group is chosen. Not everyone can be served, and only those sectors or clients that possess observable potential should receive assistance;

(b) Identify the needs and wants of the target group so that services can be designed appropriately;

(c) Deliver only those services that can be adequately managed with the available resources and manpower;

(d) Keep the organization as small as possible, so that staff can become familiar with all the functional areas and, in the same vein, keep the programmes as inexpensive as possible;

(e) Use the entrepreneurs' own energy, creativity and strengths for solving their problems and tend to adopt more of a facilitating role than a prescriptive one;

(f) Services should be cost-effective;

(g) Aim to transfer the service functions -- preferably to the private sector -- at the right time.

2. The programmes

Based on a needs-assessment of the target group(s) and building upon the strategic precepts, a set of three interrelated programmes was developed: training in new-business creation (NBC) for potential entrepreneurs; follow-up services for on-the-spot advice to former NBC trainees; and support services.

B. Training in new-business creation

The strategic sub-themes behind this programme are as follows:

(a) Real entrepreneurs as owners/managers of small firms have to make their own decisions; prescribing patent medicines and standard solutions only kills innovativeness and reduces compeditiveness and consequently growth;

(b) To make pragmatic decisions, the entrepreneur needs to collect information and data for himself/herself; he/she is then in a better position to judge the viability of the enterprise;

(c) The information collected should satisfy the needs of the entrepreneur but should simultaneously convince prospective co-financiers and credit institutions;

(d) Training courses should therefore be designed to facilitate the entrepreneurs' active participation so that they are adequately prepared to start their businesses after training;

(e) The duration of the training should be short; most entrepreneurs are impatient. Also, training should concentrate on developing those skills that are needed to start a business, not on those that are needed to run it;

(f) Product innovation is relative to the market location, so courses should be location-specific; in other words, they should be conducted in the actual market area in which the enterprises will be set up;

(g) Courses should be designed to help the trainees develop business plans that they can implement immediately after training;

(h) The selection of trainees should be rigorous and focus on factors other than entrepreneurial character which might be important in the establishment of an enterprise.

1. NBC course design

The training covers a period of up to six weeks. Depending upon the time required for entrepreneurs to do their fieldwork, the time may be reduced. In general the trainees spend about one third of their time outside the classroom collecting and analysing information and preparing themselves for short presentations.

2. Entrepreneurial competencies development (ECD)

The course opens with an ECD module of about seven days in which a series of behavioural games are played to break the ice between participants and to establish role models that highlight individual entrepreneurial competencies such as decision-making, persuasiveness, persistence, etc. This module ends with between one and three days of goal clarification where the trainees spend time determining their short- and long-term goals. They also find out which activities are required to attain these goals, and analyse potential conflicts that may arise both between goals and actions and between goals and the environment in which they must operate in the pursuance of their objectives. Essentially, the purpose of ECD is to facilitate the transformation of a less exposed individual into a public person capable of running a business.

3. Idea generation

This is a short module lasting only about one day, but it is important as an entrance to subsequent modules. In these sessions "brain teasers" (which require no prior formal skills) are put before the trainees to stretch their imaginations beyond the norm. These sessions are usually quite wild. Non-conventionalism is encouraged as a form of

self-expression and creativity-boosting. Trainees usually generate about 500 ideas for potential projects during this module, the lists of which are posted on the wall of the training room.

4. Idea processing

After the trainees have thrown out wild ideas for solving a given problem, they require a day for systematic "idea processing" to identify new products and business ideas for the establishment of enterprises in their localities. The central question posed to them is "What businesses do you think could be viable here and which could you possibly establish?" Trainees develop a list of the 40 most feasible projects during this process in a session which lasts about two or three hours.

5. Project selection

Since one main strategy of SBPP is to pass the responsibility for decision-making on to the entrepreneur, no prompting is given to the trainees in selecting their project ideas from the lists generated in the previous exercise. Trainees are encouraged to choose two to three potential ideas in preparation for an initial screening that takes place in two steps. First, guidelines are given on how to assess an opportunity -- whether it has a future, whether the Government would support the idea, whether one could get a licence to import the raw material(s), etc. The second step involves sending the trainees to the field for two to three days to talk with potential wholesalers, retailers and consumers about the two to three potential product lines they have selected. This feedback is usually sufficient for helping the trainee to make a choice, and it is far more effective than any consultancy advice given from outside.

6. Product development

The trainees have chosen their project ideas and are convinced -- after initial investigation of the market -- that the project is worth pursuing. They are now asked to bring samples, models or drawings of their competitors' products, at their cost, and to present them to the class during the next module of product development.

This module may require two to three days. In these sessions, each trainee subjects the potential competitors' products to SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis and value analysis to identify a product that has widespread local appeal. The feedback the trainee gets during this module is also a mini-market survey of consumer preference. Rather than simply copying what is already available in the market, the trainees, as newcomers, have the opportunity to introduce something slightly different that may give them an edge in entering the market. These sessions also encourage the trainees' self-confidence in their products.

7. Basic math

It may seem odd that a subject as bland as basic math is being introduced in this module. Up to now, no numerical calculations have been required in the training course.

The participants need some elementary mathematical skills to work out the financial viability of their chosen projects. In this module, five sessions are held over a period of one to three days, depending on the level of the trainees. The sessions are on fractions, decimals, percentages, interest, and profit and loss. The problems are extremely elementary and are designed to overcome the fear many trainees have of dealing with numbers of more than two digits. Trainees are given opening and closing quizzes so that they can gauge their standing vis-a-vis the class as a whole and their progress from the beginning of the module to the end. Coaching for those who are weak in mathematics is given either by trainers or by co-participants in the evening.

8. Demand survey

Typically, the course is conducted in the location in which the trainees are expected to establish their enterprises, so they are generally not expected to face major problems in carrying out the demand survey of their future markets. In market scenarios and for field tests, they are given guidelines and examples of how the markets in the locality operate and how to conduct a demand survey for their new product.

This module concentrates on questions such as: How much of the product is currently being sold in the chosen market? How many competitors are there? What is their importance (market share)? What marketing strategies are employed by competitors? Are the competitors' product features similar or different? What segment of the market can be captured? The conclusion of this module is a rationally established capacity forecast for their proposed businesses based on what can realistically be sold. This module lasts three to five days.

9. Technology choice

When the expected volume of sales has been determined, the trainees can turn their attention to choosing the most appropriate technology, including the equipment and machinery that will be needed in the manufacturing process. Again, guidelines and examples are given to help the trainees in decision-making, and additional days are devoted to fieldwork to obtain estimates of the costs involved.

10. Project costs

In this module further field information is collected on raw material(s) and overhead costs, the availability and training requirements of labour to be employed, and the determination of costs in distribution and advertising.

11. Project viability

After all this information has been collected, the trainees can calculate the required working capital, the total investment needed, the loan to be sought, the final sales price of the product, the break-even point (including loan instalments), the profit and loss of the first year, and the return on investment. Several days are devoted to coaching the participants on refining the project studies, thereby ensuring that all calculations and results are realistic.

12. Presentation to bankers

Since one is dealing, at this point, with real entrepreneurs and their real projects, real bankers are invited to appraise the schemes and give their comments. Trainees have 15 to 20 minutes to present their projects to a panel of branch managers of banks from the location in which the course is conducted, and from which 90 per cent of the trainees will be requesting financing.

During this module, which may last for two days, the trainees have an opportunity -- using flip charts for demonstrations and handouts containing their project proposals -- to present the distinguishing features of their businesses. After the presentation there is a discussion offering constructive feedback on the proposal. They can effectively use this feedback from bankers and other participants to make final changes in their proposals before submitting formal loan applications.

When this module is completed, a short closing ceremony is held and the trainees are left to pursue or drop their ideas depending on their initiative, interest and resourcefulness; follow-up services are provided only when requested after this. They are given only to those who can show that they are taking active steps on their own to start their businesses. The after-training services are described in the next two programme components.

The average success rate of GTZ in conducting this programme in the described manner is about 40 per cent one year after the course.

C. Follow-up services

The strategic sub-themes behind this programme are:

(a) Changes in business practices can only be implemented by the owners/managers themselves. They need to perceive the need for change before being motivated to introduce new practices;

(b) Based on the above, changes could be elicited by the small-business consultant from the entrepreneur rather than being prescribed by an outsider who may not be familiar with all the variables involved;

(c) Learning new business practices can be facilitated in well-structured group situations and when the consultants are used as resource persons. In this way their status and potential role as change agents is enhanced;

(d) There are definable steps in the process of consultancy, starting with establishing trust, which need to be followed if advice is to be well-received by the clients;

(e) Consultants should be able to vary their styles in accordance with the level of maturity of their clients, from highly instructive to facilitative;

(f) Consultants should concentrate on receptive clients to maximize the impact of their time;

(g) A consultant's success should be measured according to the success of his/her clients. This is determined by the incremental profits generated in the clients' businesses. Generally, the value-added will also be increased in manufacturing establishments.

While the primary focus of the new-business creation component is on getting people established in a new venture, the main objective of the consultancy programme is to counsel existing business owners so that they may thrive and grow. This also applies to former NBC trainees in various stages of starting their businesses.

Formerly the project employed two categories of professionals -- the small-business consultants (SBCs) and the NBC trainers. Today almost all of the 40 professionals have received training and gained experience in both aspects of the professional work and have thus been designated business promotion officers (BPOs).

To follow up the NBC programme, BPOs have four main functions (described below): business counselling; management training; assisting in expansion plans with credit proposals; and coordinating technical services for their clients.

1. Counselling

When ex-NBC trainees have become entrepreneurs and are responsive to the potential services that may be offered, various stages are executed for each consultancy assignment, as follows:

(a) A trusting relationship is established;

(b) Information is collected (a simple balance sheet and a profit-and-loss statement are taken);

(c) An analysis is then made of the information;

(d) Key problem areas are identified;

(e) Alternatives are generated and discussed with the client;

(f) A decision about appropriate actions is taken;

(g) If training is needed, it is provided;

(h) An implementation schedule is drawn up;

(i) Follow-up visits ensure that the client fully understands the details of the changes being made.

The counselling for already established businesses is similar to that given to former trainees of NBC courses who have demonstrated initiative in starting their ventures.

2. Management training

Short courses are organized in the local language for people whose businesses are already in operation, but who feel the need to learn new management skills. The main training method used is to employ case-study material from the trainees' own enterprises so that each business will at one point have been the focus of a problem-solving session, whether related to marketing, production or financing. Games and simulations are also employed.

These courses usually last from 6 to 12 working days and take place in the SBPP facilities early in the mornings or in the evenings to give the business owners a chance to carry out their daily work. The objectives of these courses are:

(a) To give greater visibility to the organization in the field;

(b) To activate changes in the businesses more effectively;

(c) To generate more clients for the service;

(d) To reinforce the initial management inputs provided in the NBC course.

These courses are often conducted in collaboration with local business groups such as the chambers of commerce, Jaycees, Lions, Rotarians, etc.

3. Credit proposals

It has been found that most clients are in need of capital -- particularly for the start-up, or if they want to expand their operations. One major task of the BPOs is to help their clients put together viable investment proposals. These are similar in format to the one used by NBC trainees during the training. There are now more details on marketing and finances, as the client already has a proven track record. These follow-up services are essential for the success of the programme and need the linkage with the financing sector.

4. Coordination of technical advice

Several technical problems do arise for the NBC trainees that are beyond their capacity and experience and that cannot be dealt with during the training. Such problems are referred to the technical advisory service, where a technician may offer any necessary asistance on a short-term basis. These assignments of technical consultants are coordinated through the BPOs. In cases where urgent need exists for more basic skills training, facilities are made available through existing institutions.

D. Support services

1. Staff development

An organization is only as good as the people in it, and if excellence is desired, training is required. An elaborate staff-development programme has to be conceived from the beginning to ensure that the organization can generate staff of an acceptable standard and can also upgrade those who have already served in it for a longer period. This is facilitated by a series of planned activities including: courses on the training of trainers and the training of consultants; staff secondment; short-term expert assignments; technical review conferences; newsletters; advanced training courses, etc.

Continuous upgrading of staff, with most instruction being given by senior personnel, creates respect for and confidence in the top management. It motivates the junior staff to improve their performance in client services. It also offers the opportunity to change and redirect new and old client services according to the experience gained in the field. Such courses foster international collaboration, good staff relations, and an atmosphere of team work in which almost any problem can be overcome.

2. Research and development

For the programme to maintain its high innovative value, it is necessary to constantly update the training methods used. This is most effectively done through a well-structured and result-oriented research programme. Much of this has to be undertaken by experienced professionals.

3. Publications

While the benefits of staff training cannot be underestimated, there are also limitations as to how much can be absorbed, stored and then applied. To assist staff and entrepreneurs in the application of training, several publications are developed in three tiers: for staff training, for use by field staff in training or advising clients, and lastly for the clients themselves to use on their own or with guidance from small-business consultants (SBCs).

E. Conclusion

The main distinguishing features of the GTZ approach to small-business promotion are as follows:

(a) Entrepreneurs have to make decisions on their own, and they are responsible for these decisions and subsequent actions. The promoter's role is therefore more that of a facilitator and guide than that of an instructor;

(b) As a consequence of the above, entrepreneurs are not to be spoon-fed with all services, but should learn to be independent as soon as possible;

(c) Services should concentrate on the wants and needs of the target group, with the wants being dealt with initially;

(d) For a programme to be cost-effective, rigorous client-selection criteria must be applied;

(e) For effective motivation of fieldworkers and for quality performance, a staff-development programme is essential;

(f) To achieve high targets, objectives must be very clear and performance standards easy to gauge;

(g) A great deal can be gained from assisting and interfacing with other institutions focusing on the same target groups.

Taken individually, none of these ideas is particularly new, but when put together, they form a powerful package for addressing the ever-present problems of employment and income generation in embryonic and emerging economies.

V. THE ROLE OF NON-GOVERNMENTAL ORGANIZATIONS (NGOs): THE NOOR AL-HUSSEIN FOUNDATION'S WOMEN AND DEVELOPMENT PROGRAMME MODEL

by Salwa Masri*

A. Introduction

Small-scale industries have proven, in the experience of many developing countries, to be vital in terms of employment generation, increasing savings, redistributing income, providing training for potential entrepreneurs, and developing complementarity within the economy. All these contributions are essential to the acceleration of industrial development.

Based on the results of Jordan's industrial censuses, it is estimated that there are approximately 12,000 industrial enterprises in the country; 87 per cent of these are workshop-type operations employing fewer than five workers. These very-small-scale operations are engaged in woodworking, furniture-making, knitting, and repair activities, and in the production of ready-made garments, window grilles/frames/structures, food products, etc.

The remaining 13 per cent of the industrial sector is divided as follows:

Number of employees	Number of enterprises
5-9	1 035
10-19	260
20+	315

The unemployment rate in Jordan is high -- about 20 per cent -- but is even higher (35 per cent) among women; furthermore, the participation of women in the labour force is very low. Pushing non-governmental organizations (NGOs) to play a more active role in promoting small-scale industries and encouraging women entrepreneurs to undertake a more active role in these industries are crucial if women are to form a part of the working mainstream and involve themselves in the national development of their country.

B. The status of women at work

In most developing countries women are still struggling against the many obstacles inherent in their social status. In many of these areas, the means by which women achieve economic independence may be regarded as disruptive of family life. The social norms relating to the status of women range from outright taboos against working outside the

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home, to pressures which discourage women from being involved in self-employment or entrepreneurship through the creation of small-scale businesses or industries.

The Jordanian Constitution gives equal rights to men and women with regard to work. The National Charter supports the right of women to equal job opportunities, as well as their constitutional and legal rights to equal opportunities in education and training -- thereby maximizing their role in the building of society, in its socio-economic advancement, and in the enhancement of its independence and self-reliance. The labour law provides for the protection of women's rights with regard to labour unions, equal pay for equal work, annual leaves, and paid leaves-of-absence in cases of childbirth, pilgrimage, sickness, etc.

Women represent 49 per cent of the population of Jordan, but are under-represented in the labour force (figures vary from one region to another).

Official employment figures for women in the Jordanian labour force are misleading, as they do not reflect the number of self-employed women working at home or as unpaid agricultural labourers. The concentration of female workers in the industrial sector increased during the 1980s; while in 1980 the number of female workers in the industrial sector totalled only 2,200 (representing 5.2 per cent of the total labour force), the number had increased to 4,495 by 1985, representing 6 per cent of the total labour force.

Women's work is concentrated in three main industrial sectors: textiles and ready-made garments (29 per cent); leather-working (20 per cent); and chemical industries (20 per cent). According to the labour-force survey, over half of the total female workforce in the industrial sector is self-employed, with most of the women working as seamstresses and weavers. Other areas in which female workers are concentrated include hotels and restaurants, commerce, banking and tourism.

There is a general tendency for women to work at home and produce goods for domestic use, rather than for the market. The national village survey conducted in 1984 showed a preponderance of women involved in the production of traditional handicrafts such as embroidered dresses and pillowcases. Women prefer these activities because they can work and use their skills at home.

C. Promoting small-scale enterprises in Jordan

The following is a survey of Jordanian agencies and activities that contribute to the promotion of small-scale enterprises in such areas as project identification, training, finance, and information services.

1. Project identification

(a) The Ministry of Industry, with the assistance of the United Nations Industrial Development Organization (UNIDO), is preparing profiles/sketches on 60 project opportunities -- particularly those suitable for small-scale industries;

(b) The Ministry of Planning is currently implementing a scheme for the development of very-small-scale enterprises in the outlying regions, assisted by the German Agency for Technical Cooperation (GTZ);

(c) The Industrial Development Bank has set up a small unit for project identification.

2. The training available for entrepreneurs

(a) The Jordan Institute of Management (JIM) provides management training courses for both would-be and existing entrepreneurs. JIM was established in 1979 and is an autonomous division of the Industrial Development Bank. It runs courses for upper- and middle-management personnel from all business sectors, and trains approximately 1,200 people each year;

(b) The Business and Professional Women's Club provides counselling services to women entrepreneurs who are already in business and to those who have the intention and potential to do so;

(c) The Queen Alia Jordan Social Welfare Fund is establishing a new training centre to train trainers involved in assisting entrepreneurs in very-small-scale enterprises;

(d) The Ministry of Planning, in association with GTZ, is training people in project identification;

(e) The Amman Chamber of Industry ran a "How to improve your small business" seminar in conjunction with the International Labour Organization (ILO) in 1992.

3. Financing for small-scale industries

(a) The commercial banks and the Industrial Development Bank have funds at their disposal for small-scale enterprises. There are a number of other institutions and funds that are also willing to provide financing to these small enterprises;

(b) The Industrial Development Bank operates a Small-Scale Industries and Handicrafts Fund, through which loans are directed to companies with fewer than five employees. The maximum loan is $US 11,594, with an interest rate of 6.5 per cent. The period of repayment is six years;

(c) The Development and Employment Fund (DEF) is a specialized, autonomous development institution, established in 1989 with the objective of supporting all sorts of income-generating activities and self-employment projects.

DEF provides NGOs with sufficient financial support for revolving funds, to enable them to finance individuals and community projects. Types of funding include grants to cover part of the cost of NGO projects, interest-free loans to support the cost of NGO projects, and soft loans for profitable and cost-effective individual projects.

Intermediary organizations were selected to implement productive projects either directly or through grass-roots societies. One of these organizations is the Noor Al-Hussein Foundation.

4. Business information services

(a) The Chamber of Industry has a Research Department which provides summarized information on competitors in the country;

(b) The Ministry of Industry and Trade, with United Nations assistance, operates a subcontractor-exchange programme.

D. Women entrepreneurs

Many Jordanian women have already entered the industrial sector as entrepreneurs. Records at the Amman Chamber of Industry confirm the existence of 48 industrial institutions owned by women entrepreneurs, employing 251 workers -- and three large enterprises run by women, employing 324 workers.

Women entrepreneurs in industry tend to concentrate their efforts in sewing and knitting ventures. These reflect women's interests and their special capabilities, and provide job opportunities for them at home, whether they are employed by others or self-employed. To illustrate, the 48 enterprises previously mentioned are divided as follows:

(a) 27 knitting enterprises;
(b) 9 leather-working enterprises;
(c) 12 filling and packaging, printing, plastic work, typing, cosmetics, and metal and engineering enterprises.

According to data supplied by DEF for the period March-December 1992, women represented 14 per cent of the total number of entrepreneurs given funding by DEF to establish their own enterprises. The funds allocated to these female-run enterprises represented 10 per cent of the total. The average amount of funds allocated per female-run enterprise is 29 per cent less than the amount allocated for each male-run enterprise.

These enterprises are distributed among all eight of the governorates in Jordan, with the highest concentration in Amman Governorate (57 per cent), followed by Zerqa Governorate (13 per cent), and Irbid Governorate (12.5 per cent). The remainder (17.5 per cent) are distributed among the other five governorates.

Records show that the majority of the 135 women entrepreneurs who received loans from DEF for their own enterprises (shown in table 1) set up businesses involving traditional projects such as sewing and knitting (63 per cent), followed by beauty salons and nurseries (15.5 per cent), health clinics (10.4 per cent), agricultural projects (8.9 per cent), and agro-industrial projects (0.7 per cent).

Table 1. Development and Employment Fund (DEF): credits to women
(March-December 1992)

Type or field of enterprise	Enterprise	Number of women entrepreneurs	Percentage	Allocated fund (US dollars)	Total fund	
					(US dollars)	Percentage
Vocational	Sewing and knitting	85	63.0 %	314 975	314 975	56.6 %
Agriculture	Goat raising, poultry raising, bee-keeping, sheltered agriculture	3 2 2 5	8.9 %	8 500 11 000 5 500 23 500	48 500	8.7 %
Agro-industry	Dairy processing	1	0.7 %	1 700	1 700	0.3 %
Tourism	Restaurants and coffee shops	2	1.5 %	8 200	8 200	1.5 %
Services and small-scale industries	Clinics, beauty salons, nurseries, patisseries	14 18 2 1	25.9 %	103 800 71 600 5 500 2 000	182 900	32.9 %
Total		135	100 %	556 275	556 275	100 %

Source: Development and Employment Fund.

While it is difficult to isolate performance from the wider socio-cultural and economic environment within which women operate, there is reason to believe that the absence of proper guidance is responsible for certain attitudinal and operational features which affect product selection and formulation, as well as the establishment and operation of businesses. These are outlined below.

1. Because they generally lack entrepreneurial knowledge and skills, women tend to select the most traditional activities such as stitching, sewing, embroidery, teaching, etc.

2. Women generally tend to start very small businesses. This leads them to make unrealistic investment decisions.

3. Most women lack market information, as well as other information on business and industry, licences and permission required, available financing and incentives, etc.

4. Due to a lack of knowledge and skills in preparing business plans, many errors are made in the formulation stage of a project, and this has a direct -- negative -- impact on operations.

5. In addition to the above, shortcomings during the operation stage of the project include:

(a) An absence of skills and knowledge with respect to quality control and production planning;

(b) Few market-development efforts;

(c) An absence of skills for developing marketing strategies;

(d) Poor accounting, costing and record-keeping.

6. Another observation is that these women suffer from entrepreneurial incompetence, i.e., low entrepreneurial effectiveness in terms of: personal entrepreneurial characteristics; basic knowledge about the functional aspects of business management; organizing abilities; and overall problem-solving ability.

Financial institutions and the Ministry of Industry have expressed a lack of confidence in the entrepreneurial and managerial abilities of women entrepreneurs.

E. Non-governmental organizations (NGOs) for women

There are about 450 NGOs in Jordan, and they play a major role in the overall provision of socio-economic support to women. Many NGOs are relatively small and are confined to limited activities in a single locality, but a few have widely diversified activities and/or substantial regional outreach; those of the latter group include:

(a) The Noor Al-Hussein Foundation;

(b) The Queen Alia Jordan Social Welfare Fund;

(c) The General Federation of Jordanian Women;

(d) The General Union of Voluntary Societies;

(e) The Jordan Cooperative Organization.

The major activities of these organizations include, inter alia, special education and care for the handicapped, vocational training, child care and kindergartens, health and social education for adults, and in some cases, technical and financial support to smaller, localized NGOs in the various regions.

Table 2 presents the type of projects approved by DEF for NGOs in the years 1991 and 1992. It shows that 42 per cent of total funds were allocated to sewing, knitting and handicrafts projects; 33.2 per cent to agricultural projects; 10.4 per cent to agro-industrial projects; 7.2 per cent to small-scale industry; and 6.5 per cent to services.

So far no institutionalized efforts for women's development have been undertaken in the country. Activities of benefit to women are generally more welfare-oriented than development-oriented. No constructive steps have been taken to lead women towards self-employment or entrepreneurship. Making special efforts to equip women for specific jobs is a new concept in Jordan.

Several NGOs have placed special emphasis on developing programmes designed to support value-adding productive projects for women -- covering dress-making, knitting, weaving, tapestry-making, rug-making, honey production, the freezing of fruits and vegetables, pickling, small-appliance repair, small-scale industries and other areas.

Among these NGOs is the Noor Al-Hussein Foundation; through its various projects and programmes in the fields of culture, education, heritage and community development, it aims at providing a better life for the individual and the community using an integrated and comprehensive developmental approach.

Through its Women and Development Programme, the Noor Al-Hussein Foundation can undertake a number of projects involving agriculture, agro-industry, small-scale industries and self-employment schemes -- all run with a business and market-oriented approach to ensure the viability and sustainability of the projects.

F. The Women and Development Programme

The Women and Development Programme is a national programme implemented by the Noor Al-Hussein Foundation in cooperation with the General Federation of Jordanian Women, with funding from the United Nations Population Fund (UNFPA).

Table 2. Development and Employment Fund (DEF) grants/credits to non-governmental organizations (1991 and 1992)

Project	1991			1992			1991 and 1992		
	Allocated fund	Percentage	Number of NGOs	Allocated fund	Percentage	Number of NGOs	Allocated fund	Percentage	Number of NGOs
Agriculture									
Goat raising	226 087	19.1 %	2	39 885	9.0 %	3	265 942	16.4 %	5
Agriculture	17 391	1.5 %	1	23 188	5.3 %	1	40 580	2.5 %	2
Poultry raising	217 391	18.3 %	1	--	--	--	217 391	13.4 %	1
Bee-keeping	--	--	--	14 439	3.3 %	1	14 493	0.9 %	1
Subtotal	460 870	38.9 %	4	77 536	17.6 %	5	538 406	33.2 %	9
Agro-industry									
Dairy production (subtotal)	82 609	7.0 %	1	85 507	19.5 %	2	168 116	10.4 %	3
Vocational/traditional									
Sewing	84 058	7.1 %	6	264 493	60.2 %	7	348 551	21.5 %	13
Knitting	--	--	--	725	0.2 %	--	724	0.1 %	--
Handicrafts	344 928	29.1 %	1	--	--	--	344 928	21.2 %	1
Subtotal	428 986	36.2 %	7	265 217	60.4 %	7	694 203	42.8 %	14
Small-scale industry									
Carpentry (subtotal)	116 957	9.9 %	2	--	--	--	116 957	7.1 %	2
Services									
Booths	65 217	5.5 %	1	--	--	--	65 217	4.0 %	1
Showrooms	5 072	0.4 %	1	--	--	--	5 072	0.3 %	1
Bakeries	24 638	2.1 %	1	--	--	--	24 638	1.5 %	1
Medical appliances	--	--	--	10 870	2.5 %	1	10 870	0.7 %	1
Subtotal	94 927	8.0 %	3	10 870	2.5 %	1	105 797	6.5 %	4
Total	1 184 348	100 %	17	439 130	100 %	15	1 623 479	100 %	32

Source: Development and Employment Fund.

Note: "--" signifies that the figure is nil or negligible.

The Programme was launched in October 1986. The implementation stage lasted from October 1987 through 1992. During the second (present) stage, self-sustainability of the existing productive projects is expected, and similar schemes can be duplicated in other parts of the Kingdom.

1. General Objectives

The most important objectives of the Women and Development Programme include the following:

(a) Establishing unconventional but productive self-employment schemes in both the urban and rural areas within the various governorates of the Kingdom; these schemes should serve as models for other parts of the country;

(b) Providing work opportunities -- both inside and outside the home -- for women of low income, with a view to raising their economic and social standard of living as well as that of their families;

(c) Helping Jordan achieve its self-sufficiency objectives by providing the market with locally produced products;

(d) Disseminating educational information about family life -- for men and women alike -- in order to raise people's awareness of social, population, and family-welfare issues;

(e) Training prospective women leaders in the skills that are needed for the establishment and management of projects, as well as for the supervision of production and the marketing of products.

By the end of 1992, six unconventional productive projects had been established in six Jordanian governorates. These projects include:

(a) The Bee-Keeping and Honey-Production Project: implemented in cooperation with the Production and Vocational Training Cooperative Society in Kerak Governorate;

(b) The Raiyah Ready-to-Wear Garments Project: implemented in Mafraq Governorate, with the intention of turning the Project into a shareholding company;

(c) The Medical Herbs Project and Kinanah Drying and Packaging Centre: implemented in cooperation with the Irbid branch of the General Federation of Jordanian Women in Irbid Governorate;

(d) The Rabbit-Raising Project: implemented in cooperation with the Zei and Allan Women's Society in Balqa Governorate;

(e) The Zerqa Light-Footwear Workshop: implemented in cooperation with the Housewives Society in Zerqa Governorate;

(f) The Dolls in Traditional Dresses Project: implemented through the Noor Al-Hussein Foundation (Aqaba) in Ma'an Governorate.

There is also a Small-Business Counselling for Women Project -- a joint venture implemented in cooperation with the Business and Professional Women's Club in Amman Governorate.

2. Objectives of the Women and Development Programme at the urban/village levels

(a) To use unexploited land and contribute to environmental conservation;

(b) To make agricultural products available to the local market, thereby contributing to a decrease in imports;

(c) To contribute to development at the grass-roots level;

(d) To create flexible job opportunities for women -- both inside and outside the home;

(e) To increase/supplement family income, and hence raise its standard of living;

(f) To create administrative and technical job opportunities in the villages in order to limit emigration from rural to urban areas;

(g) To train women in appropriate technologies.

3. Objectives of the Women and Development Programme at the national level

(a) To create job opportunities (thereby decreasing unemployment);

(b) To raise the economic standards of the various communities;

(c) To encourage the establishment of agro-industrial projects;

(d) To complement other related projects and industries;

(e) To promote and develop local and national expertise;

(f) To augment interaction among the relevant institutions;

(g) To provide a training ground for entrepreneurs, other local NGOs, and college and university students;

(h) To provide models of successful projects that can be replicated at the national level;

(i) To facilitate the exchange of experiences and training among the Arab countries of the region;

(j) To attract international development funds for allocation and investment in similar projects.

G. Factors leading to the success of these projects

The following have contributed to the continuity and success of the Women and Development Programme's income-generating projects:

(a) Proper planning, implementation, monitoring and follow-up of the projects;

(b) Selecting cost-effective projects that fall within the national strategy of encouraging productive activities and decreasing product imports;

(c) Providing the necessary administrative and technical training, and transferring technical know-how to those implementing indigeneous NGOs;

(d) Using a business and market-oriented approach to run the projects -- to maintain self-sustainability;

(e) Selecting projects that suit the local communities, with indigenous natural and human resources taken into account;

(f) Creating flexible work opportunities for women -- allowing them to be home producers or regular workers, with emphasis placed on the securing of market outlets for their products;

(g) Cooperating and coordinating with local agencies and institutions, with the objective of maximizing input and avoiding duplication.

H. Observations and conclusions

1. There is presently no institution or organization which has the skills and/or competence to develop women entrepreneurs.

2. Almost all the efforts to develop women are welfare-oriented and involve income-generating activities which are generally traditional in nature, such as embroidery, dress-making, teaching, etc.

3. There are no projects, programmes or activities under way at present which might lead to the start-up of new, non-traditional businesses or to the upgrading of existing women entrepreneurs' skills or competencies.

4. The external-support environment for industrial and business development is very good; there are now a number of specialized funding schemes with attractive interest rates and moratorium periods for new entrepreneurs.

5. At present, there are a number of excellent investment incentives for medium- and small-scale industries in Jordan, including tax and customs duty exemptions, good infrastructure facilities, etc.

6. There are no special financial incentives available to women.

I. Recommendations

1. Mobilize and encourage non-governmental organizations to play a more active role in setting up non-traditional and cost-effective production projects.

2. Promote the provision of extension services to industries: financial and cost-accounting systems, marketing advice, low-level production advice, etc.

3. Industrial banks should reduce required-collateral levels, particularly for small-scale projects and start-ups.

4. Provide entrepreneurs with the information they need to establish and operate small-scale businesses.

5. Run start-your-own-business (SYB) courses which cover such areas as accounting, inventory control, production, marketing, management, organization, and methods of quality control.

VI. THE ROLE OF THE ASSOCIATION OF LEBANESE INDUSTRIALISTS IN THE CREATION OF INDIGENOUS ENTREPRENEURSHIP

by Nabil M. Ladki*

A. Introduction

The Association of Lebanese Industrialists is a private economic organization grouping industrialists from all over Lebanon in a concerted and balanced effort to promote and develop industry in the country. It was founded in 1943 with no more than 50 member firms; by 1 January 1993, its membership had reached over 1,100 firms, representing about 75 per cent of the capital invested in industry in Lebanon.

The Association seeks to create and maintain an atmosphere favourable to industrial growth and development. Considering the fact that industry in Lebanon is purely private, the role of the Association becomes all the more important.

B. Organization of the Association

1. General Assembly

The General Assembly of the Association is that body's highest authority, and is composed of all duly registered members in good standing. The General Assembly meets yearly for ordinary sessions, though extraordinary sessions can be convened at any time either by a decision of the Board of Directors or at the request of a specific number of members.

2. Board of Directors

The 24-member Board of Directors is elected by the General Assembly and is the highest policy-making organ of the Association. The Board operates through four subsidiary bodies:

(a) The Bureau, or Executive Committee, is elected by the Board from amongst its members. It acts as a steering committee for the Board and may, by delegation from the Board, assume some of the functions that originally fall within the prerogative of the Board. The Executive Committee is composed of:

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The President
Two Vice-Presidents
The Secretary General
The Treasurer
The Chairman of the Foreign Relations Committee
Four Controllers

(b) The specialized committees, on which the Board depends heavily, include members selected from amongst the Board as well as members of the General Assembly. The specialized committees currently include the following:

The Finance Committee
The Foreign Relations Committee
The Vocational Training and Technical Rehabilitation Committee
The Trade Fairs Committee
The Customs Committee
The Income Tax Committee
The Industrial Credit Committee
The Social Policy Committee
The Infrastructure Committee
The Information Committee
The Transport Committee
The Membership Committee
The Administrative Committee
The Industry Institute and Lebanese Norms and Standards Organization Committee

(c) The Sectoral Council is a recently added subsection of the Association. As the name might imply, the Sectoral Council groups the members of the Association according to major manufacturing sector. The Council is headed by one of the Vice-Presidents of the Association. The Council's main objective is to assist the Board in formulating and executing policies which affect or involve the special manufacturing sectors;

(d) The Geographical Council is also a recent addition to the Association. Members are divided according to the geographical location of their factories. The other Vice-President presides over the Geographical Council groups. The idea for setting up these groups stems from the fact that the civil strife in Lebanon has produced a number of problems -- and special needs -- among the various manufacturing firms; many of these difficulties and requirements are particular to the region where a specific factory or factories are located, so the special handling needed in one area may not be the same as that needed elsewhere. The problems of electrical power, telecommunications and road maintenance very often differ from one region to another.

3. Administration

The executive organ of the Association is the Permanent Secretariat, which is headed by a Director General appointed by the Board. The activities of the Secretariat are

divided among several departments, each with specialized types of duties through which the activities of the Association are carried out.

C. Activities of the Association

The activities of the Association of Lebanese Industrialists fall within two main categories: (1) "Micro" services activities; and (2) "Macro" services activities.

1. "Micro" services activities

Activities falling under this category mainly include services rendered to members individually. These are wide and varied and include, inter alia, the following:

Certification of invoices
Various types of attestations and certificates
Market information
Legal advice
Intervention vis-à-vis third parties

2. "Macro" services activities

Being recognized as the representative body for Lebanese industry, the Association has been playing an ever-increasing "macro" role at both the national and international levels.

(a) Macro-type services at the national level

The Association is involved in a very wide range of activities at this level including: vocational training; technical-education development; the sales promotion of Lebanese-manufactured products in the local market; and the rehabilitation of infrastructure, electricity, transport, etc.

The Association pursues its activities in this regard through its representation in both established permanent organizations/institutes and ad hoc committees. The following are among the more important bodies in which the Association is directly represented:

The Economic Advisory Committee to the Prime Minister
The Board of Directors of the Social Security Fund
The Board of Directors of the Industry Institute
The Board of Directors of the Lebanese Norms and Standards Organization
The Labour Courts of Arbitration
The Official Committee on Trade Agreements
The Vocational Training Centre for Adults
The High Council for Professional and Vocational Education
The Customs Assessment Committees

(b) Macro-type services at the international level

The activities of the Association at this level cover the following areas:

(i) Promoting the export of products manufactured in Lebanon;

(ii) Securing industrial credit facilities;

(iii) Securing international assistance for vocational training programmes;

(iv) Participating in the formulation of international labour legislation.

The Association maintains special representation in various regional and international organizations, enabling it to pursue its objectives on the international scene. Among these organizations are:

(i) The International Labour Organization;

(ii) The Arab Labour Organization;

(iii) The National Committee of the United Nations Industrial Development Organization (UNIDO);

(iv) The Joint Lebanon-European Economic Community (EEC) Committee on Technical and Trade Cooperation;

(v) The International Organization of Employers;

(vi) The National Committee of the International Chamber of Commerce.

D. The structure of Lebanese manufacturing firms

In order to better understand and evaluate the role of the Association in promoting entrepreneurial development, it is necessary to provide a brief glimpse of the structure of manufacturing firms in Lebanon, in terms of both their size and their juridical status.

1. Sizes of firms

Most of the manufacturing firms in Lebanon fall within the small- and medium-scale categories. About 10 per cent are large-sized firms employing 100 or more workers.

2. Juridical structure

During the 1950s and the early 1960s, most of the manufacturing firms in Lebanon were of the individual type -- "societes des personnes" -- characterized by being purely family firms. In 1955, 60.3 per cent of the firms were under private individual ownership. In 1964, this percentage fell to 54.5 per cent: "collective-type" firms, 37 per cent; corporations, 3 per cent; and joint-stock companies, 4.6 per cent.

In order to change this situation in favour of corporate development, a new law was promulgated to encourage the formation of corporate-type firms. The effectiveness of this new law may be judged from the following figures: about 56 per cent of the manufacturing firms are still predominantly of the private, individual-ownership type; joint-stock companies represent no more than 12 per cent; limited liability companies constitute 4 per cent; and corporations represent only 2.3 per cent. The remaining 22 per cent are not officially registered firms and as such have no legal status; most of these are small manufacturing concerns established during the civil war. They are generally to be found in locations classified as residential areas, and therefore cannot be given legal status as manufacturing firms (at least where they exist at present).

3. The size and structure of firms vis-à-vis entrepreneurial development

In view of the size, structure and type of ownership of the individual firm, any efforts geared towards developing indigenous entrepreneurship will have to be personal rather than institutional in the majority of cases. One must deal with the top man, not a system. Circulars, brochures, reports, and even letters usually do not serve any purpose unless they are followed by personal contact. While this may appear advantageous in so far as the decision-making process is concerned, it is also time-consuming and in many cases impractical -- or even impossible.

Given the general types of activities of the Association of Lebanese Industrialists and the structure of Lebanese manufacturing firms, how does the Association see its role in creating and/or developing indigenous entrepreneurship, and what actions should it take to promote this role?

E. Strategy

The strategy of the Association with regard to promoting indigenous entrepreneurship is clear-cut.

1. First, the Association considers itself directly responsible for developing the entrepreneurial skills of all its members.

2. Second, the Association believes that in developing the entrepreneurial skills of present entrepreneurs, it will be paving the way for the creation of new entrepreneurs.

3. Third, the Association believes that its efforts either in developing existing entrepreneurial skills or in creating new ones should be directed towards the implementation of a five-point programme (as follows):

Industrial credit
Provision of extension services
Provision of business information
Reduction of administrative red tape
Intraregional and international cooperation

F. The plan of action

In the remaining few pages of this paper, an attempt will be made to highlight the main "action plan" adopted by the Association to implement the five-point strategy mentioned above.

1. Securing industrial credit

Securing industrial credit is one of the most pressing problems facing entrepreneurs in Lebanon at the moment. The Association seeks to alleviate this problem through a two-part action plan: (1) upgrading existing industrial-credit institutions; and (2) securing new industrial credit facilities.

(a) Upgrading existing industrial credit institutions

There are two specialized institutions for granting industrial credit in Lebanon:

(i) The Banque du credit agricole, industriel et foncier (BCAIF) was established in 1955 with 40 per cent of the capital provided by the Government. It was the only industrial credit institution until the creation of the BNDIT (see below) in 1963. Given the limited resources of the Banque and its orientation towards agricultural credit, the BCAIF can no longer play the important role it did in the early years of its operation;

(ii) The Banque nationale du developpement industriel et touristique (BNDIT) was established in 1963 as a joint venture between the private commercial banks and the Government. BNDIT proved to be a major asset for industrial development up to the late 1980s, but the civil war eventually left its mark, severely undermining the Banque's efficiency. First, its resources were completely used up; second, and again as a result of the civil war, BNDIT lost many of its qualified staff and was left with very serious administrative problems -- starting with a paralyzed Board of Directors.

After peace and security had been restored in Lebanon, the Association made the rehabilitation of BNDIT its first "crusade". The Association succeeded in appointing a new Board of Directors and in securing new

lines of credit for BNDIT. The Association -- to keep a close eye on the Banque -- succeeded in having one of its Board members put on BNDIT's Board of Directors;

(b) Securing new industrial credit facilities

The Association pursues two parallel *lines of action in its endeavour to provide new industrial credit facilities. First, the Association seeks new funds to be injected into the existing credit system in Lebanon -- directed specifically towards industry. Additionally, efforts are constantly undertaken to provide indirect financing for industrial development:

(i) Direct funding

The Association cooperates with national credit authorities and institutions in lobbying for external lines of credit (from the European Investment Bank [EIB], the International Finance Corporation [IFC], the Arab Fund, the Islamic Bank, and others). The Association recently sent a delegation to the EIB and has succeeded in securing their agreement to extend a line of credit to BNDIT.

Furthermore, the Association has held direct negotiations with IFC, and the latter has agreed to open a line of credit totalling $US 50 million, to be granted in the form of long-term credit loans to industry through five commercial banks approved by IFC. Contact has been made and discussions are under way with the Islamic Bank for the same objectives;

(ii) Indirect-credit facilities

After 17 years of civil strife, most of the manufacturing firms in Lebanon need to repair and/or upgrade their machinery and other equipment; however, the great devaluation of the Lebanese pound against convertible currencies has caused enormous -- and sometimes insurmountable -- problems in this regard. Foreign suppliers of the machinery and equipment required hesitate to grant export-credit facilities to Lebanese manufacturing firms, especially since most national export-credit institutions abroad still classify Lebanon as a high-risk country and refuse to guarantee exports of their goods to that country.

The Association has taken direct steps to deal with the situation, and has put together a high-ranking delegation which has so far visited Germany and France. The main objective of the visits was to affirm Lebanon's new image and to seek approval for removing Lebanon from the high-risk category. The delegation met with the concerned government officials, and with counterpart organizations such as the Federation of German Industries (BDI) and the Association of Machine and Plant Manufacturers (VDMA) in Germany, and the National Council of Employers in France (CNPF).

These visits have started to bear fruit; HERMES, for example, has agreed to cover export risks to Lebanon for a period of 12 months. It is hoped that this period of coverage will soon be extended. In May similar visits are scheduled for England, Holland and Austria in Europe; and Taipei and Kuala Lumpur in the Far East.

2. Providing extension services

This is one of the most important activities through which the Association seeks to promote entrepreneurial skills. These services can be grouped into four main types of activities: (a) management development; (b) marketing; (c) vocational training; and (d) development institutions.

(a) Management development

The Association offers the following services under this heading:

(i) Organizing seminars in Lebanon on the various management fields, e.g., cost accounting, systems organization, etc. The Association usually undertakes these efforts in cooperation with other specialized associations in Lebanon such as the Lebanese Management Association, the Association of Chartered Accountants, the Bankers Association, etc.

The Association also cooperates closely in these endeavours with international and interregional organizations (as will be discussed later);

(ii) Offering direct advice and guidance to individual members. For example, the Association helps members prepare their applications for industrial credit or for export-credit guarantees, and sometimes even assists in the preparation of feasibility studies;

(b) Marketing

The Association's marketing activities centre on three main areas:

(i) Preparing industrialists for the market by, for example, providing assistance in the preparation of promotional literature or providing information on labelling and packaging regulations;

(ii) Promoting the local market. The Association organizes special "Made in Lebanon" exhibitions. It has recently introduced another new mechanism for promotion: an agreement with the major audio-visual media has been signed through which Lebanese manufacturers are given major discounts on their advertising campaigns, provided they insert the caption "MADE IN LEBANON" in every advertisement. The idea behind this is first to encourage the manufacturer to take action in directly promoting his product, and second to strengthen the manufacturer's confidence in the saleability of his product;

(iii) Promoting exports. The Association has been playing an increasingly important -- and often aggressive -- role in export marketing. The Association's main activities in this area are as follows:

a. Assisting manufacturers in export preparation;

b. Selecting the most important of the specialized international fairs and organizing industry's participation in them;

c. Organizing special marketing events for potential markets;

d. Assisting manufacturers with follow-up procedures.

The Association is currently in the process of introducing a new activity: an "exporters club";

(iv) Undertaking product-adaptation projects;

(v) Organizing seminars and workshops on export-promotion techniques;

(c) Vocational training

Developing human resources has always been one of the Association's major concerns. The 17 years of incessant hostilities have taken their toll, however, making human-resource development a greater challenge than ever before. A great number of skilled and even semi-skilled labourers emigrated; furthermore, everybody -- the Government, the Association, and for that matter all those concerned -- lost track of the gaps left in manpower. Even with the restoration of peace and order in the country it will not be easy to lure back most of the skilled emigrants. The only way to remedy this situation is to generate new skilled manpower. This, however, gives rise to two challenges: (a) finding out what skills are required; and (b) knowing how to acquire them.

The Association maintains two lines of action in this regard. First, it is in continuous consultation with member manufacturing firms to try to assess their manpower needs. Sometimes it must even assist members in specifying these needs, especially in view of the changing technologies and product requirements which manufacturers may not always be aware of. A manpower-assessment survey project is being negotiated jointly by the Association and the Ministry of Labour with the International Labour Organization (ILO). Second, the Association seeks, as an immediate measure, to rehabilitate the existing vocational training centres and to work out new training programmes which fulfil the newly assessed needs;

(d) Development institutions

Technology is changing so rapidly that no single enterprise, no matter how large, can follow at any reasonable pace with its resources alone. There must be a central

organization of some sort to accumulate and evaluate information on these new technologies. Such a body should be able to put this information in readable form and make it accessible to potential users, and should also be sufficiently equipped and prepared to meet any technical and/or technological queries. And finally, it should be able to help enterprises adapt to new technologies and should provide facilities for testing and verification.

3. Providing business information

Two projects are presently under way which will enable the Association to provide its members with all the basic facts and information they might need -- easily and promptly:

(a) The Trade Information Centre will house a data bank which is designed to provide all the information a business enterprise might need, whether that enterprise is a trading firm or a manufacturing firm. This endeavour is a joint project between the Association and the Beirut Chamber of Commerce and Industry, financed through the United Nations Development Programme (UNDP). The executing agency is the International Trade Centre (ITC) in Geneva. International input is estimated at $US 516,000;

(b) The Industrial Information Centre is a data bank which will specialize in providing information of particular interest to the manufacturing sector, e.g., information on new technologies in the various industrial sectors, on the supply of machinery, equipment and raw materials, and on new norms and standards for products, packing, packaging, etc. As a first step, the Association is negotiating with UNIDO to have on-line access to their database in Vienna.

4. Reduction in administrative procedures

The complex administrative procedures, red tape, and overlapping authority are problems common to all developing countries; Lebanon is no exception. This is felt even more in the manufacturing sectors, usually because of the vast and complex operations involved in manufacturing -- legal obligations, licensing, production, marketing, industrial relations, etc.

The Association is relentless in its efforts to achieve a workable degree of centralization and is striving to place all matters relating to industry under one administrative unit, viz., the Ministry of Industry and Petroleum. This is a tall order, however, and there is still much to be done before significant progress is made.

In order to give would-be entrepreneurs in the manufacturing sector a direct incentive in so far as administrative hurdles are concerned, the Association has lobbied for the creation of industrial estates. Under such a system, new entrepreneurs have just one central authority to handle all matters relating to their business dealings with the various government authorities. Furthermore, all the basic facilities -- banks, transport, customs clearance, etc. -- are in one place and are easily accessible. The Association has been

successful in having a law for the establishment and organization of industrial estates promulgated. However, much work must still be done to put this law into effect.

5. Regional and international cooperation

As was already indicated in the first part of this paper, the Association of Lebanese Industrialists plays a very active role in promoting regional and international cooperation in the interest of (actual and potential) industrial entrepreneurs in Lebanon.

The Association seeks regional and international cooperation to back up the various extension services it hopes to provide to the manufacturing sector, especially with regard to the following:

(a) Loosening trade and tariff barriers;

(b) Assistance in management-development programmes;

(c) Securing fellowships for training entrepreneurs abroad;

(d) Business information feedback;

(e) Securing expert assistance in particular fields;

(f) Participation in specialized seminars and similar activities, and the dissemination of knowledge thus acquired.

G. Concluding remarks

The development and/or creation of indigenous entrepreneurship cannot be achieved in a vacuum -- nor can it be achieved to any acceptable degree when an ambivalent, equivocal, indefinable, and often evasive economic policy is in effect.

In Lebanon, the constitutionally approved economic policy is LIBERALISM; however, there is no clear definition of what is meant by "liberal economic policy" -- no determined guidelines or even rules of conduct.

VII. THE ROLE OF PRIVATE-SECTOR BUSINESS ASSOCIATIONS IN PROVIDING EXTENSION AND SUPPORT SERVICES FOR SMALL- AND MEDIUM-SCALE ENTERPRISES

by Abdul-Hamid Malakani*

A. Introduction

The choice of the subject of entrepreneurship is timely and appropriate, as it is an essential factor in realizing increases in both individual and national incomes -- especially in developing countries. Discussion of this topic is important, as practical guidelines may be provided for the establishment of small- and medium-scale enterprises which need neither sophisticated technology nor large funds, and which may be set up by graduates of intermediate institutions and universities, by technicians, and by those who have a rather small amount of capital. In addition, such enterprises are apt to generate a lot of employment opportunities.

The present paper is concerned with the role of private-sector associations in providing extension and support services for small- and medium-scale enterprises. The text will explain why and how employers' organizations should bear more responsibility and should develop activities which support the above-mentioned enterprises -- especially within the context of the new world order, international transitions, rapid global developments and technological changes, the recession in the world economy, and the series of crises and difficulties witnessed by the Arab world (and the Middle East in general) in the last few years. Such developments require that all Arab institutions and organizations -- including chambers of industry (regardless of the nature of their functions and activities) -- should prepare themselves to play a new role, armed with open minds and clear vision, and equipped with new instruments and mechanisms in their attempts to adjust themselves to actual situations.

A considerable portion of this text has been derived from the author's practical experience and from the actual practices of employers' organizations in general, and of the Damascus Chamber of Industry in the Syrian Arab Republic in particular.

B. Employers' organizations

Employers' organizations play a role in providing extension and support services for small- and medium-scale enterprises. These organizations are comprised of groups of owners of business concerns -- merchants, industrialists and service providers -- seeking

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to safeguard their interests and improve their standards of living. Businessmen normally set regulations and exercise control; they also take all the risks associated with their established enterprises, with a view to realizing profitability -- though they are equally exposed to the possibilities of profit and loss. As they aim at achieving success, their work is characterized by perseverance, ambition and creativity, according to Dr. R. Gloss and Dr. Harold Baker. Labour codes in the Arab countries consider an employer any person or corporate body employing one worker or more for certain wages.

Employers' organizations first appeared in ancient Mesopotamian civilizations (Assyria and Babylon); groups of craftsmen joined to form associations which were designed to safeguard the interests of their members, to help them realize their objectives, and to act as a mechanism for linkage among the members, on the one hand, and between governmental authorities and workers' organizations, on the other hand.

Even though employers' organizations may assume various names -- chambers, associations, unions, leagues, guilds or syndicates -- they have common objectives: they are non-profit institutions which serve public interests in both the economic and social fields; they bring the interests of their members and those of the public into accord; and they explain the aims and viewpoints of their members to society.

Regarding the establishment of employers' organizations, the diversification and expansion in the economic activity of employers over the ages made it increasingly necessary for guilds to specialize in some particular types of activities.

Some of these guilds independently specialized in commercial, industrial or agricultural affairs, while other preferred dual formats and/or specializations, consequently forming either chambers of commerce and industry or chambers of commerce and agriculture, or else unions of chambers of commerce/industry. Some organizations were transmuted into regional unions/federations in order to ensure coordination among the members of different unions and chambers -- as in the case of the Union of Chambers of Commerce, Industry and Agriculture for Arab Countries. Subsequently, as those organizations grew with remarkable speed, the need to establish international bodies arose, and the International Chamber of Commerce, the International Organization for Employers, and other international organizations were set up.

These circumstances apply to the Arab world as well, and in a similar fashion. In ancient times, Arab craftsmen and artisans joined to form associations or bodies that brought them together and safeguarded their interests; these bodies were called "Al-Sunoof" -- categories or groups -- each of which was a syndicate or a guild. The Arab community at present does not differ from other communities in that its employers have banded together within business associations that are designed to administer their affairs, watch over their interests and represent them before official authorities and other (unofficial) bodies. Such associations have taken varigus forms; some are the more formal public institutions, while others are private institutions which exist as syndicates or societies for employers. In many Arab countries, they take the form of commercial, industrial and agricultural unions. Others, however, combine the institutional structures of both public and private institutions. These also exist in the form of commercial, industrial and

agricultural unions and chambers; however, they differ from private institutions in that the former include representatives of the public sector within their membership, are controlled -- from a remote distance -- by some governmental authority or another (according to the kind of activity exercised by each institution), and have several public-sector representatives on their board.

In spite of the different formats and systems applied in the creation of the various Arab chambers and unions, they have all played an important role (in addition to their normal functions) in: promoting industrial, commercial and agricultural investment; supporting economic activity and economic and social development plans; and developing economic relations with other Arab and foreign countries. This has been (and will continue to be) achieved through participation in national, regional and international conferences, conventions, seminars and meetings in which constructive recommendations that uphold inter-Arab economic relations are adopted.

C. Small- and medium-scale enterprises (SMEs)

Before clarifying the important role played by small- and medium-scale enterprises in supporting the economy and in realizing economic and social development in any country, the enterprises themselves must be discussed: when should they be small or medium-sized, and what are the criteria applied in classifying them into large-, medium- or small-scale enterprises?

1. Number of workers

This criterion is the one most widely used to define the size of an industrial enterprise, though there are no internationally agreed-upon numbers for classifying industries into small-, medium- or large-scale entities. In developed countries, industrial enterprises which employ less than 200-300 workers are considered small, whereas in some developing countries industrial concerns which employ 1-50 workers are considered small, and those which employ 51-200 workers are considered medium-sized. In other developing countries, those enterprises which employ 50-100 workers are considered medium-sized, and those which employ more are considered large.

2. Amount of capital

Despite the importance of this criterion, it is not always easy to gauge or depend on, since in most cases only the book value -- which is rather low and unreal -- is appraised. All the same, those countries or enterprises that apply this criterion in determining size classification give greater weight to capital and also stress that it should be neither wasted nor used inefficiently, because it is the most essential element for establishing SMEs. However, only a few countries have adopted this criterion (one of these is India) since it is rather difficult to apply.

D. The capacity of SMEs and the amount of support they should receive

Before discussing the role of employers' organizations in providing entrepreneurship training, it is necessary to demonstrate the importance of supporting SMEs, using size as a criterion for that support (since changes in the size of an enterprise do not always necessitate any changes in its basic specifications or characteristics, unless such changes occur as a result of the application of new techniques or the alteration of types and quality of products).

Generally speaking, capacity or the lack thereof in production is not always associated with size. There are some countries where large industries have played an outstanding role in combating unemployment; alternatively, in some countries (such as the Philippines, since 1985), small enterprises manufacturing many different goods -- e.g., textiles, medicaments, pottery, glassware and electrical equipment -- have played the same role.

There are many people who none the less believe that small- and medium-scale enterprises form the essential nuclei for large industries, and that within them many things can be done, such as providing training, taming and assimilating technology, developing managerial and technical skills, and improving efficiency in production and marketing. They also believe that such enterprises form one of the most important and practical solutions to the problem of unemployment.

The same people assert that some large industries are based on separate and divided processes; each process can be carried out smoothly and easily while good quality is simultaneously maintained. This no doubt makes the activities carried out by SMEs (as subcontractors) supplementary to the activities carried out by large industrial enterprises, at the same time ensuring good work opportunities. In some kinds of industry, this process would lead to integration.

It should be stated here, however, that SMEs prefer to be coordinated and integrated with each other in order to be able to produce finished and marketable goods in the event that large industries experience crises and difficulties. Moreover, SMEs conduct business differently, and are characterized by cost-saving, by the easy relationship that exists between employers and workers, by a relative absence of routine, by rapid decision-making, and by low wages for labourers.

There are a number of disadvantages associated with SMEs. First, SMEs are usually unable to procure raw materials as efficiently or as inexpensively as the larger industries. Second, they are less able to use and recycle wastes -- which means that the costs of their products will generally be higher. Third, they are usually less capable in technical matters with regard to ensuring the procurement and maintenance of machinery with adequate specifications. Fourth, they lack sufficient skills in production, marketing and training. Fifth, they face more difficulties in obtaining funds and acquiring information. And finally, they are unable to cope with routine procedures as well as the larger concerns.

Thus, the debate continues on the economic aspects, advantages and disadvantages of SMEs; and the search continues for suitable enterprises, convenient investment environments, appropriate legislation and other requisites for developing SMEs within the framework of the economic growth process and in the context of the implementation of policies for comprehensive economic and social development.

Notwithstanding all the arguments and disparate views, SMEs are in existence, and they all play their roles in one way or another.

E. The role of employers' organizations in providing extension and support services for small- and medium-scale enterprises

1. The role of employers' organizations in providing extension and training services to aspiring entrepreneurs

Employers' organizations must be prepared to provide extension and training services to aspiring entrepreneurs; such services can be extended to those most qualified to establish and run SMEs, and can then make these people successful employers.

This requires that employers' organizations familiarize themselves with the different sources of investment opportunities, many of which are related to (or derived from) the following:

(a) The economic and social plans of their countries;

(b) Economic and social policies (as well as new legislation implemented) in their countries;

(c) Importation;

(d) Existing industries and their products;

(e) Inputs and outputs of economic sectors;

(f) Available natural resources such as agricultural produce, raw materials and mineral/halogenic ores;

(g) Traditional industries and national talents;

(h) Trends and needs of the local market;

(i) Export potential;

(j) Requirements of basic structures, public utilities and institutions;

(k) The new products and production methods of existing industries;

(l) Inventories of projects listed as investment opportunities;

(m) Feasibility studies for promising projects, prepared and arranged in order of priority. Such studies, however, should cover several aspects -- especially the following:

(i) Production capacity, actual production programmes and materials inputs;

(ii) Market position, volume of demand and sales;

(iii) Site-engineering and construction works;

(iv) Overhead expenses -- operational and managerial expenses;

(v) Financial analysis -- operating expenses, funding, and production costs and profitability;

(vi) Availability of the labour force.

Before initial feasibility studies are carried out, however, it is essential to answer the following questions:

(a) Is the capital of the project within or beyond the financial capacity and amount of funds available to the entrepreneur?

(b) Can production be ensured at reasonable prices?

(c) In technical terms, can the project be implemented?

(d) Is the size of the project proportional to its ability to compete and to satisfy the needs of local and neighbouring markets?

Subsequently, employers' organizations may form closer relationships with aspiring entrepreneurs, stimulating and guiding them towards establishing SMEs in accordance with their material and natural capabilities -- talents, dexterity and dynamism -- and to be instrumental in helping to transform investment sources and opportunities into profitable projects.

Employers' organizations could, at the first stage, provide training to entrepreneurs on understanding environmental circumstances and on choosing and training employees. They could then sharpen the entrepreneurs' practical and scientific skills, develop and enhance their entrepreneurial abilities, and enable them to choose viable and durable projects. At the second stage, employers' organizations could assist entrepreneurs by carrying out detailed studies of the production, marketing and financial aspects of their projects, and by preparing a comprehensive working plan for their proposed projects so that detailed information could be submitted to competent financial institutions for assessment

and/or to obtain loans. After the implementation of projects, the employers' organizations could offer advice and provide follow-up services related to bookkeeping, operations, etc.

Owners of existing enterprises might also benefit from the efforts of employers' organizations, as such organizations could help them design and implement plans to expand and diversify their concerns, and could train them in accordance with their individual and practical needs.

2. The role of employers' organizations in providing training for the operation and running of SMEs

The functions and activities of the employers' organizations increase steadily day by day, given the increasing complexity of contemporary life -- particularly the global changes, crises and difficulties which have thus far characterized the 1990s, as well as the global recession, the growth of protectionism, the increase in the prices of processed goods, the perpetual (and remarkable) deficits in the trade balance, rapid technological changes, the return of revenues from the developing world to developed countries, and finally, the economic slow-down which occurred world-wide in the aftermath of the oil shock in 1979, throughout the 1980s, and following the Gulf crisis in 1991.

Accordingly, employers' organizations have had to react and adjust to the dramatic changes in the world economy and to resort to a series of actions aimed at coping -- as rapidly as possible -- with balance-of-payments difficulties and price instability.

These organizations must implement long-term structural-adjustment programmes which focus specifically on offering training (to those interested) on how to establish and choose SME projects. Employers' organizations must train their staff to meet these needs. Training for both SME owners and employees is an important component of SME-building and maintenance, but is very often ignored -- due to the non-existence of in-house training centres, the fact that entrepreneurs do not avail themselves of existing centres, the high cost of establishing training centres, the difficulty experienced in securing adequately qualified trainers, or to the belief of the owners of these enterprises that training is unimportant and offers few advantages.

That which should be done by employers' organizations may be summed up as follows:

(a) Supporting the personnel of their member establishments and providing the necessary assistance for their training;

(b) Creating an awareness among SMEs of the need to supervise the actions of personnel -- especially executives -- with a view to creating a sense of responsibility among them;

(c) Guiding these enterprises to choose their employees carefully, in compliance with the principle of "the right man in the right place";

(d) Stressing the need to adopt productivity and flexibility as the principal criteria for promotion and as the basis for the provision of material and other incentives;

(e) Creating comfortable working conditions and better relationships among employees so that they become a unified working team, as well as creating a kind of "labour stability" so that the capacities of the employees can be utilized to the fullest extent;

(f) Answering the inquiries of the enterprises and offering them legal and economic advice through the systems and divisions of the employers' organizations;

(g) Depending on a number of the larger and more typical member enterprises to train the owners of existing SMEs or aspriring entrepreneurs;

(h) Holding training courses and workshops on each type of industrial activity;

(i) Encouraging training within the establishments and factories themselves;

(j) Choosing and grooming trainers carefully, and setting up the nucleus of an efficient training system within the framework of the employers' organizations;

(k) Gradually increasing training efforts so that a dedicated unit specializing in training might be established;

(l) Securing the means and material required for training in various specialties;

(m) Allocating certain amounts of money for training within the budgets of employers' organizations;

(n) Offering consultation and guidance (in the field of training) to those enterprises already associated with employers' organizations, and offering training to SMEs;

(o) Setting up training programmes to be implemented by employers' organizations in order of priority, arranged in accordance with the relative importance and basic requirements of the industries in question;

(p) Endeavouring to offer follow-up training to those who have previously attended training courses held by employers' organizations;

(q) Coordinating the efforts of employers' organizations so that they may benefit from each other's experiences and avoid replication in implementation and the waste of time and money;

(r) Developing training programmes and materials in line with the technological developments occurring within various industries and with regard to industrial machinery;

(s) Making continuous efforts to encourage a "training consciousness" among employers by stressing the advantages of training -- especially the economic benefits derived from increased productivity within their establishments;

(t) Designing specific formats for each of the basic training programmes required for the various industrial activities, in collaboration with experts and specialists;

(u) Availing themselves of the experience of Arab and international organizations in the field of training.

Employers' organizations should be aware of the objectives sought by SMEs, should be able to project which problems are likely to be encountered by such enterprises, and should be prepared to provide (together with the government authorities) the following services:

(a) Technical and statistical information;

(b) Marketing assistance;

(c) Managerial development;

(d) Advisory services;

(e) Training for entrepreneurs and their personnel;

(f) Help with the procuring of loans, financial subsidies and tax relief;

(g) Help with the procuring of equipment and machinery, either on a lease basis or through convenient instalment plans;

(h) Coordination and supervision;

(i) Feasibility studies.

In the author's opinion, exceptional subsidies should be offered to SMEs on a selective basis, so that money is not wasted on enterprises that do not merit support. Moreover, these subsidies should be used to realize economic and social objectives and to promote coordination among enterprises -- particularly SMEs -- with equal importance placed on creating employment opportunities and on the capacity of these enterprises to invest their capital wisely.

F. The informal sector contrasted with some small-scale enterprises

Global events and developments have overlapped with profound changes in the Arab world and have had a dramatic economic and social impact. Regional wars and crises and the emergence of newly independent Arab States with their nascent institutions all left their mark. The Arab World had to organize its internal -- national and social -- institutions, structures and interests in accordance with traditional heritage, the responsibilities of the modern State, and the tasks of economic and social development; their successes and failures have had a great impact on the economic and social transitions that have occurred in the Arab world. These transitions have resulted, inter alia, in the emergence of an informal "self-employed" sector which has only recently been recognized.

The informal sector can be judged from a number of angles, whether negatively or positively. It is a provider of employment and incomes for millions who would otherwise lack the means of survival. Moreover, it is a breeding ground for entrepreneurship and a source of SMEs. However, it can only thrive if unimpeded by unnecessary administrative/bureaucratic rules and regulations; in fact, it is characterized by its avoidance of regulation and protection. At any rate, this sector has become so important that it cannot be ignored any longer. Being "labour absorbent", it should be promoted and gradually covered by regulatory procedures and social protection so that its ability to provide jobs and incomes to a rapidly growing labour force is not reduced. First, however, the two inconsistent objectives of labour absorption and regulation must be reconciled, with the role of employers' organizations defined vis-a-vis their capacity to foster growth in the informal sector and transform it gradually into a more formal one made up of SMEs, existing within the framework of laws and regulations.

The informal sector is not totally isolated from the more modern, formal one, as the labour force of the more formally structured economy is comprised of those who work in the informal sector; the latter represents a reserve of employment opportunities which can be resorted to in times of expansion or recession. Some units of the informal sector rely (for ensuring their inputs) on modern establishments which sometimes practise monopoly; these units often form commercial nets controlled by the aforementioned establishments.

The role of employers' organizations in fostering the informal sector and improving working conditions within it will be reviewed below; however, one should bear in mind that this role differs between one country and another according to the type of informal sector that exists and the circumstances of the employers' organizations prevailing in each country. Despite the differences, there are certain common endeavours that employers' organizations might engage in within this sector:

(a) Get in touch with the informal sector to understand its circumstances, hardships and difficulties, with a view to solving its problems and facilitating its cooperation and integration with the formally structured sector;

(b) Draw up a plan for collecting information about this sector so that any measures proposed will be more realistic and applicable, and the treatments fruitful and useful;

(c) Design special programmes in the informal sector for ensuring/improving skills and techniques that will help increase productive capacity in this sector and improve the living conditions for those who work in it;

(d) Encourage the employers' organizations to cooperate with the Government in drawing up comprehensive economic and social plans by proposing a strategy for development that takes into consideration the role of the informal sector;

(e) Propose laws, standards and regulations that would relieve this sector of its constraints, and gradually extend social protection to it -- first, by offering basic rights; second, by offering vocational safety and health protection; third, by facilitating and expanding education; and so on;

(f) Study ways to provide assistance to this sector in its production aspects; i.e., facilitate the means for securing raw materials, ensure better ownership/management style of the workplace, improve the utilities and services offered to this sector (e.g., lodging, water, electricity and transport), help stimulate greater demand for its products, promote the cooperation of this sector with others in transactions where it acts as a subcontractor catering to the formal sector, intercede with bankers for some well-known producers in this sector with a view to obtaining credit facilities that would improve their quality and quantity of production, and intercede with training institutes for training opportunities for this sector -- especially its productive division. All of the measures above are aimed at improving the working conditions in this sector;

(g) Try to assimilate this sector into employers' organizations by setting up ad hoc committees (for example, within the framework of such organizations) that would speak for this sector, safeguard its interests and explain and tackle its problems.

G. Conclusion

It may be concluded from the above that as a result of the rapid economic developments, international transitions, global incidents and the rise of the new world order, employers' organizations have to assume additional duties and obligations, especially with respect to SMEs, which play a very important role in creating employment opportunities and in supporting the economy.

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VIII. THE ROLE OF FINANCE IN INDUSTRIAL DEVELOPMENT: THE EXPERIENCE OF THE SULTANATE OF OMAN

by Murtadha Fadhil*

A. Background of the Oman Development Bank

Once the Government of Oman had begun to organize and structure its country's economy, the need for solid financial institutions became apparent; the Oman Development Bank was one such entity. The Central Bank of Oman was the first financial institution to be established, and was set up to monitor the activities of the commercial banks and to control other financial matters within the economy.

Commercial bnks can provide short-term loans to businesses, but these are too often insufficient for the medium- and long-term needs of industrial projects; furthermore, Oman's financial system includes no official mechanism for supporting productive development projects in the private sector. The Government, however, appreciates the importance of promoting, encouraging and helping the private sector to finance its projects, and has therefore stipulated in a resolution by the Development Council (which is concerned with the objectives and policies of economic development in the Sultanate) that the basis of the development policy for integrating the constituent elements of the national economy shall be the giving of due emphasis to the role of the private sector and the rendering to it of all the support it needs to play that role in the development process.

Consequently, the idea of establishing the Oman Development Bank arose and was embodied in the first Five-Year Development Plan (1975-1980). Royal Decree No. 31/76 was issued in 1976 establishing the Bank, which commenced its activities in 1979.

B. Domestic economic developments: the fourth Five-Year Plan (1991-1995)

Implementation of the fourth Five-Year Plan began in 1991. The Plan was built on the assumption that the average price of oil would be $US 20 per barrel during the five years covered by the Plan. It also envisaged an average daily output of about 682,000 barrels, against 614,000 barrels during the previous Plan.

One of the most important objectives of the Plan is to work towards realizing growth in the different production sectors -- specifically, to achieve an overall annual average rate of growth of about 6.3 per cent (at current price levels) in gross domestic product (GDP), against an average rate of 5.4 per cent in the third Plan.

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The Plan also emphasizes the need to strengthen the State's financial position and to enhance non-oil earnings by increasing the proportion of net oil earnings transferred to the General Reserve Fund from 5 per cent to 15 per cent.

Because internal and/or external economic changes or fluctuations are to be expected, a contingency reserve provision was added to the Plan under which 7.5 per cent of the net oil earnings are transferred whenever the oil prices range between $US 18 and $US 20 per barrel, but that proportion rises to 10 per cent of the net earnings if a barrel fetches between $US 20 and $US 22.

Another important objective of the Plan is to keep the external debt at the same level reached at the end of the third Plan, and not to resort to any new external borrowing during the years of the Plan unless a resolution to that effect is passed by the Council of Ministers. It is also emphasized that public expenditure shall not increase by more than 3.5 per cent annually during the years of the Plan, and that the deficit between expenditure and earnings should not exceed 10 per cent.

The GDP is expected to increase (according to current prices) from 4,084 million riyals Omani (RO) in 1990 to RO 4,777 million in 1995.

The fourth Plan also projects that public investments will reach RO 2,788 million (an increase of 35.7 per cent over the third Plan), whereas private-sector investments will reach RO 1,319 million (a hike of 47.2 per cent over the third Plan).

In the areas of production and infrastructure, the fourth Plan allots RO 247.4 million for the production of goods (an increase of 49 per cent over the third Plan); RO 318 million for the production of services (an increase of 66 per cent); RO 329.9 million for social structures (a 217 per cent increase); and RO 390.7 million for infrastructure (an increase of 55 per cent).

The fourth Five-Year Plan (1991-1995) has also allotted RO 8 million to subsidize loans granted by the Oman Development Bank; an additional RO 30 million has been earmarked for subsidizing the industrial sector (see table 1 for further details).

C. The Oman Development Bank

1. Objectives

(a) Advancing and guaranteeing medium- and long-term loans to Omani establishments and companies which are subject to Commercial Companies Law No. 4/74 and which are registered in the Sultanate of Oman. These loans are to be used in the financing of development expenditure in industry, agriculture, petroleum, mining, fisheries, services and any other economic sector related to development which would be approved by the Board of Directors of the Bank. In all cases the loans or guarantees advanced to any one project shall not exceed 100 per cent of the paid-up capital of the company or establishment and its reserves, or 10 per cent of the toal resources of the Bank, whichever is less;

Table 1. The Omani Government's projected resources and applications during the fourth Five-Year Plan (1991-1995) (under the item "Contributions and subsidies to the private sector")

(Millions of riyals Omani)

Category	1991	1992	1993	1994	1995	Total
I. Subsidies						
To the industrial sector	6	6	6	6	6	30
To the Oman Housing Bank	6	6	6	6	6	30
To the Oman Development Bank	2	2	2	1	1	08
To the Oman Bank for Agriculture and Fisheries	3	3	3	3	3	15
II. Loans and participation in other domestic, regional and international institutions	7	8	9	11	11	46

Source: Oman, the fourth Five-Year Plan (1991-1995), p. 437.

Note: The Ministry of Commerce and Industry approves the subsidies, and the Oman Development Bank disburses and administers them.

(b) Participating in the capital of Omani joint-stock companies which operate in any of the above-mentioned sectors and which offer their shares for public subscription; this participation shall not exceed 51 per cent of the capital of the company or 10 per cent of the total resources of the Bank, whichever is less;

(c) Providing technical aid to Omani companies, especially with regard to carrying out studies and preparing projects for implementation. Such aid will be provided at the request of the companies and within the limits of the Bank's resources and capabilities;

(d) Accepting savings, demand and time deposits (this activity has not yet been implemented at the Bank);

(e) Obtaining loans from the Government and other parties (including regional and international organizations), either through direct borrowing or in the form of bonds issued for public subscription.

2. Organization

(a) Board of Directors

The Board of Directors is composed of ten members; four of them, including the Chairman, are appointed by the Government.

The Board appoints from amongst its members an Executive Committee which monitors the daily activities of the Bank and approves loans that are within certain limits. Larger loans require the approval of the Board of Directors, which convenes sessions at least four times during the year;

(b) Internal organization

The Bank is comprised of six departments, as follows:

(i) Projects and Follow-up

This Department is responsible for assessing the technical, economic and financial aspects of the development projects. It sets conditions for financing these projects in accordance with the investment requirements and criteria laid down by the Bank. The Department also identifies new opportunities for investment. One of the Department's most important functions is to follow up all phases of the projects financed by the Bank, from establishment to formation, implementation and operation. It also monitors the technical, financial and administrative aspects, and provides assistance and advice to help the projects overcome any obstacles they may encounter. This Department is also responsible for the disbursement of loans already approved;

(ii) Research

The Research Department collects and analyses information on all of the economic sectors in the country and prepares the basic data and particulars needed by the other Bank departments. The Department also follows economic developments in the Gulf region and acts as a source of information for both the Bank departments and the private sector;

(iii) Finance

This Department performs double duty; it is in charge of all accounting matters, and it administers the Bank's financial activities with respect to resource utilization and the lending of funds at the domestic level. The Department is also responsible for monitoring the performance of the Bank's investments and loans;

(iv) Legal

This Department deals with all of the Bank's legal matters, i.e., legal advice and concluding loan agreements and any other agreements or contracts to which the Bank is a party. It is also responsible for the follow-up of the implementation or execution of such agreements or contracts.

The Legal Department also files cases of default (through the Bank's lawyers) with the Authority for the Settlement of Commercial Disputes, and subsequently follows up on the court's judgement;

(v) Administration

This Department carries out all the duties related to the Bank's administration and personnel, and also performs public-relations functions;

(vi) Internal Auditing

This Department audits (examines and verifies) all of the Bank's activities and submits reports and recommendations to the Chairman of the Board of Directors.

3. Resources and terms of financing

(a) Financial resources and other particulars

Capital of the Bank: RO 10 million

Shareholders:	Government of the Sultanate of Oman	54 %
	Regional and foreign institutions	40 %
	Omani organizations and individuals	6 %

The Bank is currently studying the feasibility of raising its capital to RO 20 million;

(b) Terms of financing

To implement its aforementioned objectives (as determined by the Royal Decree), the Bank provides the following terms:

(i) Low interest rates

The actual rate of interest is currently 9 per cent, but the Government grants a subsidy which reduces the rate applied to the amounts disbursed to between 3 and 6 per cent, depending on the location of the project. Payment of interest (in quarterly instalments) commences six months after disbursement of the first part of the loan; it can, however, be amalgamated with the principal and be paid jointly with the principal's instalments;

(ii) Easy repayment terms

The loan is repayable in quarterly instalments after the lapse of a grace period which ranges between six months and one year from the time production operations commence. The pay-back period of the loan ranges between three and eight years, though a maximum of 10 years is allowed if necessary. Included in the loan pay-back period is a grace period to cover the time of construction and the first year from the date production begins.

4. The support of small-scale projects

The Bank, in response to the Royal Directives and in appreciation of the need to establish an industrial base for the country, has set up a plan to provide medium- and long-term loans to graduates of vocational training institutes, to private professionals, and to small-scale entrepreneurs to help them establish their own private projects. The plan (described in greater detail below) includes a programme of easy repayment terms and low interest rates. This is expected to help the country achieve its goal of "Omanization" and to encourage entrepreneurship.

(a) Small-scale industries

Entrepreneurs whose projects require less than RO 100,000 for start-up can benefit from this plan. Any solid idea for a development project will be encouraged by the Bank, then studied and evaluated for its viability, after which a financing plan can be set up. The Oman Development Bank can provide one third of the investment, the Ministry of Commerce and Industry one third, and the investor the remaining one third (as equity). The Bank loans carry an interest rate of 3 per cent, with repayment over four to five years, while the Ministry loans are interest-free and may be repaid over about 10 years;

(b) Vocational training graduates

To encourage self-reliance and personal involvement in business, the Oman Development Bank has introduced a scheme to help finance the setting up of units by vocational training graduates. The Bank can finance up to 50 per cent of the cost of the investment, while the graduates provide the other 50 per cent;

(c) Financing scheme for professionals

In 1991, the Bank introduced a scheme to further enhance Omanization and increase reliance on local professionals. The main objective of the scheme is to help graduates (or holders of any equivalent degree) in the setting up of professional units.

The scheme is divided into two sub-schemes:

(i) Professionals devoting all of their time to their enterprises will get maximum assistance in setting them up (80 per cent of their investment costs), with very low interest rates ranging from 0 to 3 per cent;

(ii) Professionals devoting only part of their time to their enterprises are entitled to 50 per cent of the investment cost, and must pay the Bank's prevailing rates of interest.

So far the plan has been successful; about 35 small-scale industries and service projects have been granted loans totalling more than RO 678,000.

5. The export-promotion unit

The Government of His Majesty Sultan Qaboos has made the promotion of foreign trade one of its objectives under the current Five-Year Plan, with particular emphasis on promoting non-oil exports. This objective is a natural consequence of both the expansion of the Omani economy's industrial base and the provision of new mechanisms for financing export activities. These measures are designed to reduce the State's dependence on crude oil sales, to create job opportunities for Omani youth, and to encourage Omani companies to become more competitive in external markets.

To implement this part of the Five-Year Plan, the Development Council issued resolution No. 62/89 during a meeting held on 12 November 1989, providing for the establishment of an export-promotion unit under the management of the Oman Development Bank. The role of this unit is to study the different ways of promoting exports and to make recommendations in that respect to the Development Council. A detailed scheme for export financing was in fact actually developed, and was implemented on 1 November 1991.

Main objectives of the Unit

One of the most important objectives of the development strategy in Oman is to diversify the sources of national income; increasing emphasis is being placed on non-oil

exports. The fourth Five-Year Plan has stressed this objective. One of the elements needed to realize this goal is a system which could provide banking and financing facilities to help Omani companies export their products. Such a system would be expected to increase the country's exchange earnings and to allow companies to operate at full production capacity. Such a system would also likely lead to a certain degree of integration and cooperation amongst the various production sectors to allow them to cope better with exporting requirements.

All of the objectives above are expected to be realized through the issuing of guarantees to Omani exporters, giving them security with regard to their export sales returns. These guarantees cover risks of non-payment or suspension of payments by importers for commercial, economic or political reasons. This system also provides exporting companies with a financing subsidy which enables them to reduce their export costs. The subsidy is granted for export loans by subtracting 5 per cent from the commercial cost of borrowing, to be applied throughout the period of export financing.

The Bank always endeavours to adjust its policies to reflect and cope with economic developments in the country, and it makes its services available to any economic sector which is created in response to economic circumstances and exigencies.

6. Activities of the Bank

From the commencement of its operations in 1979 up to December 1992, the Bank financed more than 370 projects by providing them with loans totalling about RO 67 million -- part of a total investment of RO 214 million expended in the manufacturing and production sectors (foodstuffs, chemicals, building materials, agriculture and fisheries, paper and printing, ready-made garments, shoes, metal products, etc.) and in the service sector (medical centres, schools, hotels, etc.). The role of the Bank does not end with the advancing of loans; it continues to keep an eye on the projects, following them up closely to ensure that they are being well-run. The Bank is especially keen to provide assistance to the projects during the formation and start-up phases. Bank supervisors monitor the progress of a project during the period of the loan, providing comprehensive consultancy and advisory services.

The sum of the Bank's activities during the period 1979-1992

From its establishment in 1979 to the end of 1992, the Bank financed 380 projects for a total of RO 70,744,130 -- RO 67,923,500 in the form of loans, with the balance (RO 2,820,630) reflecting the Bank's participation in the capital of joint-stock companies.

The sheer magnitude of the projects financed by the Bank indicates that a great many small industries and enterprises in the Sultanate have benefited from the Bank's financial plans and activities. The industrial sector contributes 4.5 per cent to GDP; the Oman Development Bank has contributed at least 70 per cent towards that share.

Table 2. The Oman Development Bank's financial activities, 1979-1992
(Thousands of riyals Omani)

Sector	Number of projects	Total cost of the project	Bank's loan (a)	Bank's participation (b)	Total Bank financing (a+b)
Food and beverage industries and warehouse facilities	74	32 531	14 915	--	14 915
Chemical industries	63	34 512	15 772	--	15 772
Building materials	57	49 847	11 279	193	11 472
Furniture industries	13	4 986	2 245	--	2 245
Agriculture and fisheries	19	17 861	4 995	180	5 175
Paper and printing	34	11 500	4 832	--	4 832
Textiles and garments	11	10 985	2 775	--	2 775
Metal products	25	11 141	5 013	1 017	6 030
Other industries	11	7 269	2 221	--	2 221
Small-scale industries and vocational training	35	15 595	678	--	678
Services	23	14 026	2 829	--	2 829
Oman Bank for Agriculture and Fisheries	1	--	--	100	100
Oman Housing Bank	1	--	--	30	30
National Transport Company	1	--	--	1	1
Oman Marine Protection Company	1	--	--	50	50
Total	369	210 253	67 554	1 571	69 125

Note : "--" signifies that the figure is nil or negligible.

IX. THE SMALL- AND MICRO-ENTERPRISE DEVELOPMENT PROJECT OF THE ALEXANDRIA BUSINESSMEN'S ASSOCIATION IN EGYPT

by Nabil A. El-Shami*

A. The advantages of private-sector associations

Private-sector associations are good candidates for the initiation and implementation of small-scale-enterprise development programmes. They generally have a number of advantages:

(a) Proximity to the beneficiaries or client population;

(b) A willingness to experiment with new methodologies;

(c) The capacity to combine credit provision with non-financial assistance;

(d) The interest of donors in providing grants and technical assistance to private-sector associations for the extension of credit to small-scale enterprises;

(e) The ability to create links with financial institutions through the clients. Private-sector associations teach clients how to manage and utilize credit, then guide them gradually into a direct relationship with the financial institutions.

Credit is one of the most important inputs in assisting small and micro enterprises (SMEs). Credit is not an end in itself, but rather a means to an end. Credit input by private-sector associations may help to:

(a) Develop the community's sense of financial responsibility;

(b) Strengthen the relationship between these associations and the community (in terms of both trust and economics);

(c) Give the associations the opportunity to learn about the economic realities of the informal sector.

Over time, this will help the associations to better identify, design, and provide for other, equally important inputs such as training and/or services in marketing, management and technology.

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B. The Small- and Micro-Enterprise (SME) Project of the Alexandria Businessmen's Association

The Alexandria Businessmen's Association (ABA) is a non-profit organization formed in March 1988 by the leading businessmen of Alexandria. It is registered with the Ministry of Social Affairs (MOSA) and has an active, elected board of directors comprised of 15 volunteer members. ABA's mission is to strengthen relations between businesses and Government, create a favourable environment for developing trade and investment, and cultivate relations between Egyptian and foreign businessmen. ABA also plays an important role in community services and development through the establishment of hospitals, schools, and other welfare services.

1. The ABA Small- and Micro-Enterprise Project

One of the most effective services provided by ABA, in cooperation with the United States Agency for International Development (USAID), is the Small- and Micro-Enterprise (SME) Project. The Project's goals are to develop and promote existing small (6-15 employees) and micro (1-5 employees) enterprises, to raise the income of SMEs, and to contribute to solving the problem of unemployment. The Project's philosophy and objectives are:

(a) To be managed from a private-sector perspective, as the private sector is more in tune with the problems faced by entrepreneurs, and is in a better position to promote satisfactory growth and increase productivity;

(b) To be supported by businesses, ensuring self-sufficiency in the long run and non-reliance on foreign grants;

(c) To spread Project activities and services to the largest possible number of small and micro enterprises in Alexandria.

2. Project funds

A cooperation agreement between ABA and USAID was signed to provide ABA with the funds and technical assistance needed to execute the SME Project and reach its targets. The USAID grant amounts to $US 10 million and covers a project duration of seven years (the Project was begun in 1989). Twenty per cent of the grant has been earmarked to cover operational expenses for the Project until it achieves self-sufficiency.

3. Project methodology

The Project design was based on that of similar projects implemented in South-East Asian and Latin American countries, though modifications were introduced to suit the Egyptian environment. The basic functions of the ABA/SME Project include the following:

(a) To provide credit, training and technical-assistance services to small and micro enterprises in Alexandria;

(b) To provide initial short-term loans for working capital during the Project start-up phase, followed by loans for fixed assets;*

(c) To use local banks for loan disbursement and repayment;

(d) To charge borrowers commercial interest rates;

(e) To encourage savings by small and micro entrepreneurs;

(f) To ensure that the sizes of the loans are appropriate for each type of business and are disbursed at the right times;

(g) To periodically follow up and monitor performance;

(h) To compile and maintain up-to-date information on Project borrowers.

4. Eligible borrowers

Borrowers are SME entrepreneurs who own and operate existing workshops in Alexandria. They should have a minimum of one year of experience in managing and operating their own businesses. The majority of Project borrowers are engaged in the manufacture and/or sale of ready-made garments and textiles, leather products, woodwork and furniture, metal, and plastics.

5. Project organization and management

Upon assuming responsibility for the Project, ABA established an executive committee comprised of three board members to supervise Project activities. An executive director was hired and is responsible for the day-to-day management of the Project. The ABA/SME Project is run by five departments, each of which has a manager who reports directly to the executive director. The departments are: Operations, Management Information Systems (MIS), Financial/Administration, Legal, and the Small Business Centre.

6. The vital role of extension officers

The extension officers (EOs), are attached to the Operations Department and play a key role in developing Project activities. All EOs are university graduates and receive intensive training from the Operations Manager and the respective branch manager before the start of their fieldwork.

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* First-time loans are usually small, while repeat loans, based on the timely repayment of previous loans, can increase in size and terms.

The main functions of the EOs include promoting the Project among potential borrowers, selecting eligible small and micro entrepreneurs, proposing loan amounts and terms for each borrower, and providing the services requested in cooperation with the Project departments. The EOs pay regular visits to clients to strengthen relationships, evaluate their activities, and follow up on repayments. The MIS Department provides the EOs with repayment reports on their borrowers, which enables them to follow up on instalments and identify delinquent borrowers.

In addition to their basic salaries, the EOs receive an incentive payment based on the number of new loans disbursed per month and the repayment rate. A minimum repayment rate of 97 per cent and 20 new loans are required for an EO to be eligible for the incentive (the minimum is ten new loans for EOs with less than three months on the job).

This particular incentive scheme enables the Executive Director, the Operations Manager, and the branch managers to follow up and evaluate the EOs' performance on a monthly basis and to recommend strategies and/or solutions for difficult cases whenever the need arises.

7. SME credit programme

The SME Project was designed to ensure the access of the largest possible number of small and micro enterprises to ABA/SME credit and outreach activities and facilities. One of the main programme features is ensuring quick loan delivery. First-time borrowers' loans are processed and disbursed within two weeks, and repeat loans are disbursed within 72 hours. As a result, the Project is able to disburse 600 loans per month, or 23 loans per day (6 working days/week). The credit requirements and conditions which exist at commercial banks -- e.g., complicated feasibility studies, credit collateral, and lengthy procedures -- are the main obstacles facing small and micro entrepreneurs. ABA/SME management has directed its attention towards simplifying lending procedures. The most important requirements for a small or micro entrepreneur to obtain a loan from ABA/SME are skills, personal reputation, and the workshop's level of productivity and management. Experience has revealed that these factors are the key to the SME Project's success. This is supported by the high repayment levels (99 per cent). Loan size ranges from 500 Egyptian pounds (LE) to LE 3,000 for micro enterprises and from LE 5,000 to LE 25,000 for small enterprises. Loan terms range from 4 to 12 months, with monthly payments on principal and interest.

Repeat loans to borrowers who have good repayment records can be increased in terms of both the size and the duration of the instalment schedule. The size of the loan is determined by a preliminary study conducted by the extension officer. In general, loans for working capital are repaid over a 12-month period, and those for fixed assets follow an 18-month instalment schedule.

8. Non-financial assistance

The Project established the Small Business Service Centre (SBSC) as a technical-support facility designed to address the non-financial needs of entrepreneurs and to perform

a complementary function to the credit-delivery mechanism by providing training in areas such as costing, pricing, accounting, production planning, quality improvement, and marketing.

C. The socio-economic impact of the SME Project on clients

A socio-economic survey of 30 per cent of the beneficiaries showed very interesting results, the details of which are provided below:

1. Profile of surveyed clients

Gender:	Male	89 %
	Female	11 %
Age:	Below 30 years old	14 %
	30-40 years old	56 %
	40-50 years old	30 %
Number of loans received:	Received two loans	78 %
	Received three loans	15 %
	Received four loans	7 %
Education:	University graduates	6 %
	High-school level	20 %
	Can read and write	74 %
Activity:	Garments	35 %
	Leather products	13 %
	Woodworking	20 %
	Metal products	13 %
	Miscellaneous activities	19 %

2. Socio-economic results

Increase in employment	26 %
Increase in labour wages	28 %
Increase in production	48 %

Each loan amounting to $US 500 created one new job.

Total number of jobs created: 11,800

D. Conclusion

The Small-and Micro-Enterprise Project in Egypt has proven its effectiveness by increasing the incomes of workers and small and micro entrepreneurs, and by helping to develop a stable business climate (which strengthens the Egyptian economy). The Project has found a way to successfully provide loans for the development of small and micro enterprises, without the cumbersome legal and collateral procedures usually required. It has also succeeded in ensuring a high repayment rate.

X. THE EXPERIENCE OF DEVELOPMENT AND LENDING INSTITUTIONS IN THE GAZA STRIP

by Salah Abed Shafi*

A. Background

In 1967, with the beginning of Israel's occupation of the West Bank and Gaza Strip, the Israeli authorities imposed their first measures directed towards destroying the economic infrastructure of these areas. Dependence upon the Israeli economy grew as all banks and financial institutions were prohibited from operating in the occupied territories.

The Israeli authorities gradually introduced Israeli currency to replace both the Jordanian dinar (JD) and the Egyptian pound (LE); while the JD was formally allowed to circulate in the West Bank, only the Israeli shekel was allowed in the Gaza Strip. Moreover, authorities began to permit Israeli banks to open branches in the main cities of the West Bank and Gaza.

The absence of a local financial and banking infrastructure led to serious problems in the financial sector -- especially with regard to savings and investment. Local capital generally found its way to neighbouring Arab countries, as (understandably) Arab banks were considered "safer" than Israeli banks.

An alternative approach adopted by local Palestinians was the investment of capital in property and real estate -- especially in the Gaza Strip. Dealing with Israeli banks were then limited to daily transactions related to buying and selling, and to normal current accounts for merchants and shop owners. Israeli banks offered no credit or investment services, and refused to become involved in any development activities.

Other disadvantages conncected to Israeli banks included their high interest rates, the continuous devaluation of the Israeli currency up to the 1980s, and the fear of the locals regarding the consequences of non-payment of loans; in many such cases, belongings were confiscated by force, with Israeli army support.

In addition to the above, Israeli occupation policy aimed at economic dependency and at preventing the establishment of an industrial infrastructure. Given the area's political instability, one can easily see why there existed an unhealthy environment for investment.

In spite of all this, the term "development" was not included on the Palestinian agenda until the end of the 1970s and the beginning of the 1980s. Priority had always been given to the political struggle in its abstract meaning, while economic development was

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postponed -- classified as a stage or an objective to be considered after the achievement of national independence. From the Palestinian viewpoint, the circumstances existing at the time justified this prioritization.

In the early 1980s, the issue of "development under occupation" was first raised by Palestinian intellectuals. A conference was organized by the Arab Thought Forum at which the concept of "steadfast development" was introduced: development in the occupied territories should focus on reinforcing Palestinian steadfastness in the face of Israeli policies.

In the mid-1980s, the development theme resurfaced, and "the improvement of living standards in the territories" became the main focus. This term was introduced by the American Government and attempts were made to attach it to the Jordan Development Plan. Once the intifadah (uprising) started, it affected all aspects of daily life -- including the economic sector.

The term "resistance economy" was introduced as many ideas were put forward and adopted -- domestic economy, self-sufficiency, a boycott of Israeli products, the manufacturing of alternative products, etc. The primary objective of this targeted development was to serve a specific political purpose related to an "interim stage" and its characteristics.

During the intifadah, new and different managerial/structural forms and systems began to appear, constituting an institutional framework and network as a basis for economic development. Credit and finance institutions were among these newly formed structures.

Subsequently, it became clear that these development institutions had to be integrated with political development -- to prepare the institutions for their important future role, especially as there were political changes that were likely to occur. There was thus a change of direction from "resistance economics" to "the economics of liberation": development of the local economic/ institutional infrastructure in a way that would enable it to cope with the challenges of the independence (or at least the interim) stage.

It is important to mention that, the above notwithstanding, the Gaza Strip has a unique development situation. Institution-building has traditionally had higher priority in the West Bank than in the Gaza Strip. This is primarily due to the pressure of daily living and the nature of the political situation in Gaza, in addition to the restrictions and regulations imposed by the authorities on institutional activities. Moreover, Gazans suffer from low per capita income and high unemployment rates. All of this has made political affairs and the provision of daily necessities a top priority.

An institutional infrastructure must be built using a scientific approach, and a democratic, efficient environment should be cultivated if economic development is to be sustained.

B. Background of credit and finance institutions in the Gaza Strip

There is actually no such thing as a banking and financial sector in the Gaza Strip. The 1967 occupation of the area led to the closure of all banks there -- two Arab Banks and the Bank of Palestine (the assets of the latter were transferred to and controlled by the Israeli Central Bank).

The authorities allowed Israeli banks to operate freely in occupied Gaza; this continued until the early 1980s. However, Israeli banks could provide neither the financial infrastructure nor the banking facilities required for an investment mechanism in the territories. The two main reasons for this are elaborated below:

(a) Israeli policies in the Gaza Strip were designed to discourage (or even prevent) local investment or development. The basic financial mechanism required for encouraging investments thus did not exist. This was only part of a comprehensive policy which sought to keep the Gaza Strip economically dependent on Israel;

(b) The chronically high inflation rate in Israel discouraged local Palestinians from placing any money in Israeli banks. There were also worries over confidentiality -- especially as it related to the tax office. And of course, many had political reasons for refusing to deal with Israeli banks.

As a result, Israeli bank activities were generally limited to daily buying/selling transactions and to normal current-account facilities for merchants who had business interests in Israel. Only 8 per cent of total Israeli loans went to Palestinians in the West Bank and Gaza Strip.[1/] Israeli banks also issued credit facilities for certain Palestinians in the export sector.

In 1981, the military authority agreed to allow the Bank of Palestine to reopen -- with certain restrictions imposed on its activities (such as banning all foreign currency dealings). Reopening the Bank should have been a positive step towards Palestinian economic development. The Bank did not adequately encourage local investment, however, depending instead on citizens' savings. Loans given by the Bank totalled only $US 2 million in 1991, despite the fact that average liquidity[2/] was relatively high[3/] -- approximately 73 per cent. If banks are to contribute to economic development, they must create a solid relationship between savings and investment. If they fail to do so, their activities will be limited to regular daily transactions. Although the overall investment rate is relatively high compared to that of private savings in the occupied territories (at 21 per cent of the net national income), this means little since these funds were generally not used for economic development (local investment projects) because of the absence of a mechanism for directing such investments.

Credit institutions, both local and foreign, fill the gap between supply and demand, whether development opportunities exist or not.

Although many local credit institutions may grow and may increase their annual budgets, they will never be a part of a strong financial/banking infrastructure as long as they depend so heavily on foreign and international assistance to support their programmes.

These credit facilities provide low-interest loans to customers, but place the capital abroad to take advantage of the high interest rates provided by foreign banks. It is important to realize, however, that unless changes are made within these institutions, reliance on foreign assistance will increase, and sudden setbacks may occur as a result of any political changes. Their chances for survival would increase if these institutions were willing to transform themselves into development banks which could use people's savings for local economic development -- and in doing so, prepare an infrastructure that would serve them well once political solutions were reached.

C. Lending institutions in the Gaza Strip

1. Aims

There are many local and foreign credit and financial institutions in the Gaza Strip, as well as one international institution (the United Nations Relief and Works Agency for Palestine Refugees in the Near East, or UNRWA).

While there are many differences in the management, organizational structures and decision-making mechanisms of these institutions, a number of similarities also exist with regard to aims and objectives:

(a) Most of these institutions prefer to finance small and medium-sized projects because they are able to provide opportunities (i.e., create jobs), but do not require a massive investment in terms of initial capital;

(b) All of the credit and financial institutions in Gaza encourage self-sufficiency by supporting local industries; imports are then reduced or replaced, which contributes to decreasing Palestinian dependence on the Israeli economy;

(c) Most of the credit and finance organizations are attempting to improve the management and technical skills of local business people by linking lending with training in management and in the technical fields.

2. Lending criteria

Lending is based on purely "economic" criteria; the project should be feasible and profitable; providing an income for its owner and allowing for timely loan repayment. Loan approval is based, by and large, on the following:

(a) The economic feasibility of the project, determined by a study which includes market research and financial analysis (especially cash flow);

(b) The creation of new job opportunities -- especially important in the Gaza Strip, where the unemployment rate is high;

(c) The project's contribution to decreasing dependence on the Israeli economy. Pioneer projects that fill a gap in the market are especially welcome;

(d) Difficulty in obtaining loans elsewhere. Priority is given to those who find it difficult to approach formal lending and credit institutions and also to new investors who lack financial recommendations;

(e) The degree to which the project contributes to social welfare -- especially the support of minority or disadvantaged groups such as women, the disabled, political prisoners or those who are banned from working in Israel.

3. Targeted economic sectors

Many of the lending institutions and programmes "specialize", targeting specific economic sectors. The industrial sector generally receives the most attention, for the following reasons:

(a) Support for the agricultural sector in Gaza is limited because of the relatively small geographical area, and because of the shortages and poor quality of water;

(b) The industrial sector was ignored for 25 years as a part of Israeli policies directed at preventing industrial development and at promoting dependence on the Israeli economy, so priority is now given to the following industrial subsectors:

(i) Building and reconstruction. This sector is very active in Gaza and is expected to grow, especially if a political settlement is reached;

(ii) Food. Especially important are those food products which require local agricultural raw materials, as there is an excess of vegetables and citrus and certain other fruits, and export opportunities are still limited;

(iii) Textiles. The clothing industry is one of the most important industrial subsectors in Gaza.

4. Loan terms

Loan terms vary from one institution to another, depending on individual policies and the groups targeted. However, loan terms and conditions generally cover the following:

(a) Loan size

Credit institutions generally provide industrial loans which do not exceed $US 30,000 for a small project or $US 120,000 for a medium-sized project. Such loans are

given on the condition that the project owner provides at least 20 to 40 per cent of the total project financing (not including land or buildings).

There is no real agreement as to what consititutes a small or medium-sized project; some measure project size by the number of labourers employed, while the amount of capital being invested is the determining factor in other cases.

There is another factor to be considered with respect to combined roles: the project owner is very often also the technical, financial, and acting manager, and is therefore responsible for the project's execution, funding and daily operations;

(b) Loan repayment period

For an industrial loan, the repayment period varies between two and seven years, depending on the nature of the project and the loan applications. For example, if the loan is to be used to buy machines and/or other equipment, then it must be repaid within three years; however, if the loan is to be used for commercial purposes -- buying raw materials or wage payments -- then it must be repaid within two years. In many cases, there is a grace period of two to nine months, after which the repayment schedule begins.

Repayment particulars are generally worked out according to the cash-flow diagram and the production and sales cycles of a project;

(c) Interest rates

The interest rate issue has inspired a number of discussions, especially among the non-profit organizations; UNRWA, for example, charges an interest rate of 8-12 per cent (depending on the profitability of the project), while other institutions such as the Economic Development Group (EDG) charge a constant interest rate of 5 per cent. Generally, though, the credit and loan institutions have agreed to charge an interest rate much lower than that charged by commercial banks; in other words, they are willing to offer a subsidized interest rate.

This subsidy policy was adopted to counter some of the harsh measures being imposed by Israeli authorities in the Gaza Strip -- especially those which brought about large decreases in project profitability. It is important to mention that the loans and repayments are linked to the American dollar, to prevent any losses that might occur with the devaluation of the Israeli currency.

5. Institutional formalities and follow-up services

Loan applicants first fill out a form which requires basic information on buildings, machines, raw materials, employees, marketing, and other project components. The loan officer pays a field visit to the project site to substantiate the information. Afterwards, the loan officer analyses the finanical aspects of the project, then submits his recommendation to the loan committee, which is responsible for approving or rejecting loans.

In cases where the requested loan exceeds $US 30,000, a feasibility study must be carried out by a specialized body -- which then offers its recommendation to the loan committee.

Typically, the whole procedure (from application submission to decision-making) takes approximately three months.

It is important to point out that these non-bank credit institutions provide more than just financial assistance. They also offer technical and managerial training and services, either through informal adult education classes or through on-site consultancy. Finally, these institutions are ready to provide moral support and reassurance when necessary.

6. Loans offered to date

To date, 510 small and medium-sized industrial and agricultural projects in the Gaza Strip have been granted financial credit; they are classified as follows:

Institution	Number of projects	Total loan amounts from each institution
Save the Children Fund	197	$US 687,000
United Nations Relief and Works Agency for Palestine Refugees in the Near East	72	$US 1.7 million
Welfare Association	36	$US 750,000
Economic Development Group	35	$US 450,000
Cooperation for Development	170	$US 1.4 million
Total	510	$US 4,987,000

The table above indicates an average loan size of approximately $US 10,000 for each project, though the amount fluctuates between $US 2,000 and $US 70,000.

As previously mentioned, the primary objective of these credit and loan institutions is to pave the way for the creation of new job opportunities, so that unemployment -- which has now reached more than 40 per cent -- can be at least partially overcome.

Most of the studies and research being carried out on different credit institutions indicate that the loan size required to create one job opportunity varies from one institution to another, and is generally related to project size and the amount of technology being utilized. The studies also show that decreasing the amount of capital invested would increase dependence on manual labour and semi-automatic machines. Overall, these studies suggest that the minimum loan amount needed to create one new job opportunity is approximately $US 5,500, but figures could go up as high as $US 15,000.

D. Conclusion

The experience of lending to small and medium-sized enterprises can be summarized as follows:

1. The current situation in the Gaza Strip does not provide either a healthy environment or the minimum infrastructure requirements for effective credit facilities or investment programmes. Political stability would encourage investment and increase the success rate for new small and medium-sized enterprises. This political stability would also mean that many of the problems and obstacles such as formalities, permission and marketing restrictions would no longer exist, or would at least be reduced condsiderably.

2. The second point is that, up to now, none of the credit and finance programmes have succeeded in affecting the local economic situation on a macroeconomic level, mainly for the following reasons:

(a) The financing available for credit has not exceeded $US 50 million;

(b) The laws imposed by the Israeli authorities have been extremely restrictive;

(c) The high failure rate of enterprises (35 per cent) affects (i.e., extends) the repayment of the loan;

(d) Credit and finance institutions have failed to support any projects related to training or technical consultation, both important to economic development in the area;

(e) Appropriately skilled staff are needed to improve productivity and efficiency levels.

Footnotes

1/ Development Opportunities in the Occupied Territories: Finance and Credit (Maryland, Policy Research Incorporated, 1992), p. 12.

2/ Liquidity = the percentage of cash relative to total assets.

3/ Ibid., p. 13.

XI. THE ROLE OF THE SOCIAL FUND IN THE DEVELOPMENT OF SMALL ENTERPRISES IN EGYPT

by Mahmoud Zayed*

A. The Social Fund for Development (SFD)

1. SFD mission and objectives

The Social Fund for Development (SFD) is an autonomous government agency working under the direct supervision of the Prime Minister. Its mission is to:

(a) Enhance the Government of Egypt's economic reform and structural adjustment programme;

(b) Contribute to the well-being of low-income groups that are adversely affected by the economic reform programme;

(c) Protect vulnerable population groups, public-sector employees, unskilled and semi-skilled workers, unemployed youth, and households headed by women from the likely adverse longer-term effects of the economic reform programme;

(d) Strengthen Egypt's institutional capacity (governmental and non-governmental) to develop new social programmes and modify existing ones;

(e) Seek additional international and local financial resources, and secure technical resources.

To fulfil this mission, the SFD aims at achieving the following specific objectives:

(a) Adopt and implement a set of "core programmes" addressing the urgent needs of the vulnerable target groups;

(b) Provide new job opportunities for:

(i) Public-enterprise workers displaced as a result of the economic reform programme;

(ii) Gulf crisis returnees;

(iii) Unemployed youth;

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(iv) Women who head households;

(c) Support the channelling of additional public investments towards social services, with special emphasis on health and education;

(d) Establish mechanisms to protect and improve the living conditions of the most vulnerable target population groups;

(e) Enhance and support the participation of non-governmental organizations (NGOs) and private voluntary organizations (PVOs) in the planning and execution of projects serving the target groups.

2. The role and activities of SFD

The Social Fund for Development supports activities designed to reach the target groups through sponsoring agencies such as ministries, governorates, public- and private-sector companies, NGOs and local community agencies.

In accordance with SFD policy, appraisal and selection criteria are applied to proposals for subprojects and activities submitted to the SFD. Sponsoring agencies are expected to attend to the requirements and standards related to management capabilities and absorptive capacity. SFD is committed to offering guidance and training to sponsoring agencies in developing subproject porposals. It also provides assistance in preparing and refining survey instruments to accurately identify the target groups most in need of assistance.

SFD has a responsibility to supervise subproject implementation, based on established monitoring and evaluation standards and procedures.

To offer immediate relief in selected geographic areas, SFD makes funding available for labour-intensive service subprojects which enhance the quality of life and create jobs in these areas.

The role of SFD is to enhance and expand enterprise-development activities and community-development efforts to ameliorate the living conditions of the target groups in rural areas and urban poverty zones through income-generating projects, and assistance to the unemployed through training programmes and placement services.

3. SFD resources

Contributions to SFD are made in the form of loans and grants, which SFD's financing mechanism then disburse using the same two forms. Loans are directed towards productive activities, and repayments are plowed back into the loan component of the Fund. Grants are used to finance infrastructure development subprojects in rural communities and urban poverty zones.

The total resources of the Fund had reached $US 612.3 million by 31 August 1992, comprising $US 320 million in loans and $US 292.3 million in grants.

SFD resources are governed by the laws and regulations of the Government of Egypt, and disbursements are made according to agreements it has concluded with the donors.

4. Core programmes of SFD

The Social Fund for Development comprises six core programmes, including the following:

(a) Community Development Programme (CDP);

(b) Municipal Services/Public Works Programme (PWP);

(c) Enterprise Development Programme (EDP);

(d) Labour Mobility Programme (LMP);

(e) Institutional Development Programme (IDP);

(f) Essential Public Transport Services Programme (EPTSP).

B. The Enterprise Development Programme (EDP)

The Enterprise Development Programme (EDP) is one of the six core programmes undertaken for implementation by SFD for the realization of its principal objectives. EDP represents the means of achieving the goals of other SFD programmes such as CDP, PWP and LMP, which focus on the establishment of small income-generating and employment-generating projects in the course of their implementation.

EDP acquires its importance from the potential role played by small industries in solving the problem of unemployment, by creating new job opportunities, by enhancing the youths' awareness of the significance of entrepreneurship as a choice for the future, and of course from the associated stimulation of industrial development.

1. Definition of small enterprises

In accordance with national and economic business characteristics, small enterprises (SEs) have been variously defined in terms of their number of staff and/or amount of capital.

International institutions are conceptually defined (depending on production size and service quality) according to the following:

(a) Micro-enterprises are those with less than five employees, and/or less than $US 4,000 in fixed assets (excluding land and buildings). Most such enterprises exist in the domain of CDP -- especially existing enterprises or those intended to be established in rural or urban areas;

(b) SEs are defined as those enterprises employing 6-15 workers, with less than $US 10,000 in fixed assets (excluding land and buildings);

(c) Medium-sized enterprises (MEs) are those with more than 15 employees and/or more than $US 10,000 in fixed assets (excluding land and buildings).

These limits are not inflexible and can be adjusted according to the circumstances of each case.

2. The target groups of EDP

The target groups of EDP are:

(a) Workers vulnerable to the economic reform process who wish to establish SEs, in coordination with LMP;

(b) Gulf returnees seeking to invest their savings in SEs, or those seeking employment;

(c) Young graduates;

(d) Women;

(e) Talented entrepreneurs desiring to start new SEs;

(f) Handicraft workers desirous of starting or expanding businesses;

(g) Productive families willing to expand their activities or to start new SEs, in coordination with CDP;

(h) Members of professional syndicates desiring to start new SEs;

(i) New urban communities and societies longing to establish new SEs.

3. The need of enterprises for financing

The circumstances of the planned or existing enterprises mentioned above vary, and have thus been classified into three groups, as follows:

(a) Enterprises which desire to expand their existing activities, and consequently need to acquire new equipment, to employ more workers at higher wages, and

possibly to move into larger premises -- and are therefore in need of some training for various purposes;

(b) Newly established enterprises which need capital for procuring equipment and starting operations, and which would benefit from information on establishing, managing, launching and marketing a business; such an enterprise would require administrative, technical and professional training for both the employer and the employees;

(c) Enterprises desirous of switching from manual to mechanical systems and are consequently in need of financial support to acquire up-to-date equipment. Expertise would also need to be provided to acquaint them with the operation, specifications and sources of modern equipment and its suitability to local working conditions. Such enterprises would also need technical and professional training on this equipment, in addition to administrative and marketing training.

4. The importance of SEs

In spite of their potential, the progress and success of SEs in Egypt has been hindered by a number of obstacles. The lack of coordinating activities amongst the concerned authorities is perhaps the biggest problem. Other barriers include the lengthy and complicated procedures which precede the establishment of SEs, and the absence of priorities in the areas of taxation, customs and banking services.

EDP aims at increasing the chances of creating new job opportunities and raising incomes in the SE sector through:

(a) Encouraging young people to acquire the appropriate attitude and entrepreneurial skills, which would allow them to become self-employed and initiate new SEs;

(b) Expanding/extending and modernizing the operations of the existing SEs.

5. Main concepts of EDP

EDP works to realize its objectives within the framework of the following core concepts:

(a) EDP services reach target groups through specific sponsoring/mediatory agencies (S/MAs) which have the potential to recognize the project-preparation needs of the target groups, and to supervise their implementation. Such agencies can be either governmental or non-governmental, financial or non-financial;

(b) The programme lends to provide working capital, and to cover equipment procurement, production requirements, and operation expenses for small and handicraft enterprises. It also provides grants for technical and training assistance, and to improve the technical and administrative efficiency of the staff of the agencies sponsoring and implementing the projects;

(c) EDP provides opportunities for professional technical and administrative training, and for obtaining the expertise required by the enterprises and their staff, according to the conditions and circumstances of each project. This is covered by non-repayable grants which are not a part of the loans;

(d) EDP cooperates with other agencies involved in developing SEs in Egypt, and analyses their objectives, activities, and interests to prevent duplication;

(e) EDP helps to maximize the benefits of private and governmental efforts in the SE field, especially with regard to policy-making, infrastructure establishment, financing, and other interventions necessary to support and enhance SEs;

(f) EDP promotes the concept of self-employment among young people by encouraging educational and training institutions of all levels to include entrepreneurship courses in their curricula, and to design and organize training courses which prepare young people to become entrepreneurs;

(g) EDP explores opportunities to finance and implement new SEs or expand existing SEs, to increase job opportunities for unemployed graduates and young men and women; it also encourages the agencies qualified to carry out such projects to submit their suggestions, and helps with the preparation of their project proposals. Additionally, EDP sets up promising pilot enterprises through appropriate supporting agencies (SAs);

(h) EDP verifies that the projects financed through SFD will bring in adequate returns for beneficiaries to be able to continue and expand, employing suitable technology -- and consequently employing more labour. Priority is given to projects through which beneficiary groups may provide more job opportunities;

(i) Loans are given to S/MAs at a suitable interest rate to be lent to the target groups at an interest rate lower than the market levels, with two years being the typical time allowed for repayment and with the lowest possible collateral requirements imposed;

(j) EDP coordinates SFD agreements with the donating agencies, whereby the conditions of loan ceilings separately agreed upon with each donor are to be taken into consideration. Loan sizes are generally expected to be in the following ranges:

Micro-enterprises:	$US 200 to $US 1,000
Small enterprises:	$US 1,000 to $US 15,000
Medium-sized enterprises:	a maximum of $US 60,000

(k) The financial S/MAs, in their contact with beneficiaries (subprojects), are represented by the staff of a unit specially established within the organizational structure of the bank for this purpose. Non-financial agencies, whether governmental or non-governmental, are represented by a loan treasurer attached to the mediatory agency (MA) responsible for making loans to 100-150 subprojects according to their (rural or urban) location;

(l) With regard to small loans, it would suffice for micro-enterprises to guarantee each other, or to mortgage equipment or final products.

6. Policies of EDP

The objectives of EDP are achieved by funding integrated assistance and service packages necessary to establish and develop SEs. This is accomplished through:

(a) Technical assistance directed at SEs and potential entrepreneurs;

(b) The institution-building of the supporting agency (SA);

(c) The administration of an adequate, supervised credit programme.

(a) Technical assistance

(i) SFD provides technical- and training-assistance packages to those who wish to establish new enterprises. Such services support young people who are seeking to invest in their futures by:

a. Developing appropriate entrepreneurial attitudes and skills;

b. Training themselves to meet entrepreneurial requirements in the areas of administration, marketing and technical expertise;

(ii) SFD offers continuous technical assistance to the funded enterprises during their early years to ensure their success and continued survival beyond SFD's involvement;

(iii) SFD offers technical and training assistance for the expansion of existing enterprises financed by the project, specifically to improve production quality, costs and size. Such services include establishing and developing:

Database systems
Comprehensive systems of quality
Maintenance systems
Production planning and follow-up systems

(b) Institution building

SFD provides expertise and technical and organizational assistance to SAs to help them increase their capacity for following up subprojects and for mediation between SFD and the end beneficiary;

(c) Credit programme

(i) SFD provides long-term loans for new and expanding SEs;

(ii) New and existing SEs are given funds to finance their working capital and equipment procurement needs;

(iii) A subproject's loan may amount to a maximum of 33,000 Egyptian pounds (LE). It may be increased to LE 50,000 in some instances, and even to LE 200,000 in the case of IDA loans;

(iv) The programme includes training for SA staff to implement credit schemes;

(v) EDP does not finance infrastructure or building and land purchases;

(vi) Banks are responsible for lending to projects that involve registered SEs and to individuals having registered documents which enable them to establish SEs, according to the regulations set by SFD;

(vii) Non-governmental authorities and volunteer societies offer non-registered SEs loans in accordance with the regulations and mechanisms established by SFD;

(viii) The credit department evaluates, monitors and manages the portfolio of loans in EDP.

C. EDP's approval of financing

The proposal application

1. Sponsoring/mediatory agencies (S/MAs) apply for financing for an enterprise. The application is submitted to the SFD regional office in whose domain the project lies. In special cases, the application can be directly presented to the SFD general administration in Cairo.

2. Some data about the S/MA are attached to the project's financial application. Relevant basic data include the following: board of directors; chief executive in charge; activities; geographic domain; beneficiary target groups; technical and legal mechanisms; administrative, financial and technical organs; financial situation; and balance sheets for the preceding three years.

3. The project application presented by the SA for financing should also provide the following information: a general idea of the project and its objectives; its target groups; a short review of its works; its expected duration; the amount of financing, technical assistance, services and training courses required; and the relationship between the components and the executive body of the enterprise.

4. After provisional approval of the project idea, the project documents -- including a technical proposal and description -- are prepared, as are other details such as the proposed management/organizational structure, the time schedule, the financing programme, the enterprise's itemized cost analysis (labour, equipment and materials) and the procedure for monitoring, appraising and submitting periodic reports.

5. The technical proposal/project description is appraised according to the criteria decided upon by EDP to suit its objectives. The S/MA is informed of the appraisal notes and a period is fixed accordingly to discuss and/or modify the proposal so that the project may proceed in the manner agreed upon.

The technical staff of EDP has the right to ask for any extra data or information deemed necessary to appraise the project proposal, informing the S/MA of these data in writing and fixing a period of no more than 15 days for the response. In cases where there is a delay or failure of the S/MA to reply, this will be taken as sufficient reason to cancel or defer the project.

6. When the S/MA has completed all the procedures required by the technical staff, an opinion is prepared and submitted to the SFD committee responsible for studying and appraising projects. The result of such an appraisal is then submitted to the SFD General Director. EDP can draft the report in a form suitable for its projects, if necessary.

7. The SA, when formally informed that financing for its enterprise has been approved, should supply any necessary documents and/or data which is missing.

8. Projects which are financed with up to $US 500,000 are approved by the SFD General Director, while projects financed with greater sums are submitted to the policies and programmes committee (comprising members of the SFD board of directors) for opinion and approval.

9. When all the project's documents are satisfactorily completed according to the requirements of the EDP technical staff, a draft agreement is concluded between SFD and the S/MA, with the legal administration participating.

10. All administrations involved in the project's operations are to be informed, and each then prepares its procedures for cooperation and monitoring, including time schedules for financing and implementation.

11. The information administration of SFD is requested to record the data related to the project, set up a method for monitoring, and arrange for the disbursement of funds as soon as the agreement is signed.

12. The administration of EDP then meets with the representatives of the donating countries for their approval of the project's objectives and financing.

D. Implementation of projects

1. After studying, appraising and approving a submitted project, SFD signs a framework agreement with the S/MA. This agreement includes the method of lending and payment, and the monitoring and control systems of the project.

2. SFD allocates loan instalments to the S/MA, and deposits them in an account earmarked for the project by the S/MA.

3. The S/MA receives project studies from the beneficiaries according to the predetermined conditions and regulations set forth by SFD. Subprojects complying with SFD policy are selected, and their authorized personnel chosen after being appraised.

4. The SA determines the amount of the loan/grant required, as well as the amounts and dates of the instalments, after assessing the subproject components (e.g., equipment, raw materials, training and technical assistance) and their costs.

5. The project agreements are drawn up between the S/MA and the beneficiaries to fix the method of lending and the repayment instalments.

6. The S/MA determines training needs (including methodology, location and timing).

7. The S/MA follows up on equipment requirements and procurement and, if possible, provides technical consultation.

8. The S/MA, in cooperation with SFD, monitors the establishment and activities of the project in its various stages to ensure that the loan is being used for its stated objectives and, if required, to provide training or technical assistance.

9. The beneficiaries should submit periodic appraisal reports to be evaluated by the S/MA, which should, in turn, submit collective periodic reports to SFD to show the progress of the project, its performance, and its repayment of the loan.

10. SFD and its regional offices periodically visit the projects and beneficiaries on site to identify the difficulties and problems facing them, and to try to offer appropriate solutions.

11. SFD's relationship with the S/MA is terminated with the payment of the last instalment of the loan. The possibility of relending can be considered afterwards, with the aim of further developing the project and fulfilling SFD policies.

4. After provisional approval of the project idea, the project documents -- including a technical proposal and description -- are prepared, as are other details such as the proposed management/organizational structure, the time schedule, the financing programme, the enterprise's itemized cost analysis (labour, equipment and materials) and the procedure for monitoring, appraising and submitting periodic reports.

5. The technical proposal/project description is appraised according to the criteria decided upon by EDP to suit its objectives. The S/MA is informed of the appraisal notes and a period is fixed accordingly to discuss and/or modify the proposal so that the project may proceed in the manner agreed upon.

The technical staff of EDP has the right to ask for any extra data or information deemed necessary to appraise the project proposal, informing the S/MA of these data in writing and fixing a period of no more than 15 days for the response. In cases where there is a delay or failure of the S/MA to reply, this will be taken as sufficient reason to cancel or defer the project.

6. When the S/MA has completed all the procedures required by the technical staff, an opinion is prepared and submitted to the SFD committee responsible for studying and appraising projects. The result of such an appraisal is then submitted to the SFD General Director. EDP can draft the report in a form suitable for its projects, if necessary.

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8. Projects which are financed with up to $US 500,000 are approved by the SFD General Director, while projects financed with greater sums are submitted to the policies and programmes committee (comprising members of the SFD board of directors) for opinion and approval.

9. When all the project's documents are satisfactorily completed according to the requirements of the EDP technical staff, a draft agreement is concluded between SFD and the S/MA, with the legal administration participating.

10. All administrations involved in the project's operations are to be informed, and each then prepares its procedures for cooperation and monitoring, including time schedules for financing and implementation.

11. The information administration of SFD is requested to record the data related to the project, set up a method for monitoring, and arrange for the disbursement of funds as soon as the agreement is signed.

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4. The SA determines the amount of the loan/grant required, as well as the amounts and dates of the instalments, after assessing the subproject components (e.g., equipment, raw materials, training and technical assistance) and their costs.

5. The project agreements are drawn up between the S/MA and the beneficiaries to fix the method of lending and the repayment instalments.

6. The S/MA determines training needs (including methodology, location and timing).

7. The S/MA follows up on equipment requirements and procurement and, if possible, provides technical consultation.

8. The S/MA, in cooperation with SFD, monitors the establishment and activities of the project in its various stages to ensure that the loan is being used for its stated objectives and, if required, to provide training or technical assistance.

9. The beneficiaries should submit periodic appraisal reports to be evaluated by the S/MA, which should, in turn, submit collective periodic reports to SFD to show the progress of the project, its performance, and its repayment of the loan.

10. SFD and its regional offices periodically visit the projects and beneficiaries on site to identify the difficulties and problems facing them, and to try to offer appropriate solutions.

11. SFD's relationship with the S/MA is terminated with the payment of the last instalment of the loan. The possibility of relending can be considered afterwards, with the aim of further developing the project and fulfilling SFD policies.

Annex I

TABLE OF CURRENT EDP PROJECTS

Annex table. The current projects of EDP

Project title	Objective	Budget (millions of Egyptian Pounds)	Duration of project (years)	Job opportunities	Outputs
A. Projects currently being Implemented					
1. Handicraft Expansion project	(a) Support the existing handicraft industries in Egypt; assist in establishing new small-scale handicraft industries and developing their products; (b) Create new job opportunities for young people.	100.000	5	70,000	(a) 5,600 new workshops; (b) 17,500 expansions and further development of existing workshops; (c) 11,900 productivity-improvement efforts in existing workshops; (d) 70,000 trainees; (e) 35,000 marketing and service activities for workshops.
2. Small-Enterprise Development (Credit Guarantee Corporation or CGC)	Support and stimulate the growth of small enterprises through credit guarantees	10.400	3	6,000	(a) Financing of 1,500 small projects; (b) Survey of small-scale industry activities; (c) Preparation of project profiles; (d) Feasibility studies; (e) Training
3. Small-Enterprise Development (PBDAC)	Grant loans to young people for establishing production and service-oriented projects based on inputs and outputs of the agriculture sector-- e.g., the agro-industries and dealing in the packaging and storing of agricultural products in five governorates.	30.900	5	5,000	(a) Small food and agricultural projects; (b) Providing servicing to small projects; (c) Training
4. Development of handicraft enterprises in Sayeda Zainab (Cairo)	(a) Support and establish small handicraft projects through provision of credit facilities; (b) Create new job opportunities	1.500	4	350	(a) Establishment of a number of small new handicraft projects; (b) Expansion of some of the existing projects; (c) Training and development

Annex table (continued)

5. Industrial Development Bank support to small enterprises (Handicraft City/Al-Salam City)	Develop small feeder industries and encourage new graduates to begin private enterprises	20.650	5	2,180	(a) Establishment of 210 new workshops; (b) Expansion of 83 existing workshops; (c) Identifying the most suitable industries and their priorities; (d) Training the targeted beneficiaries and increasing their potential
6. Small Enterprise Development (National Bank)	(a) Support renovation within existing small projects to improve their current status; (b) Support new small projects through the granting of credit facilities to create new job opportunities	50.000	5	5,000	Support, development and establishment of 1,000 projects
7. Enterprise Development (Alexandria Businessmen's Association, or ABA)	(a) Encourage new graduates and people with expertise to establish small-scale industries by providing technical assistance and training; (b) Grant loans for equipment and working capital	40.500	3	4,000	Establishment and development of about 1,000 new and/or existing projects
B. Approved projects					
1. Support for small Revolving Funds	(a) Create job opportunities through the development of existing handicraft workshops which have good marketing, administrative and technical abilities; (b) Support productive cooperatives to be able to offer subsidies to the existing workshops in a continuous and satisfactory manner	16.050	5	9,130	(a) Supporting the development of 1,500 projects; (b) Development of five productive cooperatives; (c) Preparation of guidelines for handicraft industries; (d) Training

Annex table (continued)

2. Execution and Management of Industrial Park in Tenth of Ramadan City	Establish an industrial complex for small industries in the Tenth of Ramadan City to create job opportunities for young people and to spread the idea of establishing and owning projects as a future concept (entrepreneurship)	28.840	5	2,800	(a) Establishment of 282 small projects; (b) Central services and maintenance facilities; (c) Marketing services; (d) Technical, financial and administrative training
3. Industrial Park in Sixth of October City	(a) Establish small production units to meet the requirements of the existing plants and factories in the city; (b) Create new job opportunities	8.000	5	1,750	(a) Establishment of a technical unit for the project; (b) Establishment of 110 small new projects; (c) Development of a cooperative to administer the projects and to follow up the beneficiaries and offer them technical support.
C. Projects under study					
1. Industrial Park for small-scale industries in Sayeda Zainab (Cairo)	Establish/construct small and handicraft industries and support the entrepreneurship concept among young people	6.500	6	746	(a) Social, economic and environmental study for the zone; (b) Survey of existing handicraft activities and the defining of investment priorities; (c) Establishment of 78 small production projects; (d) Establishment of a small-industry training centre
2. Small Enterprises for New Graduates (YES)	Encourage new graduates to establish small-scale projects and to participate in the eradication of unemployment	3.107	5	692	(a) Execution of 89 small projects; (b) Technical, financial and administrative training
3. Cattle-Raising and Related Industries in the Al-Fayoum Governorate	(a) Increase meat production and reduce prices; (b) Exploit the natural resources in the Fayoum Governorate; (c) Create new job opportunities	10.000	5	1,000	(a) Establishment of 1,000 projects for cattle-raising and dairy products; (b) Production of 2,000 tons of meat per year

Annex table (continued)

4. Agricultural Equipment for Aswan City	(a) Exploit the latent potential of graduates in seasonal projects, with the aim of agricultural development in the Governorate of Aswan in the area surrounding the High Dam Lake; (b) Encourage young people to engage in private business	4.000	2	2,000	(a) Cultivation of 10,000 feddans of land; (b) Training for agricultural activities; (c) Supplying the means of transportation
5. Cattle-Raising and Related Industries in the Al-Sharkia Governorate	(a) Increase meat production and reduce prices; (b) Exploit the natural resources in the Fayoum Governorate; (c) Create new job opportunities	10.000	5	1,000	(a) Establishment of 1,000 projects for cattle-raising and dairy products; (b) Production of 2,000 tons of meat per year
6. Small-Enterprise Development (NBD)	Support and establish small projects by creating a credit network of 400 bank units covering about 4,000 villages and 250 small towns	20.000	5	6,000	(a) Establishment of 400 bank units; (b) Support of 800,000 small projects
7. Industrial Park at Port Said	Establish a small industry and feeder complex in Port Said City, in the fields of engineering and metallurgy	1.200	..	5	Eight small projects involving greenhouses, marine cranes, and auto and refrigeration parts
8. Business Incubation Centres	Encourage and facilitate the establishment of small industries through incubation centres (in the early stages)	10.000	3	..	Four incubation centres in different fields
9. International Labour Organization Assisted Job-Creation Programme: Assistance in Business Creation	Train and encourage new graduates to establish small projects	5.150	3	..	..

Note: ".." signifies that the figure is not available.

Annex II

GENERAL CRITERIA TO BE SATISFIED BY S/MAs

The supporting agency (SA) is defined as the entity held responsible by SFD for implementing the project and following up the performance of both the mediatory agency, or MA (if one exists), and the executive body. The SA may be a governmental or non-governmental institution, a bank, a volunteer society, a businessmen's society, a professional syndicate, or any other entity approved by SFD. In some cases the SA is itself the MA, and in such cases is referred to as the S/MA.

The MA, if existing, is the linkage between the SA and the executive body, and thus participates with the SA in monitoring the implementation phase of projects. Consequently, it undertakes some of the repsonsibilities of the SA, particularly in the field of labour-intensive activities for the Public Works Programme (PWP). The MA may be governmental or non-governmental.

1. Criteria set by SFD for selecting S/MAs

The S\MA should:

(a) Be a legally established independent body licensed to handle grants and loans and implement the project's activities;

(b) Have staff which are capable of supervising and monitoring the technical, administrative, and financial accounting aspects of projects, and of assisting the executive branch, if necessary;

(c) Have a sincere desire to implement the proposed projects, and have a clear view of its role in supporting target groups and of the means required to assist them;

(d) Have leadership with high technical and administrative skills to monitor projects and supervise their implementation. Previous experience in realizing similar projects is essential;

(e) Be able to prepare project proposals according to SFD requirements, and also to prepare the necessary provisional feasibility study for the project;

(f) Submit its balance sheets for the preceding three fiscal years, if necessary, to ensure its capacity for sponsoring enterprises;

(g) Submit its balances regarding grants or loans, their methods of utilization, and the situation of each financed project;

(h) Operate in the same geographic domain as the target groups of the project;

(i) Have suitable executive mechanisms in the same geographic domain as the project, be well-connected enough with target groups to be able to get acquainted with their needs, and be capable of realizing the aims of the project in time;

(j) Be willing to run the credit risks, and have enough means to repay SFD its loan in due time. This applies equally to both financial S/MAs (e.g., banks) and non-financial S/MAs (e.g., businessmen's associations, volunteer societies and some governmental entities).

2. Criteria set by EDP for selecting S/MAs

The nature of EDP's work requires that the end beneficiaries obtain loans through S/MAs that must eventually get these loans back, along with interest, and repay SFD through a simple and well-timed procedure. Banks are undoubtedly the institutions most experienced in lending, settling debts, and credit work, with their expertise and branches distributed all over the country. However, many banks consider dealing with the small loans suitable for SEs a costly burden -- requiring more man-hours, with less of a return. Consequently, banks usually avoid dealing with such loans.

The existence of banks should not prevent other governmental agencies -- or even non-governmental agencies such as businessmen's associations and volunteer societies -- from undertaking this mission. Such organizations now very often have capacities and practical experience in the fields of lending, monitoring, and loan recovery and retrieval. The experience and training gained from donating agencies -- mostly foreign -- have helped in this direction.

In view of the risks inherent in the procedures related to lending, relending, and collecting interest and instalments on time, SFD established a set of general and specific criteria which potential S/MAs (both financial and non-financial) must meet if they wish to finance enterprises through EDP. The S/MAs are generally asked to provide information and material which prove their project's eligibility and capabilities.

To select suitable "financial" S/MAs (banks) for any of the SFD programmes, the following information must be provided and criteria met:

(a) The bank's history, the location of its branches and their extent of coverage;

(b) The bank's specialization, its salient operations, and their relevance to the processes and enterprises of SFD;

(c) The number and efficiency of the bank's technical staff;

(d) The bank's financial situation;

(e) The bank's method of lending and its processing-cycle period;

(f) The bank's willingness to submit the periodic reports required for follow-up, according to the SFD system;

(g) The bank's willingness to comply with the following SFD conditions:

(i) The establishment of a specialized independent unit to handle the loans and sub-loans given to the end beneficiaries;

(ii) The full responsibility of that unit to decide and approve the sub-loan amounts;

(iii) The requirement of the minimum collateral from end beneficiaries;

(h) The bank's ability to run the credit risks and to pay back the main loan in full (along with its interest) at the end of the term.

To select from among the "non-financial" S/MAs (e.g., volunteer and non-governmental societies) the following information should be provided and criteria met:

(a) History of lending activity;

(b) Current lending system, and the extent of monitoring and contact with the end beneficiaries;

(c) Regularity with which both beneficiaries and agencies have paid the instalments due to their donors;

(d) Capacity to organize lending processes and to simply collect instalments with the least amount of effort;

(e) Willingness to run credit risks;

(f) Suitability of the requirements and the quality and level of loan security for the small enterprises (SEs);

(g) Many non-financial SAs employ a "lending staffer" well-known to the area's inhabitants. His responsibilities cover the following activities:

(i) Acquainting his local community with the activities of SFD and the advantages of its core programmes and projects;

(ii) Obtaining the support, assistance, and guarantees of his local community leaders for the end beneficiaries;

(iii) Making direct contact with and providing access to those who wish to establish SEs;

(iv) Determining real needs by evaluating the proposals submitted;

(v) Studying the production cycles of the proposed enterprises to ensure their ability to pay instalments on time;

(vi) Estimating the loan amounts suitable for the enterprises;

(vii) Organizing and following up the paying of instalments and interest;

(viii) Assisting in determining the technical assistance and proper training required for the end beneficiaries and their workers.

3. General criteria for project selection

SFD has decided that the following set of general criteria must be satisfied by the enterprises of its different programmes (such criteria are sufficient for the objectives of EDP):

(a) The project should be directed towards the target groups determined by the policies and objectives of SFD -- particularly the poorest, the most vulnerable and the unemployed groups looking for employment to satisfy their basic needs;

(b) The project should be mainly dedicated to serving the poorest areas -- possibly certain governorates, city centres or villages where unemployment is common, where a lack of basic public services exists, and where the problems arising from these circumstances (revealed in their various forms by SFD studies) are concentrated;

(c) The project should bring in social and/or economic returns acceptable to SFD and be able to generate real job opportunities;

(d) The objectives of the project should be in line with those of SFD and its various programmes; one of these should be to encourage the participation of private-sector, non-governmental and volunteer institutions in their different forms and at various levels;

(e) The project should direct more attention towards women and encourage their participation, either as target beneficiaries or in the management and implementation phases;

(f) The management costs of a project should not exceed 10 per cent of its total costs. The SA can keep 5 per cent of the project amount for its management expenses;

(g) The project's costs should remain within the limits of the financial and financing capacities of SFD and its various programmes;

(h) Each project should be accompanied by a feasibility study;

(i) The project should have no negative or harmful environmental impact, and should in fact be compatible with the preservation of the environment. The measures designed to counter such effects (if any arise) should be explained;

(j) A report on any possible risks and problems should be attached to the project study. These problems should be minimal, with the SA having the means available to control and handle them in time;

(k) The project should have the potential for continuous survival and expansion/extension beyond SFD's involvement;

(l) The project should respond to the needs of the environment, the community, and the target groups;

(m) Participation of the S/MA is preferred, whenever possible, in covering a proportaon of the toal costs of the project in the form of either money or property;

(n) The project should be acceptable to the SFD donors, within the framework of the agreements made with them.

4. Project appraisal criteria for small enterprises (SEs)

(a) The project should comply with the objectives of SFD, and in particular with the aims of EDP, directing its activities towards the previously specified target groups of the programme;

(b) The project should integrate with similar projects;

(c) The project and its subprojects should be technically and economically feasible;

(d) The project should be capable of creating new job opportunities at a suitable cost;

(e) The project should utilize suitable, labour-intensive technology whenever possible;

(f) The project should be capable of continuous survival and expansion/extension;

(g) The project should encourage the participation of women whenever possible;

(h) The project should be compatible with the requirements of environmental preservation;

(i) The constituent subprojects should respond to the needs of the community and provide it with high-quality goods and services at competitive prices;

(j) The project should arise from the needs of the surrounding environment, community, and beneficiary groups, with fair distribution among the governorates.

XII. THE CREDIT GUARANTEE CORPORATION (CGC): A NOVEL FINANCIAL INSTITUTION

by Rashwan Mahfouz*

When the decision was made in 1987 to study the possibilities of implementing a credit guarantee scheme in Egypt, those responsible for the study were confronted with a tremendous task: first, what (exactly) constituted a credit guarantee scheme; and second, how would it fit in with the country's economic development. Up to that point the Egyptian economic system had been based mainly on socialist principles, with no institutional framework for the individual initiative required by the market economy system. Furthermore, no other country in the area had a similar scheme to provide a model -- a circumstance that could have helped provide answers to many questions. The organizers of the new scheme had to start from scratch and also had to be very careful when making comparative studies of other countries' experiences with credit guarantee schemes.

Credit guarantee schemes provide the best means for helping budding entrepreneurs. They make use of already available resources (namely the banking system) and help promote the entrepreneurial spirit which is pervasive in all societies. A guarantee scheme should encourage the banking system to deal with small businesses, but should also show entrepreneurs the way to the banks. A decision was taken by the authorities to go ahead with the study on setting up a guarantee scheme, because such a project was in line with Egypt's serious decision to privatize its economy -- starting with the development of small businesses, as such enterprises are known to absorb labour and have the ability to create low-cost jobs. (For other development schemes see annex I.)

A. Why credit guarantee schemes?

In all areas of economic activity, small businesses find it difficult to acquire banking and credit facilities to help them finance required fixed assets or working capital. For this reason, the owners of these small businesses generally obtain the required funding from their own savings, from relatives, or from commercial and trading loans; in these cases there is usually no mention of interest rates, representing an added convenience to the trader, who can include a hefty mark-up in his prices. The small businessman also likes this system, as there is no mention of the dreaded interest rate -- that is, until he finds out that he is paying far more to the trader than what he would have paid for bank funds.

Commercial banks, the other party to credit guarantee schemes, are reluctant to lend to small businesses for two main reasons:

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(a) Lending to small businesses is considered risky. Small businesses have a high mortality rate, are faced with a lot of uncertainty, and are vulnerable to market forces;

(b) Banks prefer lending to corporate borrowers. It is generally easier to deal with corporate officers than with the owner/manager of a small business. The administrative costs of handling larger loans are covered by the revenue from large borrowers. Most important is the fact that small-business owners seeking loans are unable or unwilling to provide accounting records, or to provide security or collateral for the loans.

Credit guarantee schemes were introduced for these reasons -- to overcome both the perceived high risk of lending to small businesses and their inability to provide collateral. The objective of credit guarantee schemes is to cover some portion of the losses incurred when borrowers default on loans. The purpose of such schemes is to encourage financial institutions, particularly commercial banks, to lend to small businesses which have viable projects and good prospects for success but which are unable to provide adequate collateral or which do not have suitable records of financial transactions to prove that they are creditworthy.

B. What is a credit guarantee?

A credit guarantee is an agreement between a bank and a guarantee institution through which the institution guarantees payment of part of a loan a bank makes to a small business if the loan is not repaid. Guarantees vary throughout the world, usually ranging from 30 per cent to 90 per cent of the loan. If the guarantees are too low, banks are not interested; if too high, results will not be positive, as banks will rely on the credit guarantee and will fail to carry out a proper appraisal of the borrower and his application.

C. The Egyptian experience in establishing the Credit Guarantee Corporation (CGC)

As part of its policy to liberalize the Egyptian economy and hence encourage the private sector, the Government, in cooperation with the United States Agency for International Development (USAID) in Cairo, counteracted two consulting offices -- one Egyptian and one American -- to do a study analysing the feasibility of establishing a credit guarantee scheme in Egypt, to oversee the process of establishing it, and to follow up on its operations for the first few years.

Early on, during the research stage, the Egyptian consultant suggested that this scheme should be established in the form of a private-sector company (with all its features) rather than as a public-sector company. This was an entirely novel idea. All other guarantee schemes in the world were either public-sector companies or outright governmental agencies. Given the cumbersome laws and regulations that govern the operations of the Egyptian public sector, it would not have been strange for a typical guarantee company to have to ask for collateral to issue its guarantees -- or to complicate the procedures of liquidating guarantees.

The study team used four different procedures to establish the necessary information and prepare for the new company; this involved surveys, studies and workshops involving bankers, insurance and government officials, small-business owners and others.

1. Survey of bankers, insurance experts, government officials and small-business owners

(a) Survey objectives: to survey decision makers in banks operating in Egypt about the idea of a credit guarantee scheme; another survey would be directed at insurance companies; a third would be directed at governmental and non-governmental institutions dealing with small businesses; and fourth would be directed at the owners of small businesses.

The main objective of the questions in each of these survey groups was to raise the awareness of the possibility of such a scheme, and to explore the difficulties it might face and how they could be overcome. It was also vitally important to identify the rather complex relationship between bankers and small-business owners, the two most important elements in the scheme. With regard to the questions directed towards the insurance companies, these were designed to ensure that guarantee schemes were based on banking "risk-taking" procedures rather than on actuarial considerations;

(b) Findings of the bankers' surveys

The survey of the bankers resulted in findings which helped in formulating the basic structure of the future company. Following are some of these findings:

(i) Bankers generally accept the idea of creating an entity which would help compliment the collateral available to small-scale enterprises (SSEs). Moreover, the availability of such an institution would help encourage banks to deal with small businesses;

(ii) The experience of Egyptian banks in dealing with SSEs is restricted to the Industrial Development Bank and (to varying degrees) the four big public-sector banks. The other investment banks and joint ventures are more concerned with the bigger corporate clients;

(iii) In general, banks do not like to deal with small loans; the main reason relates to the size of the loan. Other reasons given by the bankers include the following: SSE owners lack experience in dealing with banks; SSEs do not maintain regular account books; they do not offer adequate collateral; and there is a high cost to the bank in relationship to the expected returns;

(iv) Banks that have branches in areas with small-business concentrations are few in number. Moreover, bank staff are not trained to go out after clients; they expect clients to walk in;

(v) There is one generally accepted definition of SSEs, but banks do not agree that there is but a single definition. Banks consider a client's net worth and the quality of his collateral as the most important factors in any credit decision. Moreover, loans to purchase fixed assets take priority over loans to finance working capital;

(vi) Bearing the risk of non-payment of a loan is to be considered a banking operation and not an insurance one; the operation starts and ends with the bank, which analyses and studies the client's request for a loan, assesses any collateral the client might have, takes a decision to lend the money, disburses the money, and follows up on repayments;

(vii) All bankers agree that the success of the new scheme would depend on the ease and flexibility with which claims by banks are honoured in cases of non-payment (default).

Following are some of the questions posed by the bankers:

(i) Are loans guaranteed under the scheme exempt from the credit ceiling imposed by the Central Bank of Egypt?

(ii) When is a loan considered in default? Some bankers consider a loan in default when the client is asked to repay his loan once, or at the most twice, and fails to do so; others said that a loan is in default only when the bank takes legal steps against its client;

(iii) What would the cost of issuing letters of guarantee be under the scheme?

(iv) Will the scheme have its own technical staff to analyse the loans approved by the banks? Will this mean repeating the analyses undertaken by the banks? Whose responsibility is it in the first place to set down the purpose of the loan and to evaluate the quality of the collateral provided by the client?

(v) After honouring any claims by the bank, who will undertake legal procedures against the client? Who will follow up with the client to collect the loan -- the scheme or the bank?

(vi) Will the scheme encourage certain economic activities or will it be open to all such activities? Will certain geographic areas of the country be preferred over others?

(c) Findings of the insurance survey

The meetings undertaken with senior insurance officers indicated an acceptance of the idea of guaranteeing bank loans. They also agreed that guaranteeing the risk of non-payment by a borrower is a banking operation and not a part or responsibility of the

insurance business. The guarantee should thus be handled by the banks, although an independent entity should be created for this task. They further proposed that this new entity should have a data bank containing comprehensive information on all aspects of small businesses in the country.

The results of the governmental and small-business surveys are reflected in the following sections.

2. Elements and characteristics of small businesses: study objectives and findings

(a) Objectives: to prepare a study of the elements and characteristics of small businesses in order to find a suitable definition, and to identify how such enterprises operate and what difficulties they face in their operations -- with special emphasis on their relationship with banks -- in their quest to expand and grow. Are these limitations based on a lack of knowledge and sophistication in dealing with bankers, or is it really a matter of lack of collateral. In addition to the credit aspect, the study aims at identifying the latent demand for general banking services, in order to further develop the principle of dealing with banks;

(b) Findings

One of the main findings of this survey is that small businesses are unable to grow and develop due to a lack of sufficient financial resources under acceptable conditions and their unavailability when needed. In most cases, however, SSEs depend on their own cash generation, or on other private sources such as friends and relatives. The wholesaler plays a very important role by giving credit in the form of delayed payment, or by financing raw materials or general working capital.

In spite of the fact that the wholesaler incorporates an interest rate in his pricing which can often amount to more than 60 per cent, many small-business owners do not feel the high cost of this financing, which in real terms means more expensive raw materials and machinery. Most SSE owners are wary of dealing with interest rates out of either religious conviction or a simple mistrust of banks. The other reasons why SSE owners do not deal with banks is the long time it takes to process credit applications, and the numerous documents and types of collateral (particularly real-estate mortages) demanded of them.

SSE owners have emphasized that banks must change their attitudes if this scheme is to be successful. Banks should make efforts to go after SSEs (not the other way around), they should train their staff to deal properly with small-business owners, and they should provide appropriate services.

3. A survey of other countries' experiences

(a) Objective: to carry out a survey on other countries' experiences in setting up credit guarantee schemes. The objective here is to assess practical experience, to find

out how these different schemes operate, and to identify the criteria which have made some successful and others unsuccessful. This survey was designed to focus specifically on those countries that could safely be compared to Egypt; the comparison would have been easier had there been a credit guarantee experience in another country in the area;

(b) Findings

International experience shows that credit guarantee schemes have been successful in encouraging banks to increase their loans to small businesses. The most successful are to be found in countries where the private sector is seemingly well-organized, thus enabling the banks to reach them and better analyse their creditworthiness. The study group found that in all countries the credit guarantee schemes were independent entities or managed by banks -- but not by insurance companies.

Countries with advanced credit guarantee schemes have introduced a system whereby banks are rated according to their dealings with small businesses -- number of defaults, size of SSE credit portfolio, geographic distribution of the banks' activities, and so on. First-class banks have a line of credit and do not have to submit applications to the guarantee scheme, but are empowered to issue the guarantees on its behalf. Second- and other-class banks are more closely controlled. This system helps speed up the decision-making process, and in this manner SSEs can meet their financing requirements much more quickly. This rating of banks is usually carried out every two years.

The two most vital elements for the success of any scheme are the flexibility and speed with which liquidation claims are honoured in cases of non-payment by borrowers. Many countries have realized this and have set up and organized their schemes according to private-sector criteria. There are no set and constant rules in a credit or banking-guarantee decision; this is why most countries have avoided giving the funds available to these schemes the "character" of public funds. This would have immediately encumbered the operations of the scheme with bureaucratic regulations designed to safeguard public funds from liquidation.

The study group did not find one example where a guarantee scheme guaranteed 100 per cent of a loan to an SSE. The guarantee percentage varied between 50 and 70 per cent.

In many countries the rate of default averaged 5 per cent of the total number of loans given to SSEs. This rate increased to some 15-20 per cent in some developing countries. Liquidation of guarantees does not occur within the first three to five years of a scheme, however; this is why in their early years these schemes try to build up healthy reserves for the future. The rate of default was found to be directly related to the laws and regulations affecting the operations of SSEs.

Most guarantee schemes guarantee the loan principal only and not the interest or other bank fees and charges. The follow-up on defaulted loans has in general been left to the banks. Whatever funds the banks have been able to collect have then been divided

between the two institutions according to the percentage of guarantee. (Three examples of guarantee schemes may be found in annex II).

4. Workshops to study the applicability of the scheme in Egypt

(a) Objective: to set up workshops and panel discussions during which the study team could discuss and test findings and their applicability in Egypt. Every session would ideally end up with a group of findings which would be adopted or modified at the subsequent session(s). This was to be repeated until a workable model of the scheme was identified. The last step would be to test the feasibility of this model through a cash-flow analysis of its sources and uses, in order to ensure the financial viability of the credit guarantee scheme;

(b) Findings

The study group identified the following objectives, which provided the bases for drafting a mission report for the Credit Guarantee Corporation (CGC):

(i) CGC should aim at encouraging the growth and development of SSEs in all areas of economic activity;

(ii) CGC should not limit its activities to one geographical area of the country, but should be active in all 26 governorates;

(iii) The main activities of the Corporation should be:

a. Guaranteeing bank loans to SSEs;

b. Providing training for bank personnel on how to deal with SSEs;

c. Providing training for SSE owners and managers in management and financial techniques;

d. Introducing a bank rating system which is based on criteria such as number of guarantees issued and number of defaults by any one bank or branch;

e. Establishing an elaborate database covering all aspects of SSE operations in Egypt.

The findings of the study group are reflected in the following report on the actual organization and activities of CGC.

D. Setting up the Credit Guarantee Corporation (CGC)

1. Prior to the establishment of CGC

(a) Nominations for Board of Directors

Before the CGC's official incorporation procedures had been completed, the shareholders nominated their representatives for the Board of the new Corporation. The nominees were top bankers at the general-manager level with extensive credit experience. They attended special meetings and seminars with other bankers or small entrepreneurs. The purpose was to teach them as much as possible about the small businesses they would be financing and to make them aware of the other problems they might face in the local economy;

(b) Special seminar for CGC Board members

A two-week seminar was held in Washington, D.C. for the members of the Board to acquaint them with American and international experience in small-business financing. The seminar did not simply consist of lectures, but included application of cases, problem-solving and brainstorming with professionals in the field of small-business lending.

The three major themes of the seminar were:

(i) The small-scale enterprise (SSE) as a viable entity in the economy;

(ii) The role of lending institutions in facilitating the establishment and growth of SSEs (the organization and function of CGC was discussed in this capacity);

(iii) Credit guarantee schemes and lending to small businesses in the United States and developing countries.

The new CGC is important to the Egyptian economy not only because it will issue credit guarantees to assist small- and medium-scale businesses, but also because it will stimulate development by encouraging existing and new entrepreneurs to look to commercial banks to help them grow;

(c) Promoting a participation agreement between CGC and banks

The CGC Chairman and the Egyptian consultant were involved in a campaign which was directed at encouraging the chairmen and senior officers of Egyptian commercial banks to sign an agreement of participation with CGC. This agreement is necessary for regulating the relationship between CGC and the banks. It covers such items as the definition of a small business, the percentage of risk coverage by CGC, cases of default, and liquidation procedures;

(d) Seminars for small-business owners

A series of seminars were held for small-business owners involved in various activities, including woodworking, metal-forming and engineering, Khan Al-Khalili types of products, leather goods and ready-made garments, and spinning and weaving.

These meetings were held in the presence of bank representatives in order to identify and discuss -- directly -- the difficulties these entrepreneurs have with banks. The results were as expected. The bankers complained that entrepreneurs had no financial statements and offered no collateral; the entrepreneurs complained that the collateral requested was too high, and that interest rates were also high. By the end of each session the gap between each party appeared to be bridged. The entrepreneurs' strongest complaints, however, were directed at the fiscal authorities and the social-security system. One major (and interesting) request was to promulgate a law that would give small-business entrepreneurs advantages similar to those enjoyed under the investment law. A list of resolutions were summarized in a paper which was sent to the proper authorities.

2. After the establishment of CGC

(a) One-day seminars for the banks' branch and middle management

In these meetings, which were run concurrently with the previously mentioned campaign, important presentations were given about the efforts being made to liberalize the economy, and the merits of a market economy were highlighted. The agreement of participation was discussed, to spell out the obligations of both CGC and the banks. A presentation was also given about the procedures to be followed by banks applying for a guarantee, and the cases where CGC would refuse to issue a guarantee were mentioned. The most important aspect of these gatherings was that the banks started to see CGC as their partner in the development of the economy, as both were helping small businesses try to find adequate financing for their needs;

(b) Calls on bank branches

Following these one-day seminars, which were invariably held on Saturdays in different cities in Egypt, CGC staff would make follow-up calls on the branch managers who had attended these meetings to further discuss the possibilities for cooperation. From these calls, active branch managers were identified and set apart from those who were still not ready to deal with small entrepreneurs. Naturally, it was thought to be easier to deal with bank branches that followed a corporate policy of aiding small businesses. Cooperation between these branches and CGC would be ideal, and would help the Corporation achieve its success;

(c) Operating manuals for CGC and a model credit policy for the banks

The Egyptian consultant prepared two very important documents for the banks. One was the "Credit policy for small-business lending by banks". The other covered

"Prototype small-lending units", providing the basic outline for setting up a specialized unit within the bank to audit SSEs.

E. CGC organization and assets

1. CGC structure

From the beginning it was planned that CGC would have a lean structure and would keep personnel growth in line with the growth of the guarantees issued. The Corporation's departments are listed below:

(a) The Guarantee Department receives applications from banks, analyses and processes them, and issues guarantee documents -- after approval has been granted by the appropriate authority. This Department also maintains the files, is responsible for the marketing and promotion of CGC services, and follows up (with the banks) the progress of the SSEs guaranteed;

(b) The Investment Department undertakes the placement of CGC funds in the best possible investment vehicles, striving to achieve the highest possible returns with the lowest possible risk;

(c) The International Relations Department is responsible for maintaining a strong relationship between CGC and the foreign providers of funds (governmental, regional and other entities);

(d) The Economic Research Department keeps tabs on developments in the local and international economies. At a later stage it will undertake studies on special sectors of the Egyptian economy where CGC might consider it unwise or unsafe to overexpose itself (in terms of offering guarantees);

(e) The Management Information Systems (MIS) Department is the neural centre of the Corporation. It is responsible for the information processing within CGC, and for all the related hardware and software. It develops and maintains the software used by CGC -- especially CGIS, which is a program tailor-made for the SSE and guarantee database; it is used as a basis for credit and risk analysis of bank applications, for decision-making, and for follow-up;

(f) The Financial and Accounting Department is responsible for the financial transactions and balance sheet of the Corporation and also for the setting and follow-up of the annual plan and budget;

(g) The Administration Department is responsible for the logistics, premises and equipment of the Corporation. It is also responsible for all personnel matters;

(h) The Legal Department will, in time, follow up on the guarantees liquidated by the banks and their claims against their customers. For the time being, as no cases of default have occurred and no claims have been undertaken, this department has not

been established, and general legal matters are undertaken by the Corporation's legal adviser.

2. CGC shareholders

The shareholders of CGC are the following nine banks and an insurance company:

Societe Arabe Internationale du Banque
Misr Iran Development Bank
Arab Investment Bank
National Bank of Egypt
Credit International Bank of Egypt
Suez Canal Bank
Bank of Alexandria
Industrial Development Bank of Egypt
Banque du Caire
Al-Shark Insurance Company

To date 29 banks operating in Egypt (including the nine shareholding banks) have signed the agreement of participation with CGC.

3. CGC capital and funding

The Corporation's authorized capital is LE 5 million, with only LE 2.2 million paid up. The Egyptian Government provided CGC with an LE 60 million loan, payable in three tranches; CGC has received the first two tranches, amounting to LE 40 million. The loan provides CGC with a two-year grace period for payment of interest and ten years for capital instalments; this allows CGC to cover the cost of issuing guarantee documents during the first few years of operations or until it can build up a portfolio of guarantees whose total fees can cover the costs of the Corporation. It is vital that a special reserve fund be built up from the revenues of these funds for eventual claims against defaulting loans. It goes without saying that claims should not be paid out of the loan capital, but rather from the net earnings received from placements made with it.

A Cost Recovery Programme agreement was signed between the Egyptian Government and USAID to help rehabilitate governmental general hospitals and the health insurance system, and to help fund the private-sector health care providers; CGC was given the task of helping this last component. CGC was given a trust fund of $US 30 million by USAID -- also in three tranches -- to guarantee bank loans to help the medical profession establish private practices and polyclinics all over the country. Only the first tranche of $US 10 million has so far been received.

4. CGC guarantee capacity

The feasibility study done for CGC showed that the default rate would likely vary between 3 and 5 per cent of loans outstanding. It was also found that the Corporation

could reach a default rate of 10 per cent and still be economically viable. The per-annum net earnings from the invested funds at the Corporation's disposal are equal to a certain amount; one can safely assume that this earned sum could be used to honour claims equal to 10 per cent of the CGC guarantee portfolio. Say, for example, that CGC earns (nets) LE 6 million from its investments and that this sum represents the 10 per cent in default; this means that CGC can safely handle a guarantee capacity of LE 60 million per annum (i.e., a multiplier of 10). Given that this amount represents a 50 per cent guarantee, banks can lend up to LE 120 million every year under this scheme.

F. CGC operations: terms and policies

1. Authorities

CGC's policy limits the amount of the letter of guarantee issued to small-scale enterprises to between LE 10,000 and LE 700,000; the following table shows which authorities are authorized to approve the various guarantee amounts.

Authority	Limits of authority
Board of Directors	From LE 350,001 to LE 700,000
Executive Committee	From LE 150,001 to LE 350,000
Chairman and Managing Director	From LE 100,001 to LE 150,000
General Manager and Credit Director	From LE 10,000 to LE 100,000

The same limits apply to approving claims to liquidate a guarantee.

2. CGC definition of an SSE

An SSE is a legal entity whose total assets -- excluding the value of land and buildings but including the value of the loan facility -- range between LE 40,000 and LE 5 million. For the medical programme there is no minimum, but the same maximum of LE 5 million applies. (These guarantees are designed to cover small hospitals and polyclinics only.)

3. CGC guarantee amounts

Guarantees issued by CGC vary from LE 10,000 to LE 700,000. In other words, CGC guarantees loans and credit facilities that range between LE 20,000 and LE 1.4 million. For the medical programme, there is no guarantee minimum, though the maximum is the same as that for SSEs.

4. Percentage of risk coverage

CGC guarantees up to 50 per cent of an accredited bank loan to an SSE. For the medical programme the guarantee coverage ranges between 65 and 80 per cent. The 80 per cent coverage is for loans up to LE 50,000 -- especially in rural areas. With increasing loan amounts, the coverage is reduced to 65 per cent to represent the maximum guarantee that CGC can issue (LE 700,000).

5. Administration fee

CGC levies a 2 per cent charge on guarantees issued on behalf of SSEs, calculated according to the guarantee amount. For the medical programme the fee ranges between 0.5 and 1 per cent of the guaranteed amount; the lower figure is applicable to guarantees issued for loans of LE 50,000 or less.

6. The legal status and activities of SSEs

In order to obtain a CGC guarantee an SSE must be a legal entity. There is no restriction on the form -- it can be a proprietorship or as a joint-stock company -- but its documentation must be in order. The SSE can be involved in any type of economic activity, including all branches of industry, agriculture, tourism, transportation, all types of contracting, and different types of services and education. The only exception (for the time being) is trading, as it does not entail any value added. At a later date, when CGC is able to dispose of more funds, it can expand its activities to cover trading as well.

For the medical programme different criteria apply; a solo health-care provider must fulfil Ministry of Health conditions to set up his/her own practice.

7. Type of banking facilities

CGC covers bank facilities to finance both working capital and the purchase of fixed assets. These are usually extended in the form of medium-term loans or short-term facilities. CGC also covers 50 per cent of the uncovered portion of banking letters of guarantee (bid and performance bonds), as well as import and export letters of credit. For the medical programme, solo health-care providers can apply only for term loans, which are to be used to finance the purchase of the premises and/or the required medical equipment. Polyclinics can apply for both term loans and working capital.

8. Terms of the CGC guarantee

CGC guarantees range from a minimum of six months to a maximum of five years. Letters of guarantee that cover working capital are extended for one year only, but are eligible for reissue with the presentation of a new application. The same applies for the medical programme.

G. CGC activities

In spite of the fact that it is privately held, CGC considers itself a vehicle for social and economic development within the country; its activities are therefore not limited to the issuing of guarantees, but have gone further to include the following:

(a) CGC coordinates the SSE's technical-assistance and know-how requirements with international voluntary organizations (IESC in the United States, NMCP in the Netherlands, CESO in Canada, GTZ in Germany and others);

(b) CGC helps promote SSE exports by maintaining a vast data bank of foreign importers of Egyptian goods -- complete with addresses and product specifications;

(c) CGC is sponsoring a very important survey of five different areas in Egypt in order to identify the possible needs of existing enterprises and the local communities for products and services. From these findings prefeasibility studies of five to six pages in length will be prepared to provide the basis for prospective entrepreneurs to set up shop. In this manner, the start-up SSE is established as a sort of feeder enterprise for other (already existing) entities, thus solving the most complex problem facing small businesses -- namely, the identification of a market;

(d) CGC introduces specially designed guarantee programmes. A very important guarantee programme (referred to in the previous sections) was put together to help the medical profession set up clinics or small hospitals, and especially to help them finance the increasingly high cost of medical equipment. Talks are currently under way with both the Arab Fund for Social and Economic Development and the European Economic Community (EEC) to set up a similar specialized programme using CGC as an intermediary.

Annex I

LIST OF SMALL-BUSINESS ASSOCIATIONS AND SCHEMES

A. Schemes and associations in Egypt

1. Alexandria Businessmen's Association (ABA)

ABA was founded in 1988; financial support from USAID has allowed the organization to develop the basis for wide-ranging support of small businesses. Its main objectives are to:

(a) Strengthen relations between business and Government;

(b) Create a favourable environment for developing trade and investment;

(c) Cultivate relations between Egyptian and foreign businessmen.

2. Alexandria Small-Business Services Centre

The Centre provides exhibition space for clients' products. A full set of new clients/products is introduced and included every two months or so in order to keep the exhibit up to date.

3. Credit Guarantee Corporation for Small-Scale Enterprises (CGC)

CGC was established on 9 December 1989. Its main objectives are:

(a) Increasing the number of SSEs;

(b) Raising the productivity and efficiency of existing firms;

(c) Helping banks to improve the credit ratings of SSEs;

(d) Increasing output and exports and reducing unemployment;

(e) Attracting new types of clients to banks;

(f) Providing training and technical assistance in all activities with the help of international voluntary organizations.

CGC extends its support to health-care providers in the regions of Egypt that are not served by others. Moreover, under the credit guarantee component for health-care providers, CGC is able to offer technical-assistance services through its in-house unit.

B. Schemes initiated by USAID

1. Commodity Import Programme (CIP)

The Programme is designed to expand investments in Egyptian private-sector enterprises. The Programme provides foreign exchange and short- to medium-term credit to the private sector to finance the importation of goods and equipment from the United States.

2. United States Investment Export Promotion Office (USIPO)

This Office provides expertise to entrepreneurs preparing to launch new ventures or expand existing projects. USIPO can help SSEs to upgrade their technical and managerial capabilities and find appropriate foreign partners for them. USIPO also helps SSEs assess the viability of their business plans and requirements through the Private-Sector Feasibility Studies Programme (PSFSP).

3. Science and Technology Cooperation (STC) Project

Jointly developed between USAID, the Ministry of Scientific Research, and the Academy of Scientific Research and Technology, the Project aims at coordinating research and development efforts with those of the production and service sectors to improve production processes and develop new products and technological know-how relevant to Egyptian needs.

C. Other SSE-development schemes

1. Egyptian Export Promotion Centre

This Centre is designed to provide export-promotion support.

2. Export Development Bank of Egypt

This Bank has developed a computerized export-information service. Its main function is to provide incubation-like support services to encourage the development of the export aspect of the economy.

3. Federation of Egyptian Industries (FEI)

The Federation is establishing new headquarters which will include significant exhibition space to highlight the capabilities and reflect the interests of its members.

4. Friedrich Ebert Stiftung

This German-funded project, consisting of two experts supported by a panel of national consultants, provides advice in conjunction with the Central Production Corporation

Union to craftsmen and workshop cooperatives in the furniture, leather, clothing and metal-working sectors.

5. The Innovation and Invention Development Organ

This body was established in 1976 to encourage innovations and inventions for the purpose of generating and building up the national technological base, as well as to produce prototypes and carry out semi-industrial experiments.

6. Industrial Development Bank of Egypt (IDBE)

An Egyptian joint-stock bank, the IDBE is charged with:

(a) The formation of new industries and the expansion/renovation of existing ones;

(b) Developing Egyptian industries;

(c) Providing industries with credit and offering business advice;

(d) Conducting feasibility studies and participating in exhibitions and international trade fairs in order to support lending activities.

7. International Executive Services Corporation (IESC)

This non-profit organization was founded in 1964, with the first advisors sent to Egypt in 1979. It is operated by businessmen to assist businessmen in:

(a) Increasing productivity;

(b) Improving quality;

(c) Upgrading management skills;

(d) Enhancing basic technologies.

IESC developed a series of computer centres in each governorate, as well as an international trade networking system.

8. New Urban Communities Programme

This joint Government/private industry programme goes beyond creating industrial cities to create an entire community. The development of these cities provides an outlet for industrial development outside Cairo and Alexandria.

9. Small- and Micro-Enterprise Project

Jointly developed between the Alexandria Businessmen's Associations and USAID, this Project's targets are the development and promotion of existing enterprises. The Project includes credit training and technical assistance services.

D. Scheme initiated by the Egyptian Government

Social Fund for Development (SFD)

This economic-reform programme was initiated by the Egyptian Government in 1986, and is financed by the Government of Egypt in cooperation with the World Bank/International Development Association (IDA), the European Economic Community (EEC) and other multinational and bilateral donors. The programme is aimed at:

(a) Enhancing the Government's economic reform and structural adjustment programmes;

(b) Contributing to the well-being of low-income groups that are adversely affected by the economic reform programme;

(c) Protecting vulnerable population groups, public-sector employees, unskilled and semi-skilled workers, unemployed youth, and households headed by women from the likely longer-term adverse effects of the economic reform programme.

Among the Fund's programmes is the Enterprise Development Programme, whose main objectives are to:

(a) Expand existing small enterprises to generate income and increase employment opportunities;

(b) Create small enterprises.

E. Governmental organizations

1. Academy of Scientific Research and Technology

The two main functions of the Academy are to:

(a) Enhance Egyptian scientific capabilities and their contribution to development;

(b) Bridge the existing gap between: (a) scientists; and (b) industry, agriculture and other sectors.

2. Cabinet Information and Decision-Support Centre (IDSC)

Established in 1985, the IDSC is an outgrowth of a mid-1980s strategy of the Egyptian Government to improve Egypt's managerial and technological infrastructure through:

(a) Developing an infrastructure for information and support systems;

(b) Developing the software service industry;

(c) Developing a high-tech industrial base.

The Ministry of Cabinet Affairs has established a computerized network to support trade development.

3. General Organization for Industrialization (GOFI)

GOFI is a governmental agency attached to the Ministry of Industry. The Organization has a Small-Scale Industry Department with fourteen engineers who offer advice to small enterprises. GOFI has contributed to developing small-scale industries by identifying 50 proposed projects in new cities.

4. Industrial Design and Development Centre (IDDC)

IDDC is a governmental agency affiliated with the Ministry of Industry; it was established jointly by the Egyptian Government and the United Nations Development Programme (UNDP) in 1968. IDDC offers a variety of services and workshops.

Annex II

EXAMPLES OF GUARANTEE SCHEMES IN OTHER COUNTRIES

A. Korea Credit Guarantee Fund (KCGF)

This Fund was established as a public corporation in June 1976, and is one of the most successful of the credit guarantee programmes. Major activities include the provision of:

(a) Credit guarantee services;

(b) Credit information;

(c) Technical assistance to small and medium-sized businesses.

KCGF has 16 departments at its head office, 24 branches throughout the country, and over 1,300 employees. It provides guarantees for payment of taxes, duties, invoices, loans from banks and non-financial institutions, and leases. The guarantees allow the payment of taxes and duties and invoices to be deferred, thus providing liquidity. Guaranteeing leases allows firms to lease production facilities.

KCGF reviews applications, interviews entrepreneurs, and conducts credit investigations and analyses; guarantees are only issued after a thorough screening. KCGF also provides credit ratings on firms. Guarantees vary according to the size of a business -- from $US 130,000 (equivalent to 10 per cent of $US 1.3 million) up to 80 per cent of the loan. KCGF is funded by the Government of the Republic of Korea through a tax on the profits of all banks and a 1 per cent per annum guarantee fee. Original capital was equivalent to $US 73 million and in 1981 reached approximately $US 190 million. The total amount guaranteed increased from three times the capital in 1976 to 11 times the capital in 1981, then dropped to seven times the capital by 1985. The peak leverage reached 12 times the capital in 1982. When a loss occurs, banks are compensated directly by KCGF.

In 1985, total credit guarantees reached $US 2.3 million, and guarantees to small businesses rose from 41 per cent of all guarantees in 1976 to 91 per cent in 1985. Guarantees are given to three government banks rather than to commercial banks. Income from the guarantee fee covered costs up to 1982, but by 1984/1985 these fees no longer covered costs.

B. Credit guarantee scheme in India

A credit guarantee scheme was initiated for small industries in 1960 by the Government and operated by the Reserve Bank of India, but it was later transferred to the Deposit Insurance and Credit Guarantee Corporation. In 1981 a new credit guarantee scheme was introduced.

The guarantee scheme covers credit for investment and working capital for small businesses involved in manufacturing and the processing of goods, and for service and

repair workshops. An SSE is defined as a firm whose investment in plant and machinery does not exceed the equivalent of $US 300,000. The scheme is operated by a government entity -- the Deposit Insurance and Credit Guarantee Corporation -- with a paid-in capital of $US 42 million. Administrative expenses are covered by the interest on the investments of the general fund. Resources from another reserve -- the credit guarantee fund -- are used to meet guarantee claims. The credit guarantee fund is supported by guarantee fees which amount to 0.05 per cent per annum of the total credit -- not only the 60 per cent covered by the guarantee.

Guarantees are not invoked upon default if there is a chance that the defaulting borrower can be rehabilitated; additional lending is usually required. Disputes often arise as to payment, as the lender is supposed to take action against the collateral and only invoke the guarantee for the balance not collected. Conditions for repayment are complicated. A loan must be past due for one month after the notice for demand of payment of the entire amount has been given; the loan must have been transferred to a "doubtful loan" category. Credit institutions have to certify that the loss has not been due to the bank's negligence; disputes sometimes arise as to whether there has been any negligence.

Guarantees increased from $US 3 million in 1960/1961 to $US 5 million by the end of 1985. A total of 449 of all types of credit and financial institutions participated. In 1984, claims amounted to $US 67 million (left over from previous guarantee schemes). During 1985, 5,325 out of 8,597 claims for payment were paid for $US 11 million; 3,085 claims were withdrawn for $US 15 million; and claims amounting to $US 1.8 million were rejected. As of 31 December 1985, 4,000 claims were pending for $US 56 million.

The guarantee coverage for loans is virtually compulsory for a large number of financial institutions. The major complaint is the slow payment of claims; some are not settled for two years or more. Many disputes have arisen about the terms of guarantees.

C. Fonds National de Guarantee (FNG) in Tunisia

This guarantee fund was established by the Government of Tunisia in 1981 to provide guarantees to small- and medium-sized agricultural, industrial and artisanal units.

The FNG guarantees between 50 and 75 per cent of the outstanding principal of a loan -- 75 per cent if less than 10,000 dinars, and 50 per cent if the loan exceeds 10,000 dinars.

FNG is funded by a five-eighths per cent tax on short-term bank overdrafts. A one-time tax of one-eighths per cent is levied on the investment loans given to non-agricultural sectors by banks not eligible for an FNG guarantee.

A claim can be invoked two years after a loan is in default if the bank has made every reasonable effort to collect the loan.

FNG has not been widely used by the commercial banks.

Annex III

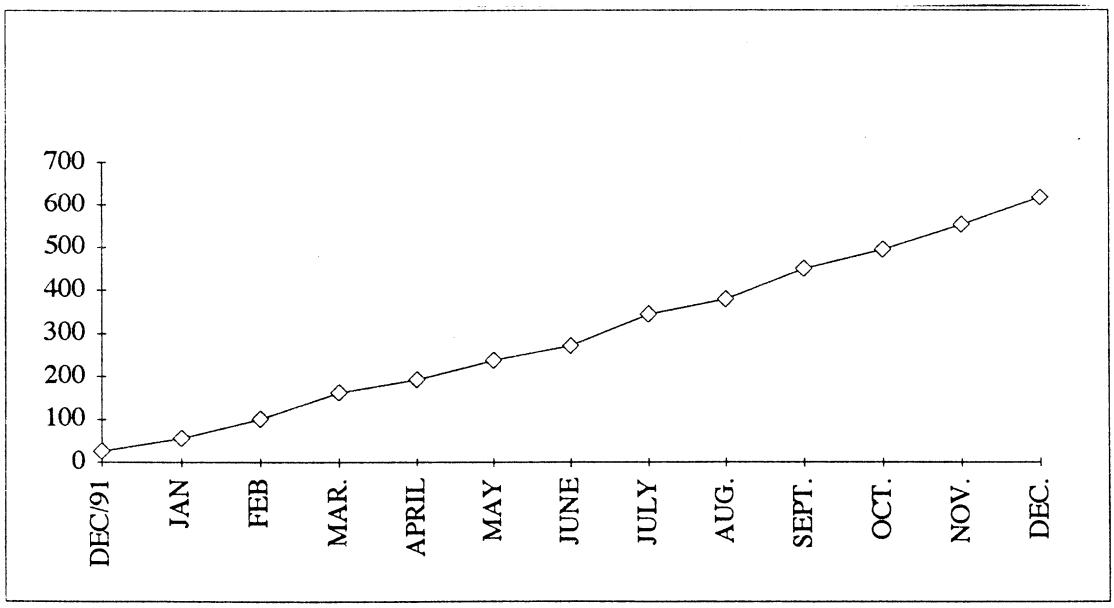
TABLES AND FIGURES ILLUSTRATING THE RESULTS OF CGC ACTIVITIES

Annex table 1. Total number and amount of the letters of guarantee issued to small-scale enterprises and the medical programme (CRP) in 1992

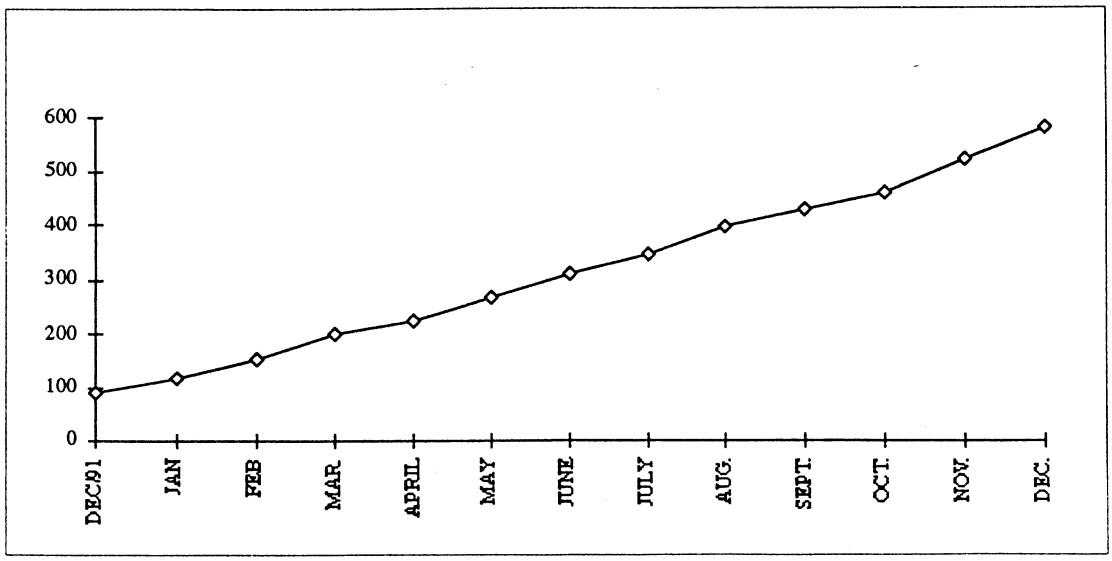
Medical programme			Small-scale enterprises		
Month	Number	Amount (LE)	Month	Number	Amount (LE)
December 1991	26	884 550	December 1991	92	5 865 255
January 1992	56	846 075	January 1992	119	1 093 867
February 1992	101	3 753 875	February 1992	152	3 546 261
March 1992	162	5 303 240	March 1992	201	6 858 246
April 1992	193	6 122 970	April 1992	224	7 931 246
May 1992	238	7 354 340	May 1992	266	10 291 896
June 1992	273	8 912 560	June 1992	310	13 189 610
July 1992	344	10 940 702	July 1992	347	15 753 610
August 1992	379	11 964 417	August 1992	397	18 534 149
September 1992	450	14 228 926	September 1992	427	20 453 851
October 1992	495	15 242 106	October 1992	458	21 864 876
November 1992	553	17 982 900	November 1992	523	26 415 664
December 1992	618	20 020 207	December 1992	582	29 572 807

Note: LE = Egyptian pounds.

Annex figure I. Total number of letters of guarantee issued to the medical programme (CRP) in the first two years



Annex figure II. Total number of letters of guarantee issued to small-scale enterprises in the first two years



Annex table 2. The Credit Guarantee Corporation's first two years

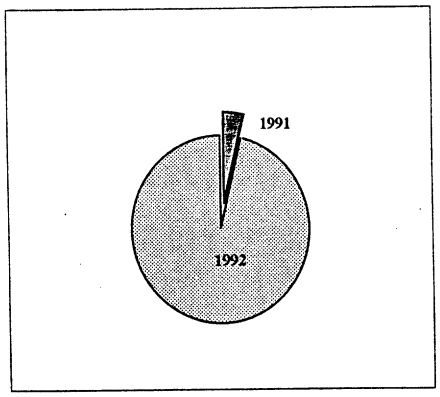
	Medical programme (CRP)			Small-scale enterprises (SSEs)			Total		
	Credit (LE)	Guarantee (LE)	Number of letters of guarantee	Credit (LE)	Guarantee (LE)	Number of letters of guarantee	Credit (LE)	Guarantee (LE)	Number of letter of guarantee
1991 figures	1 234 000	870 150	26	13 003 558	5 790 255	91	14 237 558	6 660 405	117
1992 figures	28 360 501	20 018 607	592	66 098 769	29 580 672	490	94 459 270	49 599 279	1 082
Net outstanding balance	29 594 501	20 888 757	618	79 102 327	35 370 927	581	108 696 828	56 259 684	1 199
Average	47 890	33 800		136 150	60 880				

Note: LE = Egyptian pounds.

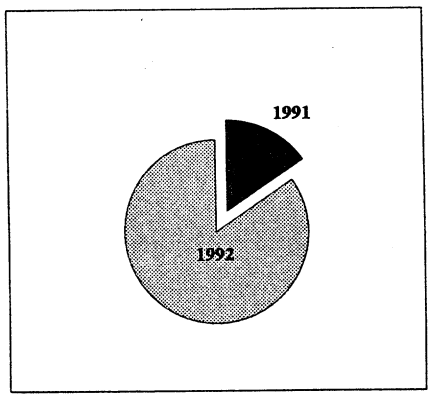
Annex table 3. Guarantees issued to small-scale enterprises, classified according to credit purpose (year-to-date as at 31 December 1992)

Purpose	Number of letters of Guarantee	Total loan amounts (in LE)	Total guarantee amounts (in LE)	Percentage of total letters of guarantee	Average letter of guarantee amount
Working capital	359	44 734 579	19 489 588	65.89 %	54 289
Fixed assets	131	21 364 190	10 091 084	34.11 %	77 031
Total	490	66 098 769	29 580 672	100 %	60 369

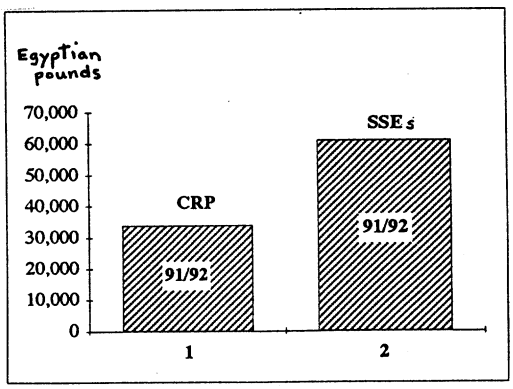
Annex figure III. Total number of letters of guarantee issued to the medical programme (CRP) in the first two years



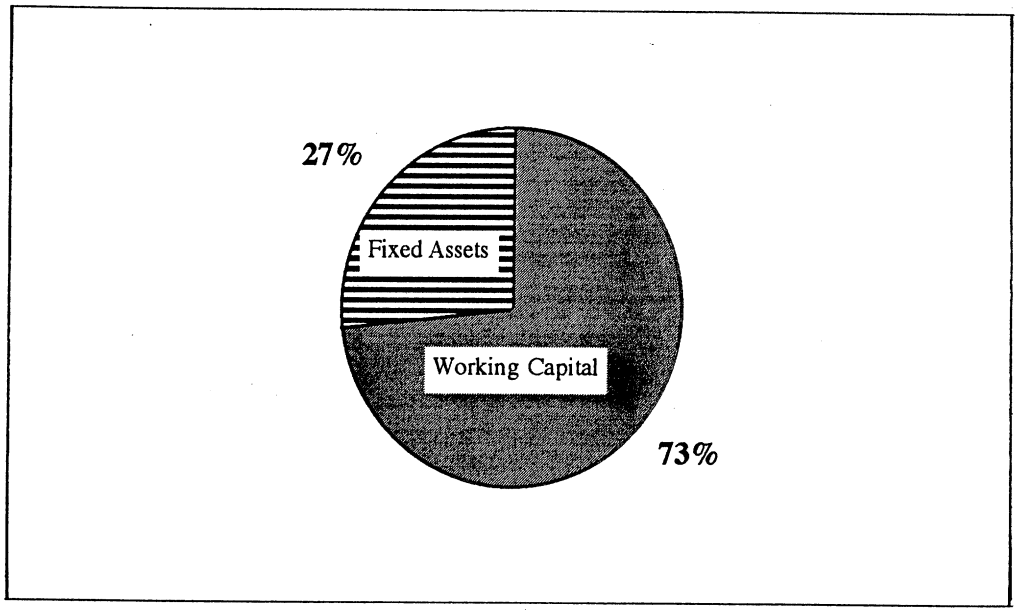
Annex figure IV. Total number of letters of guarantee issued to small-scale enterprises in the first two years



Annex figure V. Average amount of each letter of gurantee issued in the first two years to the medical programme (CRP) and to small-scale enterprises (SSEs)



Annex figure VI. Letters of guarantee issued to small-scale enterprises (year-to-date as at 31 December 1992)



XIII. THE ROLE OF THE FINANCIAL AND BANKING SECTORS AND SPECIALIZED FINANCIAL INSTITUTIONS IN FINANCING SMALL- AND MEDIUM-SCALE ENTERPRISES

by Horst Mund*

A. Introduction

It is now generally accepted that small- and medium-scale enterprises (SMEs) play an important role in enhancing economic growth and development in developing countries. Being labour- rather than capital-intensive, they create jobs at relatively low capital costs. SMEs lay the groundwork for future industrial expansion as they offer excellent opportunities for entrepreneurial and managerial talent to mature. Informal-sector enterprises, in particular, provide opportunities to generate at least a minimum income for growing numbers of job-seekers who cannot find employment in the formal sector. SMEs offer relatively cheap products, thus providing low-income customers with goods and services at affordable prices. Furthermore, SMEs often help to save scarce foreign exchange by relying primarily on locally available inputs.[1/]

It seems, however, much easier to acknowledge these positive features and virtues of the small-scale enterprise sector than to create an enabling environment or to design concrete policies and support mechanisms. Small-scale entrepreneurs frequently face problems in numerous areas. They suffer from bureaucratic red tape.[2/] SMEs often find it difficult to acquire appropriate premises, and their access to both physical and technical inputs is limited. Managerial knowledge and expertise alone are often hardly adequate to run a business profitably. Moreover, access to the informal sector is relatively easy, leading to stiff competition and a high mortality rate among enterprises. Access to financial services is the most prominent obstacle to small-scale business development.

The paper starts with a short analysis of the problems SMEs face in obtaining loans from formal financial institutions. The different schemes and approaches presented thereafter attempt to address the problems related to finance at different levels within the financial system. The Double Credit Guarantee Scheme (DCGS) of the Friedrich Ebert Foundation in Kenya is an example of an approach implemented at the micro-economic or enterprise level. The linking project in Indonesia is geared towards problems found at the sectoral level. At the macro-economic level, the financial systems of many developing countries have recently undergone profound reforms. These reforms (geared towards increased liberalization), though not specifically designed for small-scale enterprises, clearly have an impact on the access of these enterprises to financial services.

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* Horst Mund is associated with the Friedrich Ebert Foundation.

B. Problems and constraints in financing small-scale enterprises

There is a widespread consensus that lack of access to financing is the leading constraint for most small enterprises. Although clearly linked to other problem areas, it still remains the most important obstacle to small-scale business development.[3/]

Most of the difficulties small-scale entrepreneurs face in obtaining financial services are directly related to the transaction costs that are associated with any of the lending activities carried out by either formal or informal financial institutions. "Transaction costs of lending consist of the cost of administering credit and the cost of the risk of default. Administrative costs are those which are directly attributable to the processing, delivering and administering of loans. ... Costs of risk and defaults incorporate an element to cover losses through default."[4/]

Not surprisingly, loans to small-scale enterprises are relatively small. Administrative costs, however, are fairly constant irrespective of the loan size. As many small firms submit incomplete financial statements (if any) or files that are hardly "bankable", these administrative costs might often be even higher for small loans than for large ones.

Due to their inexperience with commerical banks, the track record and reputation of small-scale borrowers are usually limited or relatively unknown. Banks, therefore, regard small enterprises as risky clients. This judgement is reinforced by the fact that the majority of small-scale business operators are not able to meet conventional security requirements set forth by commercial banks. Their creditworthiness is limited, which prevents them from obtaining loans from banks, thus preventing them from creating goodwill, which in turn keeps their creditworthiness low; small-scale entrepreneurs often find themselves in a vicious circle when it comes to formal financing.

To sum it up, the transaction costs of small-scale lending are presumably relatively higher than those of large-scale lending. Estimates for the Philippines confirm this hypothesis. The costs of loans to small-scale farmers were approximately three times -- and those to small-scale industry double -- the loan costs of large-scale industry.[5/]

Transaction costs are but one element in the calculation of the cost of credit. The other elements are the costs of refinancing and the rate of return paid to the owners of the financial institution on their equity.

The price of any credit is the interest rate charged by the bank. As interest-rate ceilings in many countries are determined by banking laws, higher transaction costs will necessarily reduce the profits of commercial banks, given the fixed costs of refinancing facilities. Loans to small-scale enterprises are less profitable to banks, and this means that less credit is extended by formal institutions to the small-scale enterprise sector.

Financial markets are among the most regulated in many countries -- and not only in the developing world. Interest-rate ceilings, sectoral credit allocation, high minimum-

reserve requirements by central banks, and exchange-rate controls are but a few examples of the governmental interventions which have often been introduced in financial markets with the good intention of channelling funds towards sectors of high political priority or of offering financial services at reasonable prices -- even to the small-scale economic sector. The above-mentioned negative correlation between interest rates and credit supply, however, have often led to the virtual exclusion of small entities from the services of the formal financial sector.

As a consequence of strict market regulations, financial sectors in virtually all developing countries exhibit a high degree of "financial dualism", i.e., the co-existence of formal and informal financial institutions.

Sometimes the latter are of much greater importance than their formal counterparts. In rural Nepal, rural Malaysia and the rural Philippines, for instance, the share of informal credit is 70 per cent or higher.[6/] Informal-sector entities such as money-lenders benefit from at least two advantages they have over formal financial institutions: first, they are close to their clients, which reduces the risks of default and hence transaction costs; second, they are in a position to charge interest rates which are well above those of commercial banks and often reach usurious levels.

C. Innovative financing schemes

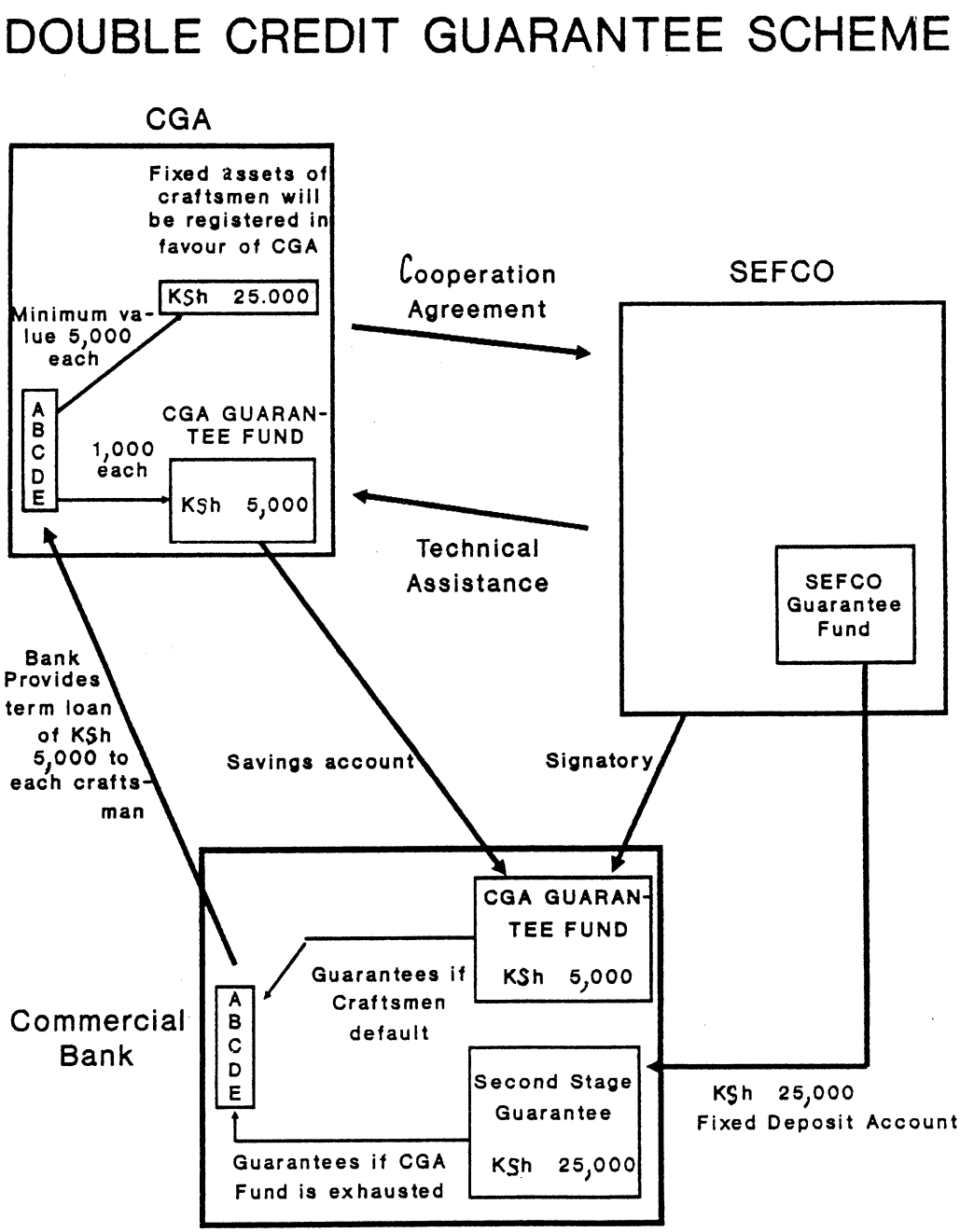
1. The micro-level: the Double Credit Guarantee Scheme (DCGS)

The joint Double Credit Guarantee Scheme (DCGS)[7/] of the Friedrich Ebert Foundation (FEF) and the Small-Enterprise Finance Company (SEFCO) in Kenya tries to address the problem of the insufficient security of small-scale businessmen trying to obtain loans from commercial banks; the idea of the Scheme is to substitute conventional collateral (i.e., most often land title deeds) with mutual guarantees among businessmen. These guarantees are supplemented by counter-guarantees offered by SEFCO/FEF. The DCGS's main objective is to introduce craftsmen to the existing banking system, with the ultimate aim of enabling them to negotiate their individual loan requirements directly with commercial banks.

(a) The concept

The chart below explains the basic concept of the DCGS. Five craftsmen (A, B, C, D, and E) wish to obtain loans from a commercial bank amounting to 5,000 Kenyan Shillings (KSh) each.[8/] They form a credit guarantee association (CGA) which is registered as a limited-liability company. It thus becomes a legal body; i.e., it can sue and be sued, and it will be held responsible for loan repayment in case of default by individual members. All five members of the CGA contribute the equivalent of 20 per cent of the loan -- or KSh 1,000 -- to the so-called credit guarantee fund (CGF); this is deposited in a savings account with the same bank that will provide the loans to the CGA members. In doing so, all members accept that the individual contributions might be used as a basic security for the loans of all the other members.

Figure. Diagram of the Double Credit Guarantee Scheme



At the same time, each CGA member has to provide tangible security to protect the CGF and thus safeguard the other members. This security usually consists of fixed assets such as sewing machines, circular saws or welding machines which can easily be identified by serial number. Their value must cover 100 per cent of the individual loan amount, and they will be registered in favour of the CGA.

As is the case in many African countries, the lending practices of commercial banks in Kenya are very conservative, or risk-averse; this is all the more true when it comes to lending to the small-scale sector. Kenyan banks demand a security cover equivalent to more than 100 per cent of the cash amount to be lent. SEFCO, a development bank specifically designed to cater to the financial needs of the small-scale business sector, cooperates with the Friedrich Ebert Foundation to provide the necessary additional security to satisfy the commercial banks' requirements. In each case, a fixed deposit reserve which amounts to 100 per cent of the total loan (KSh 25,000 in the example) is opened at the appropriate bank.

A cooperation agreement between CGA and SEFCO designates SEFCO as the sole signatory to the CGA guarantee fund. It also stipulates that technical assistance in the form of individual advisory services and training courses be made available by SEFCO's project staff to the CGA members. SEFCO charges a 2 per cent guarantee fee for its services.

The end result is that the commercial bank is provided security equivalent to 120 per cent of the loan volume. The 20 per cent supplied by the CGA (KSh 5,000 in the example) is supplemented by the fixed deposit reserve of SEFCO (the latter covers 100 per cent of the loan: KSh 25,000 in the example). After the deposit of the counter-guarantee by SEFCO, the loan agreements between the bank and the loanees (with the application of commercial interest rates) are concluded, and disbursement of individual-term loans of KSh 5,000 to each of the five craftsmen follows. Each member individually negotiates his repayment period and the monthly instalments he has to pay.

The task of monitoring and controlling loan repayment is delegated by CGA to a group of CGA members who are elected at a general CGA meeting to a credit committee; their work is crucial to the effective performance of the CGA. Monthly repayments are monitored, with the CGA member presenting the pay-in slips he receives from the bank for any loan payments he makes. The credit committee prepares a monthly statement of the repayment situation of all CGA members, and is therefore able to quickly identify those who are in arrears. Any failure on the part of a loanee to service his loan regularly constitutes a breach of contract, theoretically entitling the bank to recall the loan in full immediately.

In practical terms it takes three months before the bank effectively recalls the loan. This period is used to rectify the situation, if possible, by convincing the member to pay his outstanding arrears. In the case of a first-month failure, the credit committee reminds and advises the member in arrears to meet his obligation. Pressure increases after two months of non-repayment. The defaulter is given a deadline by the leaders (or management committee) of the CGA. After three consecutive months of default, SEFCO is requested by the CGA to instruct the bank to offset the total outstanding loan balance against the

CGF. The respective member is informed in writing that his loan has been recalled and that repayment of the total amount to the CGA is immediately necessary.

Once the loan has been paid out of the CGF, the defaulter owes the loan amount directly to the CGA, as all members originally had contributed to the fund. Mortgaged assets must now be seized. A deadline is set for their sale, although it should be noted that such a sale, usually through an auctioneer, will only be carried out as a last resort. The money that is recovered will be used to replenish the CGF.

As has been mentioned above, the CGF only covers 20 per cent of the total amount loaned to all CGA members. Should the CGF be exhausted -- as non-repayment might eventually exceed the resources of the CGF -- the fixed deposit reserve of SEFCO will be used to meet the obligations. While the CGF is the first-stage guarantee, SEFCO's counter-guarantee forms the second-stage guarantee, which explains the name of the Scheme;

(b) Salient features and empirical evidence

There are several factors which determine the success or failure of the DCGS, the single most important element being the degree of social cohesion among the CGA members. The CGA is a self-help organization, and as such its members must aim at full self-administration. To achieve this, the management of the CGA is designed to be run by two committees. As was indicated above, these are the management committee and the credit committee.

Elected during a general meeting of the CGA, the management committee is responsible for the day-to-day running of the Association's affairs on behalf of its members. In particular, it:

(i) Ensures the smooth and efficient running of the CGA;

(ii) Implements CGA policy as determined by the general meeting;

(iii) Ensures that statutory requirements are being observed (the registration of members, the keeping of a minutes file, etc.);

(iv) On the basis of recommendations made by the credit committee, decides how to follow up defaulters, assess new loan applications and vet new membership applications;

(v) Registers the members' security.

The credit committee is also elected during a general meeting, but operates independently of the management committee; all of its recommendations, however, are made to the management committee. In particular, it:

(i) Vets all loan applications and applications for new membership, and makes recommendations to the management committee;

(ii) Identifies and verifies the security (collateral) of members;

(iii) Monitors monthly repayments and ensures that they are made regularly, and that arrears are reported for necessary action;

(iv) Follows up the defaulters' situations and repayments;

(v) Organizes the repossessing and disposal of the security of defaulters.

Thorough screening of all members with regard to their commitment and seriousness is in the interest of the CGA as such, although single members might be tempted to default. The element of social pressure which is built into the concept means that it is not an anonymous institution providing guarantees that will suffer possible losses; it is the craftsmen themselves, through their contributions to the CGF, that have to bear the risk of defaulting.

The tasks to be performed by the various self-administration bodies of the CGA are very complex. Given their general educational level, most of the craftsmen are not prepared to complete these tasks satisfactorily by the time the credit guarantee associations become operational. It is therefore up to SEFCO/FEF to provide comprehensive training and follow-up for the members of the CGAs, particularly for their office-bearers.[9/]

As was indicated above, the loan amounts are very small and only enable the craftsmen to finance parts of their working-capital requirements; given that most of the craftsmen have had no prior experience in obtaining credit from commercial banks, risks can thus be kept to a minimum. The financial needs of many small-scale businessmen, however, exceed the DCGS ceiling of Ksh 20,000 or $US 1,000. It is for this reason that the Scheme has been supplemented by the Individually Guaranteed Loan Fund (IGLF), with which fixed investments of up to Ksh 150,000 can be financed. Only those CGA members who have a good record of DCGS loan repayment are eligible for IGLF loans. Members who envisage more important capital investments in their enterprises therefore have a direct incentive to service their DCGS loans properly.

At present there are 16 CGAs with approximately 550 members -- an average of 34 members per CGA. Counter-guarantees by SEFCO/FEF amount to more than Ksh 3.5 million. Out of this amount, only Ksh 15,000 -- or a mere 0.4 per cent -- have had to be paid by SEFCO for defaulted loans. This means that the vast majority of repayment problems were able to be dealt with within the CGAs themselves. The average rate of repayment of all CGAs is well above 85 per cent. SEFCO's fixed deposit reserve, while serving as the second-stage guarantee, is effectively earning money for SEFCO, as the deposit bears the usual interest. It has also been realized by the local authorities in Kenya that the DCGS might -- through the establishment of CGAs -- provide a good opportunity for them to assist local craftsmen in their constituencies. Working with the Kenyan Ministry of Local Government, the Friedrich Ebert Foundation helped establish seven

additional CGAs with approximately 200 members, with the second-stage guarantee provided by the local authorities themselves;

(c) Critical assessment of the DCGS

Two different sets of criteria are applied to assess the quality of the Double Credit Guarantee Scheme. The first set is taken from an evaluation of small-scale financing programmes in three African countries, according to which the financial technology employed by a financing programme is the single most important determinant of its success in serving the credit needs of the target group.[10/] The authors identify seven elements of a "good" financial technology:

(i) The provision of a range of services -- not only financial but also extension services, training, sales promotion, etc. -- tailored to the needs of the target group;

(ii) A specially designed strategy which gives the promoting agency maximum access to clients who are usually not regarded as creditworthy by the formal financial sector;

(iii) An effective selection procedure for choosing the beneficiaries of the programme;

(iv) Realistic repayment terms and loan volumes;

(v) A functional equivalent of collateral;

(vi) Appropriate procedures for monitoring and enforcing the repayment of loans;

(vii) Motivated, efficient and flexible project staff.

In addition to the above-mentioned training courses in CGA self-administration, the DCGS offers training in business management and record-keeping. Individual craftsmen are visited by SEFCO project staff at least twice a month to discuss problems related to their businesses.

The vast majority of CGA members had previously never been able to obtain loans from commercial banks, although many had tried. In the CGA programme, craftsmen themselves select the partners with whom they wish to share the risk. As they are immediately affected by any default on loan repayment, the members of the association make every effort to exclude risky candidates. The repayment period for the DCGS loans is between 18 and 30 months, making monthly instalments relatively modest. The same holds true for the loan volumes.

The whole system is designed to substitute conventional collateral with the two stages of guarantees that have been described at length above. Loan-repayment monitoring

is carried out by the craftsmen themselves, supported by SEFCO project staff. Repayment rates, which are well above 80 per cent, indicates that the mechanism seems to work satisfactorily. As it is rather difficult to evaluate the quality of project staff, the effective overall performance of the DCGS could be taken as an indication of the quality of SEFCO project officers.

A first assessment, therefore, indicates that the DCGS uses an appropriate financial technology which seems to satisfy the financial needs of its partners.

The second set of assessment criteria has a wider, rather macro-economic scope, and tries to highlight general aspects of credit guarantee schemes all over the world:[11/]

(i) According to Levitsky and Prasad, risk-sharing between the lending institution and the guarantee fund is a key issue in designing guarantee schemes. Their study also describes examples of funds in Japan and France where loans are guaranteed up to 100 per cent;

(ii) The credibility of guarantee schemes is principally built upon its handling of claims in cases of default. Precise regulations have to be laid down which specify both the period of arrears after which the guarantee must be invoked and what steps follow. The delineation of the responsibilities of the participating actors must also be defined;

(iii) "For guarantee schemes to meet their objectives, it must be shown to have created additional lending to the finance that would normally be made available by the banking system to the small-business sector";[12/]

(iv) As a general rule, guarantee schemes should be designed in such a way that fees and other incomes (e.g., return on investments) cover all costs arising from the administration of schemes and from claims.

Commercial banks in Kenya do not participate at all in the risks of non-repayment of DCGS loans. In the beginning this was accepted by SEFCO/FEF with the hope that a good repayment performance could gradually convince banks that clients from the informal sector could be creditworthy. This hope did not materialize. Recently, commercial banks even raised banking fees to a prohibitive level, thus forcing SEFCO to cease its collaboration with commercial banks. SEFCO has since begun to offer loans directly to small-scale craftsmen. Based on the above, the aspect of risk-sharing might therefore be regarded as a major deficiency of the DCGS. It should, however, be noted that the basic concept of the Scheme has not been changed, as craftsmen still mutually guarantee their loans and a second-stage guarantee is offered by SEFCO.

As has been indicated above, the DCGS has clear-cut rules that define when a CGA member is in default.[13/] Three months of arrears automatically leads to an immediate recalling of the loan. Furthermore, as the CGF is the first to be affected, the craftsmen have a direct incentive to deal with any case of default internally.

In the case of the DCGS, additional lending is ensured by the simple fact that the vast majority of CGA members never had access to commercial loan facilities prior to their contact with SEFCO/FEF. Moreover, a growing number of CGA members are now able to negotiate their loans directly -- either with commercial banks sur place or with SEFCO -- as they now have a proven record of good repayment performance.

Internal auditing of the DCGS revealed that the 2 per cent guarantee fee charged by SEFCO was sufficient to cover all the "banking expenses" of the Scheme. These expenses covered, inter alia, legal fees for the registration of associations or the members' security, and the time spent by the SEFCO staff on processing the guarantees. SEFCO has even been able to generate a substantial part of its revenues from the DCGS, as the second-stage guarantees (in the form of the fixed deposit reserves) yield interest for SEFCO. Besides the "banking expenses", there are also "development expenses" to be paid by SEFCO/FEF, i.e., the costs of training and business advisory services. These costs are being covered by the Friedrich Ebert Foundation, which is the promoting agency of the DCGS.

2. The sector level: linking formal and informal financial institutions

(a) Background

In early 1986 an association of central banks, rural development banks and commercial banks in the Asian and Pacific region (APRACA) started a programme of facilitating access to formal financial institutions -- not only for small-scale entrepreneurs, but for all those who until then had been excluded from the services of the banking sector.[14/] It focuses innovatively on a financial intermediation system that is built upon the concept of self-help groups as intermediaries between banks and small-scale businessmen.

Studies of financial markets in several APRACA member countries have revealed a high degree of financial-sector segmentation. The formal sector only serves the upper 5 to 20 per cent of the population, and is comprised of three levels.[15/] The first is that of the central bank with its prudential functions over the second level, which is made up of commercial banks, development banks and also non-bank financial institutions. At the third level are capital markets such as bond or stock markets.

Savings and credit cooperatives, non-governmental organizations and self-help promoting institutions (SHPIs) form the semi-formal financial sector; these entities are not controlled by banking laws but do provide financial services with the approval of the State. Individual money-lenders and groups of mutually organized individuals constitute the informal financial sector. Often without legal status, the self-help groups within this sector do have an organizational structure, and the majority employ effective social control mechanisms which help to limit loan defaulting and/or fraud.

To improve or create accessibility to banking services, three possible approaches were discussed within APRACA:

(i) Upgrading the financial self-help groups composed of small-scale operators;

(ii) Linking existing self-help groups with banks;

(iii) Helping banks adapt to new clients ("downgrading").

The linking approach -- which could eventually incorporate both the upgrading and adaptation elements -- was finally selected and was to be implemented on the basis of the following guiding principles:[16/]

(i) Working through existing formal and informal institutions rather than establishing new ones;

(ii) Promoting savings mobilization by observing two principles:

a. Savings should not yield negative real returns;

b. Savings mobilization must not be undermined by cheap (i.e., subsidized) credit from the central bank or from donors;

(iii) Promoting credit delivery at market rates;

(iv) Linking savings and credit: no credit without savings, and no savings without credit;

(v) Substituting group liability for conventional collateral;

(vi) Ensuring institutional viability. All financial intermediaries involved -- self-help groups, SHPIs and banks -- should be able to cover their costs through adequate interest margins;

(vii) Covering the risks from the margin. The risk of default is thus borne by the financial intermediaries themselves;

(b) The Indonesian case

The implementation of a pilot project in Indonesia must be seen in the light of the deregulation of Indonesian financial markets, a process that started in 1983.[17/] Since then, exchange-rate controls have been loosened and minimum-reserve requirements have been lowered. Interest-rate and credit ceilings have been removed, leading to the highest interest rates in the South-east Asian region. Since 1987 the creation of banks in rural areas has also been greatly facilitated.

Roughly 90 per cent of the more than 30 million enterprises in Indonesia belong to the small-scale sector -- most of them are informal. More than 15,000 banking and non-banking institutions offer financial services. The number of self-help groups exceeds one

million, and acting as informal financial institutions, they have generated their own savings and credit business. Additionally, there is a growing number of SHPIs which act as semi-financial institutions. "Both informal and semi-financial institutions share a number of shortcomings:

(i) They are not linked to the banking sector, except in some cases, with regard to fund depositing or transfer;

(ii) They have no access to refinancing facilities of the central bank; at best they depend to a moderate extent on external donors;

(iii) They are restricted in their savings and credit activities due to shortages of funds;

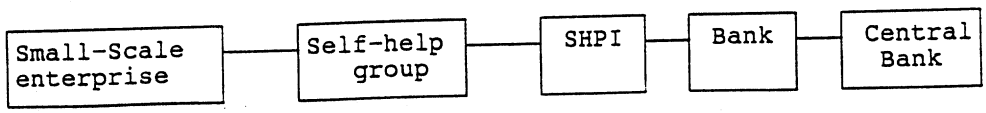
(iv) They have no access to bank training facilities; consequently they lack financial skill and banking experience."[18/]

As was indicated in section B, it is mostly the problem of excessively high transaction costs for both banks and small-scale customers that impedes the provision of appropriate banking services to this target group. Money-lenders who are in a position to charge interest rates cover these transaction costs can only partly fill this gap.

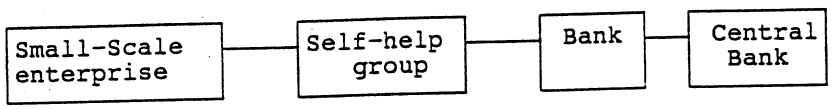
In order to minimize transaction costs, the pilot project aims at linking self-help groups (as grass-roots intermediaries) to commercial banks for the mobilization of savings as well as for credit delivery. In addition to the institutional aspect of the linking approach, there is also a financial one, as savings are a necessary pre-condition for any credit. It is envisaged that institutional linkages between banks and self-help groups should grow in an evolutionary manner, with the ultimate aim of giving small-scale businessmen direct access to commercial banking facilities (as indicated in the following chart):

Chart. The evolution of small-scale enterprise access to commercial banking facilities

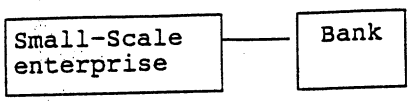
Stage 1: Indirect-linkage model



Stage 2: Direct-linkage model



Stage 3: Direct-access model



In line with the general APRACA guidelines, the pilot project applies the following principles:

(i) Commercial banks and self-help groups are free to negotiate interest rates locally among themselves. It is thus warranted that loans to hitherto neglected target groups become attractive for commercial banks as they will add to the costs of refinancing a gross margin that comprises transaction costs, reserves for bad debts and profit. Stiff competition among banks will prevent them from charging usurious rates, so that interest rates are well below those charged by money-lenders;

(ii) Self-help groups should use part of their funds for internal lending and another part for depositing in a bank as a basis for refinancing from the bank;

(iii) Savings are regarded as partial collateral. The balance not covered is taken care of by joint liability of the members of the self-help groups and not by physical collateral;

(iv) Savings always come first. There is no credit without prior saving;

(v) The ratio between savings and credit depends on creditworthiness -- first on that of the group and secondly on that of the small-scale enterprise;

(vi) Bank loans are treated as group credits which are lent to the members of the groups;

(vii) Credit decisions for lending to members are taken by the self-help groups;

(viii) Interest rates on savings and credit should reflect market rates, taking into consideration reductions in bank transaction costs as a result of the intermediary services of the self-help groups;

(ix) Short-term credit should extend to 18 months;

(x) Banks should offer incentives for timely repayment instead of imposing penalty fees for arrears;

(xi) Self-help groups are advised to add an extra charge onto the interest rates to enhance internal fund generation.

Since the beginning of the project's financial operations, more than 200 self-help groups have deposited savings of more than $US 80,000 in 18 participating banks. In turn they have received more than 220 group loans; these were forwarded to approximately 3,500 group members. Within one year the total amount of disbursed loans totalled more than $US 400,000. Consequently, the savings-credit ratio was roughly 1:5. No global data

on loan repayment are available so far; the experience of the first two years, however, is excellent. No case of default has been reported, while the arrears ratio is a mere 0.3 per cent. There are two major reasons for this positive performance: first, the participating SHPIs offer quality services which include group guidance and credit supervision; second, "credit at market conditions is treated as serious financial business by both banks and self-help groups and the micro-entrepreneurial members;[19/]

(c) Elements of success

Project sustainability as a criterion of its success can only be evaluated once the project has been terminated. Certain factors contributing to project sustainability, however, seem crucial:

(i) Institutional capacity. All participating institutions maintain their autonomy. The central bank of Indonesia -- Bank Indonesia -- is the leading agency. Being responsible for the development of the fianancial system in Indonesia, it possesses the necessary authority for competent project implementation. Administrative bureaucracies are not involved in the project;

(ii) Motivation. All institutions -- banks, SHPIs, and self-help groups -- participate voluntarily in the project, as they expect the linkage approach to be profitable for each of them. Banks attract new clients and thus additional funds; at the same time they reduce the transaction costs and lending risks. SHPIs as well as self-help groups increase their financial base by opening up new sources of refinancing. The vast majority of small-scale enterprises are served for the first time by the formal financial sector;

(iii) Policy environment. As has been mentioned, the process of financial deregulation exposed commercial banks to competition for new clients and funds. For the first time Indonesian banks were given the opportunity to work with different interest rates which reflected the different quality or creditworthiness of customers. Market forces form the basis, but are utilized in favour of the target group, i.e., small-scale economic operations that had previously been excluded from the formal financial circuit;

(iv) Socio-cultural factors. The interventions of the project are based on existing structures (mainly at the grass-roots level) that possess the necessary knowledge of the local environment. Rather than relying on pre-established regulations, the project tries to adapt its basic principles to local conditions;

(v) Exchange of international experience. Through APRACA an international forum is offered that facilitates communication among relevant institutions from the region and, consequently, timely improvements in project design.

D. The macro-level: reforms of financial systems

It should have been made clear from the project examples of section C that the general policy framework of financial markets is of paramount importance in the provision of credit -- not only for the small-scale sector, but for others as well.

Since the beginning of the 1980s, financial systems in many developing countries have fallen into distress. It would be beyond the scope of this paper to embark on an in-depth analysis of the reasons and the suggested solutions for the difficulties of third world financial markets. The World Bank devoted its entire 1989 World Development Report to the issues of the nexus of finance and development and the reforms of financial systems.[20/] Some salient features of these reforms are briefly outlined below.

In general, financial reforms can be geared towards external and/or internal liberalization. External liberalization includes, among other things, the opening of domestic financial markets to international financial flows, the removal of exchange-rate controls, and the elimination of entry barriers for foreign banks.[21/] Internal financial liberalization refers, inter alia, to the elimination of domestic credit controls related to credit rationing, interest-rate ceilings, and differentiated reserve requirements. Other elements include the removal of discriminatory practices and capital requirements that drastically curtail the free entry of new, local participants into the domestic financial market.

Any monetary policy must be geared towards the creation of conditions that lead to positive real interest rates; i.e., nominal rates must exceed the rate of inflation. There is a positive correlation between the volume of savings and positive interest rates, as assets of households are protected against inflation. Furthermore, financial income from deposits to banks are increased. Positive real returns on monetary deposits will also lead to an increase in bank holdings. They may result from reduced hoarding, from the reduction of funds that formerly circulated in the informal sector, and from a higher rate of retention. "The combined effects of attracting monetary funds to the banks and of increasing the rate of monetary savings would stimulate growth because capital could thus be recycled and mobilized in the context of the whole economy, by means of banking circuits".[22/]

It should be noted, however, that the removal of interest-rate or credit controls cannot, by itself, guarantee the development of financial systems in a satisfactory direction. These measures have to be accompanied by legal and accounting systems that provide effective loan supervision. Supervision should concentrate on the inspection of loan quality rather than control, if commercial banks obey directives on credit allocation. Furthermore, the enforcement of laws concerning collateral and foreclosure must be improved.

Developing countries should also try to develop or strengthen other financial institutions whose services complement those of commercial banks. Non-bank financial intermediaries like insurance companies and pension funds are potentially important sources of long-term financing.[23/]

The Indonesian example quite impressively demonstrates the positive effects of financial deregulation on small-scale financing. Banks were given the opportunity to charge

interest rates reflecting the scarcity of capital, and they acted promptly and efficiently in improving their services to the small-scale sector. The same holds true for the creation of rural commercial banks in Indonesia.

Summing up, reforms of financial systems which represent a move towards strengthening market forces seem to be a necessary condition for economic development -- even in the small-scale sector. It is, however, not a sufficient condition, as a stable macro-economic climate (overall) and an effective regulatory and prudential framework seem equally important prerequisites for financial and, in a more general sense, economic development.[24/]

E. Conclusion

This paper has presented two concrete examples of how the access of SMEs to financial services can be facilitated. Both projects -- to a different degree -- cooperate with formal financial institutions. Neither SEFCO/FEF nor the Indonesian project try to channel loans directly to their target groups. The interest rates charged reflect market rates.

The Kenyan project of the Friedrich Ebert Foundation applies a complex (though apparently appropriate) financial technology to solve the problem of insufficient collateral for small-scale entrepreneurs. However, Kenyan commercial banks could not be convinced to actively participate in dhe project by way of sharing some of the risks involved. Compared with this, the linking approach in Indonesia is embedded in an overall process of financial deregulation which provides the necessary basis for the cooperation between banks and the small-scale sector. One of the major lessons to be learnt, therefore, is that any strategy addressing the SMEs' access to financing -- without a political framework which is conducive to development of the financial system -- must be limited in scope.

Projects that aim at improving the access of SMEs to financial services should incorporate formal financial institutions -- from the beginning -- into their design and implementation. This demand will only be met, however, if the financial institutions regard their participation as profitable.

Market forces alone will not solve the finance-related problems of SMEs if they stem from a lack of knowledge and experience. Training and advisory services will always be a necessary complement to financial interventions, enabling the different actors to do what they do best.

Footnotes

1/ See: Republic of Kenya, sessional paper No. 2 of 1992: "Small enterprise and Jua Kali development in Kenya", March 1992, p. 2.

2/ A study in Peru simulated the setting up of a small-scale industry. In the "rules of the game", the "entrepreneurs" had to comply with all the bureaucratic procedures tto establish it in accordance with the law. It took the researchers 289 days to acquire 11 necessary permits. The total costs amounted to 32 times the minimum living wage. See: H. De Soto, The Other Path: the Invisible Revolution in the Third World (Lima, 1989), p. 134.

3/ See: E. Kropp and others (eds.), Linking Self-Help Groups and Banks in Developing Countries, (Eschborn, 1989), p. 21; and B. Levy, "Obstacles to the development of indigenous small and medium enterprises: an empirical assessment" (unpublished paper), pp. 12ff.

4/ K.A. Saito and D.P. Vilanueva, "Transaction costs of credit to the small-scale sector in the Philippines", Economic Development and Cultural Change 29, No. 3 (April 1981), p. 631.

5/ Ibid., p. 636.

6/ See: P.B. Ghate, "Interaction between the formal and informal financial sectors: the Asian experience," World Development 20, No. 6, p. 860.

7/ For a comprehensive presentation of the Scheme see: Friedrich Ebert Foundation, Handbook for Credit Guarantee Association in Kenya (Nairobi, 1990).

8/ In 1990 the exchange rate of Kenyan Shillings to US dollars was approximately 20 to 1; it may then be better understood that the loan amounts are fairly small (roughly $US 250), which means that loans can only finance working capital.

9/ The complete programme of training courses designed to enhance the self-administration capacities of CGA is given in: Friedrich Ebert Foundation, Handbook for Credit Guarantee Associations in Kenya (Nairobi, 1990), pp. 95-99ff.

10/ See: Reinhard H. Schmidt, Small-Scale Financing and Credit Intermediaries (Eschborn, 1985), pp. IIIff.

11/ See: J. Levitsky and R.N. Prasad, "Credit guarantee schemes for small and medium enterprises" (World Bank Technical Paper No. 58) (Washington, D.C., 1990), p. 4ff.

12/ Ibid., p. 11.

13/ See flow charts on loan repayment and the follow-up of defaulters in: Friedrich Ebert Foundation, Handbook for Credit Guarantee Associations in Kenya (Nairobi, 1990), pp. 92 and 93.

14/ See: H.D. Seibel and U. Parhusip, "Financial innovations for microenterprises -- linking formal and informal financial institutions," Small Enterprise Development 1, No. 2 (June 1990), p. 15.

15/ See: G. Germidis, "Interlinking the formal and informal financial sectors in developing countries," Savings and Development 14, No. 1 (1990), p. 9.

16/ H.D. Seibel and U. Parhusip, op. cit., p. 17. See also: H.D. Seibel, "Finance with the poor, by the poor, for the poor: financial echnologies for the informal sector with case studies from Indonesia", Social Strategies Forschungsberichte 3, No. 2 (December 1989), pp. 9ff.

17/ See: D. Germidis, D. Kessler and R. Meghir, Financial Systems and Development: What Role for the Formal and Informal Financial Sectors? (Paris, 1991), p. 208.

18/ H.D. Seibel, "Finance with the poor ... ", op. cit., p. 11.

19/ H.D. Seibel, "Financial innovations ... ", op. cit., p. 23.

20/ See: World Bank, World Development Report 1989 (Washington, D.C., 1989).

21/ See: M.I. Blejer and S.B. Sagari, "Sequencing the liberalization of financial markets", Finance and Development 25 (March 1988), p. 19.

22/ D. Germidis and others, "Financial systems ... ", op. cit., p. 218.

23/ See: World Bank, "Financial systems and development," Finance and Development 26 (September 1989), p. 3.

24/ See: A. Chandavarker, "Of finance and development: negleted and unsettled questions", World Development 20, No. 1, p. 136.

XIV. BUSINESS INCUBATORS FOR PROMOTING TECHNOLOGY-BASED ENTERPRISES IN WESTERN ASIA

by Rustam Lalkaka*

A. Background

The power of entrepreneurship has been rediscovered and small is beautiful again. Advanced computing and telecommunications technologies are rapidly changing the traditional concepts of manufacturing scale, styles of management and the competitive advantage of nations. This technological revolution has triggered political changes, away from command systems towards more liberal regimes, not only in Eastern Europe and the former Soviet Union but in scores of Latin American, African and Asian countries. With open minds must come open markets and private-enterprise-based economic models. Recognizing these dramatic changes, the United Nations General Assembly in New York recently made landmark decisions urging Governments to create a level playing field for private initiatives to contribute effectively to social and economic development.

1. The dynamic new role for small enterprises

In both industrial and developing countries, small- and medium-scale enterprises (those employing between 5 and 500 persons) have generally constituted the overwhelming bulk of total firms by number, and have accounted for around one third to one half of gross national product (GNP) and total employment. Indeed, in countries such as the United States -- as employment in large corporations has declined due to automated manufacturing systems and international competition -- small and medium-sized enterprises (SMEs) have been responsible for almost all the net growth in jobs as well as a significant proportion of technical innovations. Small companies with growth-oriented management can adapt faster to change, create new products and bring them to market swiftly, trim overheads, and feed the large corporations with low-cost, high-value services.

The Organization for Economic Cooperation and Development (OECD) countries have intervened legislatively to provide better access for small enterprises to credit, technical support, fiscal incentives and markets; in most developing countries, however, the good performance by SMEs has been achieved despite Governments, not because of them. Government-sponsored support mechanisms have generally lacked the needed flexibility, motivated personnel and political leadership; comprehensive small-enterprise development strategies do not exist; international technical-assistance projects and development loans have been largely unsuccessful in leaving behind sustainable activities; and universities,

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research organizations, and large corporations and their associations have, until recently, played no significant supporting role in these countries.

If this new trend in the affairs of nations -- the growth of small entrepreneurial businesses -- is to be fully exploited and lead on to fortune, then innovative ways must to be found to channel it. One such modality -- the business and technology incubation centre -- has been fairly successful in the United States and Europe over the last five years. The United Nations Development Programme (UNDP) is assisting some 20 developing countries in adapting this concept to their specific needs and conditions.

This paper outlines the essential features of business incubators -- both their potential for creating technology-based enterprises and their shortcomings. Operations in the United States are reviewed, as are recent applications in China and Poland, and project preparations in Indonesia. The applicability of the incubation system in the United Nations Economic and Social Commission for Western Asia (ESCWA) region is analysed, with special reference to ongoing work in Egypt. Pertinent lessons are drawn from recent experience world-wide.

2. Creating technology-based enterprises

Technology-based enterprises have unique characteristics that require special attention: (a) being knowledge-intensive, they need linkages to technical universities and research complexes, including access to faculty, graduate students, scientific facilities, documentation and the creative ambience; (b) they can benefit by technology-transfer arrangements on equitable terms, but proprietary know-how imposes intellectual-property constraints; (c) the variety of biotechnology, computer software and microelectronics applications is rapidly expanding; this calls for agile management skills to handle "unbundled" project teams working with networks of specialist service-providers; (d) development costs and time can be reduced by well-prepared inter-country collaboration and alliances; (e) projects generally have widespread social and economic implications, and touch upon environmental concerns; and (f) in high-technology work, there are perhaps a dozen developing countries which now have the necessary technically skilled human resources and infrastructure, but an image problem limits the acceptability of their products/services in other countries and even in their own domestic markets.

Key constraints

The tasks to be handled by a technology-based enterprise (as well as its needs) become more sophisticated as it moves forward from concept to commercialization, as indicated in table 1 below.

Some of the key constraints to creating such enterprises are as follows:

(a) Entrepreneurship. An entrepreneurial culture lies dormant in many developing countries. Here, the distinction has to be drawn between the successful sole proprietor of a family business and the innovator-entrepreneur who can bring together various resources to create an enterprise on a significant scale. Such businesses can best be developed in a

Table 1. Technology-based enterprise development (United States experience)

Stages of development	Tasks to be completed	Capital needs
I. Concept stage (3-6 months) Opportunity identified Preliminary investigations	Literature/patent search Prefeasibility study ED:* Acquire motivation	Modest needs ($US 10,000-$US 30,000) Studies under way, while still employed Sources: family, friends
II. Research stage (12-24 months) Process technically viable Market generally identified	Market, pricing information Access to research/faculty Identify management team ED: Develop business plan	Seed capital ($US 50,000-$US 150,000) Product research Sources: knowledgeable individuals, seed capital funds
III. Development stage (18-24 months) Debug prototype Further product refinements	Protect know-how Intensify market research Business plan finalized ED: Management-control system	Start-up ($US 200,000-$US 500,000) Product development and initial marketing Sources: first-round venture capital
IV. Commercialization (12-18 months) Product successfully marketed Cost analysis favourable	Order facility and equipment Form sales organization Start operations ED: Follow-up advisory support	Production ($US 2 million-$US 5 million) Plant and equipment Working capital Source: second round venture capital

* ED = Entrepreneurship development training needs.

culture which supports risk-taking and the possibility of failure, encourages the team-work necessary to expand, rewards innovation, promotes the candid assessment of viable projects, and is focused firmly on the potential inherent in the future. The extent to which imitation, secrecy, individual inaction, and lack of concern exist will determine the constraints on the development of entrepreneurial talent.

The entrepreneurial culture is both fragile (that is, deterred by seemingly minor constraints) and robust (able to surmount a variety of obstacles). It is no wonder that third-world entrepreneurs who have survived this regulatory maze at home are often very successful as immigrants abroad. Neither is it surprising that informal businesses prefer to continue at the micro level, outside the regulatory framework, whiie planners debate how (and whether) to "grow" them into modern, environmentally correct enterprises;

(b) Financing. A key constraint is access to medium-term investment and short-term working capital. The traditional banking system is ill-equipped to bear the costs and risks of providing credit to businesses with no collateral, or to appraise the complex business plans of a technological venture. Further, information on the available credit mechanisms is not properly disseminated;

(c) Bureaucracy. There are pervasive regulatory hurdles -- rules and procedures interpreted by a well-meaning but bureaucratic system -- which add many extra months and much unfruitful expenditure, both scarce commodities for a fledgling enterprise;

(d) Technology-based enterprise promotion strategy. State interventions to control SMEs are plentiful, but seldom are there explicit national policies to promote them, or adequate policy instruments or institutions to provide effective support, incentives and/or markets. Small enterprises with their limited financial and human resources cannot access the management skills, trade information and technologies they need.

The development of an entrepreneurial sector with significant growth potential must come from the ranks of the business, research and university communities. But Governments can intervene effectively to remove certain constraints and to facilitate technological initiatives. The concerns and needs of an innovative enterprise are not the same as those of the corner grocer, the artisan, or the establishment industrialist. The ESCWA countries now have the challenge of defining the proper role for Governments, in areas ranging from the urgent steps needed to simplify the regulatory morass to the more complex tasks of selective interventions where discontinuities in the market system result in significant costs to society;

(e) Technology management. Businesses of any scale require a variety of skills to compete effectively in today's fast-changing global markets. In such whimsical environments management has to adopt decentralized "guerrilla" tactics. Such experience begins with the ability to identify feasible projects and to acquire the appropriate technologies, and continues through the range of functions from marketing and finance to production, using bold team approaches. The existence of a strong and extensive service sector of professionals (accountants, attorneys, and management consultants for everything

ranging from strategy development to quality assurance and packaging) can help overcome some management shortcomings.

Specific challenges faced by the technology-based enterprise are: first, to move from conception and research through to prototypes and production, towards a product or service which meets market needs at a price consistent with value offered and with the ability of customers to pay; second, to develop markets, from creating new distribution channels to educating potential buyers. These call for developing capabilities for the following: (a) acquisition of technologies from the best (including international) sources; (b) adaptation and application of these technologies to country resources and conditions; and (c) mobilizing networks of support, both at home and abroad. A carefully designed technology incubator, if located in a technical and supportive environment, can play a positive role in facilitating these tasks.

B. The business and technology incubation concept

As one of the new approaches being tried to create small technology-based enterprises (which are almost always in the private sector), the business incubation modality has had good results. Today some 800 incubators are in operation world-wide, mainly in the United States and Europe, but also increasingly in the developing and former socialist countries.

1. Essential design characteristics

In simple terms the business incubator is a micro facility (with a small management staff) that provides the physical work space, shared facilities, and access to technical and business support services in one integrated and affordable package. Such caring and sharing have been shown to facilitate business start-ups by reducing initial costs and delays, and to diminish the chances for the failure of a fledgling enterprise. Three fourths of the carefully selected and nurtured businesses in the incubator are likely to succeed, while in the hostile outside world only one fourth may make it.

(a) Main features

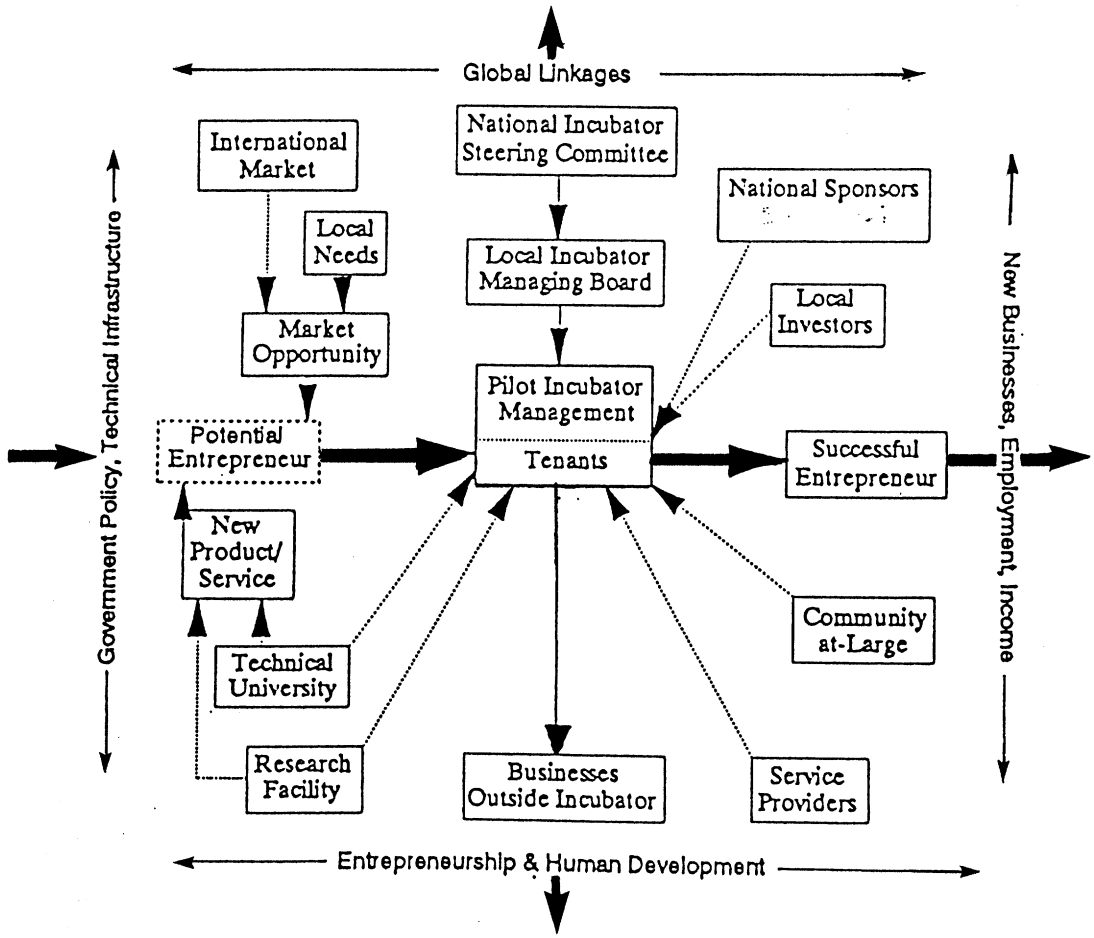
Prospective entrepreneur-tenants are carefully selected. They are assisted in preparing business plans and accessing seed capital and are trained in small-business management skills. After a stipulated incubation period, the successful businesses "graduate" from the incubator, making space available for new tenants. While in industrial countries the graduating company is not serviced by the incubator, in developing countries a system of continuing assistance may be needed.

Another important characteristic is that the business incubator is itself run as a business, with the objective of becoming self-supporting when operations are fully established. Initial support, however, is almost always provided by local State authorities, for instance, in the form of an existing low-rent (or no-rent) building.

The incubator is service-oriented and depends upon the use of equipment and facilities at neighbouring universities and laboratories, as well as professional services from

an informal network of community supporters. The key players in the incubation system are shown in the figure below.

Figure. The key players in the incubation system



While the incubator is a micro environment, industrial estates and technology parks are longer-term, large-scale real-estate developments. It is, however, possible and desirable to place an incubator adjacent to an existing park, so that the graduating tenants can move into a bigger factory space when needed;

(b) Incubator objectives

The primary purposes of an incubation centre are to foster an entrepreneurial culture and to increase the participation of indigenous entrepreneurs in the national economy, including youth, women and other special groups. It also helps the fledgling enterprises to overcome the bottlenecks and regulatory obstacles that stand in the way of rapid business formation, mainly by facilitating the start-up process and through access to a community-support network.

The incubator's specific objectives may vary according to the incubator's focus, as follows:

(i) Technological innovation: by interacting with technical universities and research complexes for the purpose of improving quality and productivity, as well as initiating innovative products and services for domestic and export markets;

(ii) Regional development: by decentralizing economic activity away from large urban concentrations, mobilizing local natural resources, and enabling informal businesses to make the transition into the formal sector;

(iii) Industrial subcontracting: by linking up with industrial estates, facilitating the down-sizing/privatization of large conglomerates, providing specialist "brainware" services and ancillary goods to the large companies, and/or providing opportunities for "spin-offs";

(iv) Globalization: by helping foreign companies to start quickly and enter the domestic market with local partners, or to use the incubator as a base to export to third-country markets. It could also facilitate the re-entry of developing-country-origin entrepreneurs now settled abroad who wish to bring their know-how and capital back home;

(c) Incubator arrangements

To achieve the above objectives, a variety of incubator arrangements are being used -- of course, they need not be called "incubators". These include:

(i) Full-service incubator: provides a broad range of assistance (software) to start-up businesses on its premises, but utilizes the equipment and facilities (hardware) of neighbouring universities, laboratories and factories;

(ii) Internal incubator: a spin-off of a large conglomerate which works in symbiosis with it. A marked trend in industrial countries is the creation of networks of flexible suppliers to provide a wide range of services to big corporations. Such "intrapreneurship" is also now practised in Eastern Europe, where giant combines are being down-sized to meet the challenges of an open market;

(iii) Single-trade or special-purpose incubator: concentrates on computer software or biotechnology, or has mainly architects or consultants as tenants, or primarily serves women, youth or disadvantaged groups;

(iv) Small-business development centre: serves tenants within its building as well as companies outside the incubator walls, including "sick units" that are a part of industrial estates and other programmes.

2. Incubator costs and benefits

(a) Financing incubators

The incubator programme needs funding for three purposes:

(i) Capital resources are needed to design and establish the incubator; this includes the purchase of office equipment and furniture as well as preparation expenses. The incubator building can be custom-built, renovated, or leased. To make an early start and to reduce initial costs, it is recommended that the incubator secure vacant building space (such as an unused office, laboratory, or training centre) and renovate it to meet basic functional requirements;

(ii) Operating funds are needed to pay staff, building utilities and related costs for the initial three or four years; thereafter, the income from tenant rents and services can generally cover these operating costs, enabling the facility to break even and progressively wipe out its cumulative losses;

(iii) Seed money is required by the incubator's tenants to cover working-capital and investment requirements. Start-up companies have difficulty raising credit from conventional sources, and such money can be provided on commercial terms through a revolving fund linked to the incubator management, or as equity by growth-capital funds;

(b) Funding sources

While the funding structure varies with the sponsor's orientation, so do the sources of investment. For example, the private sector will usually draw from financial institutions, corporations, private equity funds, or individual investors to begin operations. Non-profit incubators may receive funding from community groups or foundations. Governments can issue bonds, make direct appropriations of tax funds, offer tax breaks, and/or donate buildings to sponsor incubators. Universities can assist through the provision of buildings, the in-kind support of faculty, and staff and student expertise. Joint-sector sponsors utilize a combination of the above tools in providing initial incubator investments;

(c) Investor benefits

Increasingly, incubator programmes are a partnership between the Government and the private sector, in their mutual interest. For a relatively modest investment, a well-designed and well-operated incubation centre could help create 50-70 new businesses and generate up to 2,000 direct jobs over a ten-year period. It would also contribute taxes and income to the local economy, and towards overall social and economic development. The benefits to the different sponsors are outlined below:

(i) Private investors. Private investors can target the industries which have the ability to generate high growth and are thus able to withstand a larger risk premium over a longer time horizon than may be possible without the protective umbrella of the incubator. By acting in a venture capital mode, the incubator owner can garner above-average rates of return. A successful incubator can also cause neighbourhood property values to appreciate, providing an indirect fiduciary return on the direct investment;

(ii) Universities. Technology incubators are vehicles for the commercialization of new products; the university can use these incubators to support further research as well as to attract additional corporate and governmental research funds. Also, the university can help faculty, students and alumni to start their own businesses. This provides hands-on experience in a real-world setting, resulting in a better understanding of business issues and the challenges of the market-place. The enlarged economic and employment base becomes a manifestation of the university's commitment to the community;

(iii) Public/non-profit organizations. Publicly sponsored incubators have the primary goals of job creation and economic diversification. The tax base of an area can expand through the successful incubation of small businesses, which can provide resources for community revitalization. In addition, business incubators can help rehabilitate areas which have suffered from neglect, thus demonstrating the State's commitment to decentralized growth with equitability;

(iv) Public-private partnerships. Hybrid incubators allow the benefits and goals of public and private entities to come together with a mix of funding from different sources. Such partnerships allow the economic development goals of the Government to be achieved and allow the private investor to receive a premium for his investment;

(d) Tenant benefits

As noted, incubators are designed to meet the needs of entrepreneurs by coordinating the required services and financial resources. To summarize, benefits for the tenants are as follows:

(i) Firms in the incubator have a greater chance of succeeding, given the reduced operating expenses and gestation times and the access to advisory services that can be vital to viability and growth. The "mentoring" by management, by peers, and by successful friends of the incubator give the tenant a competitive edge over a firm that must access these services on its own;

(ii) Rental expenses are lower than elsewhere, and the terms of incubator leases are more flexible to allow for business fluctuations;

(iii) Management can enhance a firm's credibility so that it may more easily access capital from both private financial institutions and governmental programmes;

(iv) Incubator tenant businesses can be developed to serve as feeder units through the subcontracting of services and components to industrial estates and large enterprises, both at home and abroad. Also, the tenants can do business deals among themselves;

(v) The social environment enables tenants to share experiences and not feel that their difficulties are unique or a result of misfortune or incompetence. The efficient networking process and the creation of role models are important assets;

(vi) The incubator increases the firm's visibility. Owners are able to generate business contacts in academia, industry, Government and the financial sector, which facilitates access to potential customers as well as to foreign investment and technology;

(e) Cost-benefit analyses

Even in the case of American incubators, proper appraisals of cost-effectiveness have seldom been done. Costs of facilities and operations (including subsidy elements) can be estimated, but shadow prices cannot easily be determined for the informal support system on which the incubator depends -- nor can the benefits of new entrepreneurial activity, skill formation or regional development be readily quantified. The following questions can be asked: Would these benefits accrue without the incubator investment? What are the alternative opportunities to achieve the same purpose? There are no easy answers -- and this is the rationale for starting with a pilot programme to better understand the costs/benefits and sensitivities.

3. Organization and management

A serious problem with the developing-country incubators is finding incubator managers with the requisite entrepreneurial and business background who are familiar with the problems faced by technology-based companies and who have a network of local contacts. It is therefore necessary to identify the best available persons, train them at home

and abroad, and provide them with challenging conditions and incentives to work with dedication.

Management staff of the first Mexican incubator (CEMIT in Cuernavaca) have undergone management- and entrepreneurship- development training at the Rensselaer Polytechnic's incubator in Albany, New York; managers from all Latin American incubators received training at Twente University, the Netherlands, in 1992 under the auspices of the European Community's Columbus Project.

At the start of UNDP's technical assistance for the programmes in China, a group of planners made a study tour of incubators in Europe. Then, during the course of the feasibility exercise, a two-week training workshop with international resource persons was organized in Guangzhou in 1989, followed by a course for potential incubator tenants at the State Science and Technology Commission's training institute in Wuhan.

The UNDP Special Unit for Technical Cooperation among Developing Countries organized a workshop in Cuernavaca, Mexico, in November 1991 to exchange experiences in nurturing technology-based enterprises. It recommended the establishment of a third-world incubator network, starting initially with national and regional associations. This resulted immediately in the establishment of the Mexican Association of Business Incubators and Technology Parks (AMIEPAT). The UNDP-ILO (International Labour Organization) entrepreneurship-development network (called INTERMAN) and the United Nation's EMPRETEC programme have major capacity-building activities for entrepreneurship.

Personnel salaries in developing countries are generally low ($US 2,000 a month is usually good remuneration for an incubator manager); nevertheless, incubators in these countries must have small staffs and must control expenditures, because the income from rentals and services is also low. Typically, incubator staffing includes: (a) a manager with overall responsibility; (b) an assistant manager to look after accounts and property; (c) an executive secretary; (d) a receptionist; (e) some part-time accounting or technology specialists; and (f) one or two messengers for miscellaneous tasks.

The need to generate a positive cash flow requires certain procedures to be followed: while a few facilities (e.g., receptionist, conference room) may be covered by rentals, other frequently used services (e.g., fax and copy machine use) are offered on a cost-recovery basis, and professional assistance (e.g., accounting, legal work) is organized through an external- services network. The recent National Business Incubator Association (NBIA) survey shows that the biggest problem of American incubator managers is finance (both capital and operating expenses), followed by relations with tenants.

4. Other incubator issues

(a) Extension services. When incubators provide their services to off-site businesses, the clients may not receive the programmatic and synergistic benefits enjoyed by on-site firms. Such services are normally provided to outside firms which either cannot afford to rent space or have no real need to be within the facility. These extension services could be billed as a small percentage of the firm's turnover or other negotiated means;

(b) Geographic location. Business incubators located in urban areas have access to the critical mass of facilities and technical expertise not normally available in remote areas. University-affiliated incubators are geographically suited for nurturing high-tech businesses with high growth potential. Inner-city areas with depressed economies can utilize the incubator structure for community revitalization and to meet employment growth objectives. Incubators in rural areas will typically nurture resource-based industries, light manufacturing or agro-business activities;

(c) Tenant classification and focus. Start-up businesses in different sectors face different input costs and thus have needs which are unique to their particular industrial classification. For example, firms in light manufacturing typically pay low wages and are labour intensive; labour management is therefore one of their foremost concerns, together with the necessity to make large investments in capital equipment and organize subcontracting arrangements. High-tech firms are typically less labour-intensive, but the wages for scientifically trained personnel tend to be higher. Here the incubator will require specialist skills and access to expert knowledge and facilities.

Incubators with international goals will require specialists to deal with the geographical concerns. One designed for export markets needs to provide advice and information pertaining to foreign trade conditions. One million third-world professionals are now permanently settled abroad, and many wish to bring their know-how and capital back to their country of origin. Here, an incubator with international linkages can ease the pain of re-entry. "Maquilladora-type" (twin plant) incubators can serve as research or assembly facilities for industrial-country firms that wish to export to third countries.

C. Incubator developments world-wide

More than half the world's incubators are in the United States. Their operations are well supported and their information is compiled by the NBIA. Many successful innovations -- as well as some endemic problems -- have emerged here. Incubators in Europe, Canada and Australia generally follow similar practices. European incubators are often sponsored by city-government partnerships and linked to research-park/real-estate development. Also, they have limited access to seed or venture capital. The European-Community-sponsored European Business Innovation Centre Network in Brussels provides an excellent range of promotional, advisory and training services -- and statistical information on their clientele is now being compiled.

The discussion below relates to experiences in the United States, Eastern Europe and the developing countries.

1. Incubators in the United States*

The total number of incubators in the United States has grown from less than 50 in 1980 to 431 in 1992. Most of this growth has occurred recently, with two thirds of all

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* Except where stated, the figures given here are derived from the National Business Incubator Association (NBIA), State of the Industry Report, November 1992.

incubators opened since 1988. Interestingly, concentrations of incubators appear in a few States -- e.g., Pennsylvania, Illinois, Michigan and Ohio. This could imply that States such as California and Massachusetts, known for technology businesses, achieve success by providing support through other means.

(a) Sponsors/funding. Approximately one half of all American incubators are supported entirely by the Government, while an additional one quarter are funded by a combination of public and private organizations. Government assistance is usually provided through an economic development corporation, and funded by a variety of State and local agencies.

Distribution of sponsorship for incubators

Public sector/Government	51%
Hybrid (public and private)	25%
University	10%
Two-year college	6%
Private sector/for profit	8 %
Total	100%

(b) Incubator objectives. The primary objectives of American incubators are to promote economic development and diversify the local economy.

Incubator objectives

Economic development	91%
Diversification of the local economy	61%
Commercialization of research	33%
Transfer of technology	23%
Income for sponsoring organization	20%
Neighbourhood revitalization	12%

Neighbourhood revitalization refers to the efforts of local Government to renew communities which have suffered from decline and disinvestment. Incubators in such cases are often located in renovated industrial buildings and warehouses. At private/for-profit incubators, the top priority is to earn a profit, while lower priorities include commercializing new technology and economic development. Among university incubators, technology commercialization is the primary goal;

(c) Space and location. The median amount of space for incubators less than four years old is 19,000 square feet, while those constructed prior to 1988 averaged 37,000 square feet. Some 62 per cent of the total are in urban areas, while 26 per cent are suburban and 12 per cent are rural;

(d) Number of tenants/business types. The average number of tenant companies is 12 per incubator, employing an average of 54 persons. There is considerable

variation, with the largest having 120 tenants. Service-oriented companies make up the largest single category of firms located in incubators. The types of incubator businesses as a percentage of national total are indicated below.

Types of businesses

Services	36%
Light manufacturing	20%
Technology products	16%
Research and development (R and D)	11%
Other (retail, wholesale, non-profit)	17 %
Total	100%

(e) Services provided. The range of services depends on the incubator's objectives, type(s) of tenants, financial condition, and management capabilities. Incubators go through phases of development, beginning with basic services and expanding to include more complex functions. Most incubators initially provide office services and/or facilities such as telephones, facsimiles, and photocopying equipment. Two thirds offer counselling to help entrepreneurs improve their strategies while a smaller proportion provide more specialized financial and marketing management assistance.

In-house services offered

Office services	81%
Business planning	65%
External debt financing	59%
Government grant/loan assistance	58%
Training/educational programmes	52%
Financial-management assistance	51%
Sales/marketing assistance	51%
External equity financing	47%

(f) Graduating tenants. Tenant companies reside in the incubator for an average of 2.2 years before graduating. Incubators that have been open for over seven years have graduated an average of 3.1 companies per year, while those open under four years have graduated an average of 1.5 companies annually. Interestingly, the rate of graduation varies significantly among incubators of different types, as shown below:

Rates of graduation

For profit	12.0
University	8.7
Public	12.9
Hybrid	5.3

(g) Job creation. On average, the companies graduating from an incubator have provided a total of 85.3 jobs from the time the incubator opened. In 1991, graduating firms averaged 22.4 jobs per firm, compared to 28.0 in 1990. The relatively low number of jobs created can be attributed to a number of factors. Most incubators are less than four years old and have not had time to incubate new companies. Average employment is itself low for the small enterprises in incubators (eight employees per tenant). Furthermore, most incubator companies are technology-based start-ups, which (compared to light manufacturing) traditionally create small numbers of higher-paid jobs;

(h) Financial performance. Roughly two thirds of American incubators continue to receive federal/State/local government support for their operations, while the remainder receive no such subsidy. The average distribution of revenues and expenses for those with and without subsidy are indicated in table 2 below.

Table 2. Average distribution of revenues and expenses for incubators with and without subsidies

Incubators wihout operating subsidy	Percentage of total	Incubators with operating subsidy	Percentage of total
A. Income		A. Income	
Rentals	74.1	Operating revenue	44.6
Service fees	8.5	Subsidy (federal, State, local)	31.4
Equity income	2.8		
Other	14.6	Subsidy (corporate, individual)	24.0
Total	100%	Total	100%
B. Expenses		B. Expenses	
Staff costs	29.7	Staff costs	40.0
Plant/equipment	15.4	Plant/equipment	23.4
Other	54.9	Other	36.6
Total	100%	Total	100%

Taking all the incubators responding to the survey, 38 per cent suffered net losses, 8 per cent broke even, and 54 per cent realized net gains.

The reasons for poor financial performance among incubators include the following:

(i) Most incubators charge below-market rents or include a range of services in rents. Further, they may defer rent payments to help a tenant through difficult financial periods;

(ii) Less than half of the incubators surveyed had "anchor tenants" (defined as those with established businesses, longer leases and larger space requirements, and who also pay market rents);

(iii) Incubators in the early stages of development must absorb heavy development costs and high vacancy rates. Even when operations mature, the average vacancy rate is high (19 per cent);

(i) Public-sector incubators in the United States. Many public incubators were established to help stimulate economic growth in areas that had suffered from recent plant closings or experienced high rates of unemployment. These incubators are typically oriented towards the betterment of the surrounding local area. Secondary objectives include diversifying the local economy (68 per cent), commercializing new technology (25 per cent), and improving minority business opportunities (22 per cent). Neighbourhood revitalization is also cited as a primary objective by 15 per cent of public incubators, a goal not shared by private or university incubators. State budget constraints are putting pressure on this type of incubator, as operating funds are now more difficult to obtain;

(j) Public/private incubators. These share many of the same objectives of public incubators, such as job creation, the growth of minority-owned companies and neighbourhood revitalization. There is, however, one significant difference: hybrid incubators, reflecting the fiscal discipline imposed by their private sponsorship, strive to support operations from rental and fee income alone and reduce dependence on subsidies;

(k) University-related incubators. The goal of most university-related incubators is to translate basic research findings into new products and technology. In many cases, the impact is not in jobs created but in enhancing the university's image as an institution actively involved in technology transfer. This helps attract top researchers and research funding. The majority of university-sponsored incubators are located within research parks. University incubators offer specialized laboratory space for researchers, while faculty members provide consulting services. For these reasons, companies located within university incubators place a high value on linkages to the university and tend to have a significantly higher rate of success than comparable firms in their industry;

(l) Private-sector incubators. Private-sector incubators work to make a profit through new-business development and real-estate rental. They have strong ties to private

sources of venture capital. Their emphasis is on high-technology companies with fast-growth potential which can provide a flow of good business deals for affiliated venture-capital firms. Finally, many large corporations are learning that spawning a new venture stands a better chance of success if it is allowed to germinate outside of existing corporate operations.

2. Incubators in Central/Eastern Europe

In the emerging market economies, the old structures have not yet been fully replaced by the new attitudes and approaches needed for the transformation to a deregulated system with the rigours of competition. After a half-century of socialism, the once-vibrant spirit has barely survived; the privatization process and down-sizing of large combines have resulted in massive unemployment, while the need for a social survival system drains limited government resources. The higher-education institutions and research academies are undergoing severe budget cuts, and conversion from military to civilian purposes has begun. Management training is only now being intensified, public administration restructured, and new organizations such as commercial/development banks being initiated. While opportunities abound, local customers are short of cash. For export, the entrepreneur is caught between the closing market in the Commonwealth of Independent States (CIS) countries and the cost-/quality-driven market in the West. The countries of Central and Eastern Europe are beginning to grasp the concept of true entrepreneurship, which until recently had been confused with speculation and black-marketing. This entrepreneurial awakening provides the main hope for the future.

In this context, the technology business incubator is a valuable modality for: (a) creating small businesses, often in symbiosis with their parent combines, by developing basic business skills (which do not presently exist) for the transition from a State-dominated economy to an open market system; and (b) strengthening existing small/medium-sized businesses, by providing outreach services and a forum for exchanging experiences.

(a) Case-study: Poland

Incubator-type arrangements are sprouting up in Poland at a rapid rate. The Ministry of Industry established the Business Incubation Council by special decree in April 1991 to promote the healthy development of technology and business incubators and to provide high-level technical advice to the Ministry. Micro enterprises in regions with high unemployment are being supported by an incubator programme under the Ministry of Labour and Social Policy through a World Bank loan. The European Community's PHARE (Action Plan for Coordinated Aid to Poland and Hungary) programme has been active in the training of incubator planners and managers.

Over 30 towns and cities in all regions have taken the initiative to install business incubation facilities -- many with a technological-innovation focus. The more advanced of these are in Poznan, Celestynow, Gdansk, Torum, Krakow, Lodz, Szcxzecin and Wroclaw.

Poznan, in the Weilkopolska region, has a favourable environment for innovation: a concentration of scientific-research centres, universities, industrial plants and foreign

enterprises; access to skilled technical manpower; and strong support from the local Government, private banks, chambers of industry and business associations and an annual international trade fair. The Weilkopolska Business and Innovation Centre, initiated by a UNDP project, has been effective in promoting the incubation concept through seminars and publications. The Poznan Enterprise Centre, completed in 1991 by the Poznan Technical University at a cost of $US 600,000, is a well-designed workspace of 1,500 square metres.

The Centre for Emerging Technology Enterprises (CETE) has prepared business plans for major incubator facilities in Warsaw and Celestynow. The CETE project will be owned by the International Foundation for Science and Technology, a non-profit foundation formed by prominent scientists. By providing high-value-added jobs in advanced materials, environmental technologies and computer software, it will help reduce the outflow of talented young professionals. CETE has established linkages in order to access foreign technology, investment and markets.

Celestynow, 40 kilometres south-west of Warsaw, has an incubator adjacent to a premier vocational school. It is being expanded to 2,300 square metres (at an estimated cost of $US 1.1 million), but not until additional tenants are expected to join. The Warsaw incubator is being planned for an existing 5,000 square metre building space which is to be renovated. Half the floor area is to be leased to anchor tenants, who are expected to pay high commercial rents. The building will also house extensive computer-aided design and computer-aided manufacturing (CAD/CAM) demonstration facilities and up-to-date telecommunications facilities. It will induct 8-10 new start-up tenants each year, reaching a level of about 40 in both CETEs. At the end of 10 years of operation, 70 successful businesses are expected to be created, with employment of 3,000-5,000 and a sales turnover of $US 150 million to $US 250 million;

(b) Incubators in other Eastern European countries

In addition to the major programme in Poland, incubators have been started in Hungary (Budapest and Sopron), Estonia, Ukraine, and the Czech/Slovak republics (Prague, Brno and Bratislava), and others are planned in Romania and Bulgaria. Incubators are growing rapidly in eastern Germany, often through "twinning" with their Western counterparts. Technology parks have started in Moscow, St. Petersburg and Tomsk, and others are planned by the Higher Education Science Parks (HESP) Association.

The experiences in Poland and other emerging market economies indicate that the transition to open markets is painful. While privatization is making halting progress, the public sector and its philosophy are still dominant. Further, the education, banking, legal and other support systems can only be gradually restructured to meet the needs of technological entrepreneurship. While many building spaces are empty, it is difficult and expensive to deploy these for an incubator due to legal constraints. Moreover, seed capital is not readily available from the local banking system. Government financing, including funding from the International Bank for Reconstruction and Development (IBRD, or World Bank), the European Bank for Reconstruction and Development (EBRD), operation PHARE, and other multi/bilateral support -- is therefore essential. Despite these

difficulties, the technology business incubator provides a valuable "halfway house" in the transition from a command economy to an open market.

3. Progress in developing countries

UNDP and its Fund for Science and Technology Development (UNFSTD) have initiated feasibility and training exercises for incubation centres in 17 developing countries:

Projects under way:	China	Nigeria	Mexico	Philippines
	Zimbabwe	Uruguay	Indonesia	Gabon
	Trinidad and Tobago	Turkey	India	Jamaica
	Poland	Thailand	Guyana	Cote d'Ivoire
	Korea			
Projects being started:	Morocco	Ghana	Chile	Egypt

While India has a variety of mechanisms to stimulate SMEs, the UNFSTD-supported feasibility exercise has confirmed the potentially significant role of technology incubation centres vis-a-vis business start-ups. The technical capabilities, entrepreneurial pool and infrastructure are available for an incubator programme, as is government support. Three initial centres are being established at the Sriram Industrial Research Institute in Delhi, the Maharashtra Technological Consultancy Corporation (MITCON) in Pune, and the Central Electronics Research Institute in Pilani. These are essentially regional initiatives -- with the involvement of the scientific community and with local management -- broadly guided by a national advisory council. It is also planned to start specialized incubators for expatriate Indians returning to India and for small consulting firms.

The approach in the Philippines is similar. An incubator has been started in Manila, and plans call for four more, with broad government support. In Thailand a more ambitious technology park is visualized, drawing on the experience of similar developments in Taiwan, Singapore and Malaysia.

Trinidad and Tobago's first incubator -- INNOTECH -- has been initiated, led by the Caribbean Industrial Research Institute. In Jamaica, St. Lucia and Guyana, business-development centres are being planned to help create economic activities based on or related to available natural resources.

UNDP is currently assisting a biotechnology-based incubator in Uruguay and another for rural development on the northern Uruguay border with Argentina. In Mexico incubators are already operating in Ensenada, Merida and Cuernavaca, while others are

starting up in Guadalajara, Veracruz, Pueblo and Queretaro. A number of incubators are in operation in Brazil; an interesting approach is in the town of Sao Carlos, where two physics professors have succeeded in nurturing some 50 technology-based businesses through university laboratories.

Adapting the business incubator concept for African countries requires a number of special considerations. In Nigeria the feasibility study has resulted in a business plan for an incubation centre in Agege, where the Lagos State Government has donated space to accommodate 35 tenants. Similar arrangements are planned in Zimbabwe. In Cote d'Ivoire, the Society of Incubation of Technology Enterprises has been formed and building space identified to launch an incubator. In Gabon arrangements are being made for an initial "incubator without walls".

Case-study: China

The Technology Business Incubator performs a variety of functions in China's "socialist market economy". In addition to supporting business development, it confers legitimacy on entrepreneurial activity (which was until recently contrary to government policy and law) and provides a mechanism for the development of spin-off businesses from large State enterprises as an indirect means of privatization.

A UNDP evaluation mission (December 1991) confirmed that the concept of business incubation is functioning successfully in the People's Republic of China. While each of the five incubators visited (in Guilin, Chengdu, and Tainjin) has its own character and mission, the development of a range of businesses is being promoted on a decentralized basis, while technology from universities and research institutes is being transferred to commercial practice.

The State Science and Technology Commission initiated the Torch Programme in 1988 " ... to promote the quick transfer of new and high technology results into products so as to realize the commercialization, industrialization and internationalization of new and high technology results". The technology incubator programme is directly supportive of such goals. Regulations were promulgated for the development of technology enterprises by directing banks to give active support, establishing priority for capital construction, specifying import protection, and providing for the establishment of venture investment funds. The intention of the Government to establish 50 technology incubators by 1993 is a test of China's faith in the concepts of technology incubation and entrepreneurship as part of its programme of economic development. Some 37 incubation centres are now in operation, all with support from the central and State Government and with significant local autonomy.

The incubators are operating as enterprises responsible for their own profits and/or losses. Each is owned by a public entity, however, so these incubators exhibit public-private characteristics. About two thirds of the incubators are under the local Science and Technology Committee, while others are under the local High-Tech Development Zone. The five incubators visited reported operating at or above the break-even point.

The operations are directed by a senior manager who has significant industrial or scientific experience, and who is assigned to the post. The determination of entry/exit/graduation is handled by a committee, augmented by outside experts as necessary. A wide range of support services is provided, including telephone connection, modest computing, and advice on creating the enterprise form of organization. The Chinese incubators are notable for guaranteeing loans from the banking system to the tenants.

The programme appears, from both the policy and operational perspectives, to be driven by a technology-commercialization orientation, with a corollary goal of employing underutilized technical personnel. While some incubators appear to be organized around a specific class of technology, others are linked to research institutes and other technology-based organizations. Each incubator reported an "applications process", including a formal interview and business plan. The application forms varied from two-page to multi-page documents. The policy for admission is administered by a review committee. The explicit basis for assessing potential tenancy is the "4 less (Energy, Materials, Transportation, Pollution) and 2 more (High Technology, Value-Added)" rule used by the Guilin Foundation and Service Centre of Science and Technology.

Graduation policies are flexible. The expectation of a three-year residency before graduation, often to an adjacent Development Zone workspace, is common. However, several centres have programmes which include periodic evaluation, with exit based on commercial progress. Tenants in the incubator appear to be of several organizational forms (sole proprietorship, partnership, enterprise, institute), but all have responsibility for income and expenses. The tenants are committed to debt funding (reported at 7 per cent interest for three-year loans). At least two incubators act as active "holding companies", with tenants as wholly owned subsidiaries with separate accounting.

The tenants appear to be early-stage development companies, frequently commercializing technology developed in State research institutes. In spite of this early-stage characterization, most tenants appear to have products on the market within a few months and report reaching operating break-even within the first year of operations. They join the ranks of "village and township enterprises" (VTEs), which already number 2 million (generally with under 100 workers each). VTEs now contribute 40 per cent to total industrial employment and 30 per cent to output value, compared to the large State-owned enterprises, which contribute 50 per cent to employment and 55 per cent to output.

The development of training programmes for the management of the Chinese incubators takes into account the needs of the job at hand. A recent survey reported that one third of the respondents believed that knowledge of finance was most important, followed by marketing studies and technology management. The incubator managers are drawn from the ranks of senior factory officials with experience in technology policy or engineering. Several formal training programmes for the incubator personnel are organized.

Within a few years, a technology business incubator programme has been successfully implemented in China. UNFSTD provided critical third-party endorsement of

a significant effort to utilize technological results and personnel in the development of new enterprises. The success also owes much to the pragmatic and entrepreneurial propensities of the State bureaucrat, as well as those of the nascent entrepreneur.

4. Lessons from recent experience

Recent evaluations of business incubators in developing countries indicate that their success depends on the following factors:

(a) Sponsors -- both Government and private -- who are willing to devote time and financial resources to this concept, as part of an overall small-enterprise programme;

(b) Technical infrastructure, with a university, a research complex, industrial activity and available professional services in the neighbourhood;

(c) Systematic analyses of the real needs of the entrepreneurs/beneficiaries and all relevant costs in operating the incubator programme, even though particular benefits cannot be expressed in monetary terms;

(d) Careful screening of tenants and proactive pursuit of business opportunities, both at home and abroad;

(e) Dedicated and trained incubator managers, who must be carefully selected and trained, and well-paid;

(f) Access to investment and working capital for both the incubator and its tenants;

(g) A macro-economic policy framework which encourages entrepreneurial activity and also stimulates the market for new goods and services.

Developing countries are now moving towards the establishment of what might be called the "second-generation incubator", that is, a centre which offers an integrated, affordable package of support and rapid access to risk capital and technical and business services in a dynamic, flexible manner. It services a mix of start-up entrepreneurs as well as more mature businesses (for short durations), both inside and outside the incubator building. This facility is itself a component of a nationwide strategy for small-enterprise promotion which relies upon a partnership between the State, non-governmental organizations (NGOs) and the private sector.

An example of this comprehensive approach is the business incubator programme now being implemented in Indonesia, with substantive support from the UNDP Division for Private Sector in Development. Since January 1992 a $US 400,000 technical-assistance package has been supervised by a national incubator steering committee (consisting of high-level representatives from all concerned government ministries and the private sector), with responsibility for implementation entrusted to the UNDP Private Sector Advisory Council.

Business plans have been prepared for four pilot incubators: in Serpong in West Java, focused on technology commercialization; in Solo, on regional development; and in Surabaya/Malang in east Java, for industrial subcontracting. However, unlike earlier UNDP assistance which stopped at this stage, the Indonesia project will continue to assist in finance mobilization, manager training, building renovation, and start-up. In addition, incubator-like developments are being encouraged for purposes of regional development through ongoing schemes such as LIK-PIK (small-industry centres and settlements) and BAPAK-ANKAT (father-son twinning).

Shortcomings of the incubator modality

While a number of positive lessons have been learned from the incubator experience, this modality is not without its critics and limitations:

(a) Incubators represent aspects of both the public and private sectors, each of which has significantly different goals and modes of operation. The measure of performance for the public sector may be the number of jobs created, while the business sponsor looks for return on investment. The failure to develop agreed-upon measures of performance, and thus reconcile differences in expectations from the onset, can result in problems. While the incubator has been successful in stimulating entrepreneurial activity under defined conditions, its role in creating large numbers of jobs or promoting rural development has yet to be established;

(b) From the financial standpoint, the incubator is structured quite differently from a prudent real-estate investment. A real-estate development involves securing creditworthy tenants on long-term leases; the incubator, however, rents space on a month-to-month basis to entrepreneurs who are generally not creditworthy, and is required to graduate (expel) tenants once they become financially viable. While a real-estate developer will minimize the "extras" provided, the incubator is dedicated to providing a wide range of services. To deliver success (break-even) under these circumstances is a significant challenge;

(c) When a tenant business fails, the natural tendency for the entrepreneur is to assign the blame to the incubator and its support programmes. Further, the tenant may graduate from the incubator but still need advisory support and a new space to continue operations. These needs have to be foreseen, by linking the incubator to the industrial/technology park and by designing an outreach programme;

(d) Sooner or later the incubator management and sponsors may be required to address the use of the modality to support the relatives of persons of power or influence. Strong political leadership and support are essential, but the incubator cannot be allowed to become a political football;

(e) The goal of the incubation modality is the creation of successful, vibrant businesses. Some businesses will not survive and must be removed from the incubator to make space for potentially viable enterprises. A more difficult class of ventures neither succeeds nor fails. Without strong resolve on the part of management, the incubator can

become a haven for financial cripples, or a home for hobbies (ventures conducted for personal pleasure rather than economic gain);

(f) If rental and services are provided indefinitely at concessionary rates, the ability of the entrepreneur to develop a strong business will be compromised. The balance between initial support and subsidy-based dependency is a delicate issue that must be closely monitored for both incubator and incubatee, in order to achieve the goals of the programme.

In summary, while this modality is not without its shortcomings, a carefully designed and executed incubation strategy is an effective tool for economic development and for strengthening the private sector. The combination of space, mentoring and financing can provide a powerful tool in supporting entrepreneurial initiatives for economic growth.

D. Technology business incubators for the ESCWA region

The countries of the ESCWA region cover a wide spectrum in terms of income, human-development indicators, and science and technology (S and T) capacities. As table 3 indicates, while Kuwait, Egypt, Jordan, the Syrian Arab Republic and Iraq have significant R and D activity, other ESCWA countries are only now making a start. Figures for Poland, Mexico and Indonesia are also indicated.

1. Obstacles to technology-based enterprises

The ESCWA/UNDP project on the promotion of industrial entrepreneurship in countries of the ESCWA region has identified a variety of problems facing small businesses in Jordan, Yemen, the Syrian Arab Republic, Iraq, Lebanon and Egypt, and has made recommendations for improving the support systems. As noted, technology-based enterprises have special characteristics, and face even greater obstacles in Western Asia. Can technological entrepreneurship succeed in the face of the problems outlined below?

(a) At political/economic levels

(i) Inadequate understanding of and commitment to technology and business among politicians, planners and officials;

(ii) Consequently, inadequate financial resources for engineering education, scientific research, support structures and technical infrastructure;

(iii) Lack of capacity in the banking system for the appraisal and support of technology-intensive projects;

(iv) Slow progress with regard to legislative reforms and changes in mentality in moving towards deregulated industry in competitive markets;

Table 3. Development indicators in the ESCWA[1] region and in other selected countries

Country	Human development[2]					Technology development[3]				
	Population (Millions)	GNP[4] per capita (US (dollars)	Real GNP per capita (US (dollars)	Life expectancy (years)	Adult literacy (as a percentage)	R and D[5] scientists (per 10,000)	Stock of scientists, engineers and technicians	R and D expenditures (millions of US dollars)	R and D as Percentage of GNP	Military expenditures as % of GNP
Iraq	18.9	1 970	..	65.0	60	..	145 000	344	1.10	29.7
Bahrain	0.5	9 550	10 804	71.0	77	..	25 500	1.14	0.03	7.5
Kuwait	2.0	16 150	15 984	73.4	73	10.2	186 000	241	0.90	5.0
Oman	1.5	5 220	10 573	65.9	30	..	..	..	..	24.3
Qatar	0.4	15 500	..	69.2	86	7.9	15 700	2	0.04	10.1
Saudi Arabia	14.1	6 020	10 330	64.5	62	..	111 000	108	0.10	16.6
United Arab Emirates	1.6	18 430	23 798	70.5	48	..	..	7	0.03	6.7
Egypt	52.4	640	1 934	60.3	48	5.4	..	145	0.45	7.2
Jordan	4.0	1 640	2 415	66.9	89	1.1	29 000	15.6	0.30	11.3
Lebanon	2.7	2 220	..	66.1	80	0.7	35 000	6	0.10	4.0
Syrian Arab Republic	12.2	980	4 348	66.1	65	..	..	..	..	13.7
Yemen	11.7	650	..	51.5	39	..	2 700	3.3	0.30	16.8
Poland	38.4	1 790	4 770	71.8	..	..	..	..	..	..
Mexico	88.6	2 010	5 691	69 7	87	5.2	..	940	0.60	0.5
Indonesia	184.3	500	2 034	61.5	77	1.7	2 176 000	258	0.30	3.2

1/ Economic and Social Commission for Western Asia.
2/ Data from United Nations Development Programme, Human Development Report 1992 (New York). Mainly 1989 and 1990 figures.
3/ Data from United Nations, Centre for Science and Technology for Development, "State of science and technology for development in the world: options for the future" (New York), 1989). Figures mainly for 1984 and 1985.
4/ GNP = gross national product.
Note: ".." signifies that the item or figure is not available.

(v) Political instability, external interventions, regional economic imbalances, and a continuing mistrust between public officials and private entrepreneurs;

(vi) Limited, segmented markets;

(vii) Inhospitable policy environment for attracting foreign know-how and investment in the transition from State-controlled to open systems;

(b) At organizational/cultural levels

(i) Lack of technology-management and related skills (marketing, accounting, legal, research commercialization and know-how acquisition);

(ii) Entrepreneurial talents, while latent, are not identified and developed from early educational stages. Entrepreneurship is confused with a get-rich-quick mentality or speculative activity;

(iii) Lack of technical information, consulting services, and access to scientific facilities to meet the needs of technology-based enterprises;

(iv) Misdirected and poor-quality research at State-sponsored laboratories/universities, poor linkages to productive sectors, and inadequate procedures or incentives for professors/researchers to provide technical services or to start businesses of their own;

(v) Neglect of advanced technologies and intellectual-property systems;

(vi) Cultural attitudes which discourage women from working in entrepreneurial, knowledge-based occupations;

(vii) Behaviour patterns of dependency and differing attitudes towards wealth and bankruptcy;

(viii) Isolation from the international community.

The creation of technology-based enterprises occurs in a variety of circumstances; table 4 indicates the current situation in Poland, Mexico, Indonesia and Egypt. These are subjective assessments, to be interpreted with caution. While each country has special strengths and weaknesses, Poland and Mexico (in general) have stronger infrastructures and better chances for the success of technology-based enterprises than do Indonesia and Egypt.

2. Incubator issues in ESCWA countries

The general determinants for the success of incubation arrangements, outlined earlier, are present -- or can be mobilized -- in selected ESCWA countries. Specific characteristics and concerns to be addressed in designing appropriate technology business incubators include the following:

Table 4. Infrastructure for technological entrepreneurship in Mexico, Poland, Indonesia and Egypt

	Mexico	Poland	Indonesia	Egypt
1. Technical Universities	Many good universities	Excellent; now severe fund shortages	Few good universities	Few good universities
2. Research laboratories	Good facilities, limited original research	Excellent in science, not technology	Good; poor commercial linkages	Good; poor commercial linkages
3. Professionals and skilled workers	Fair stock	Good technical people, few managers	Large numbers of professionals being trained abroad	Fair
4. Entrepreneurship networks	Started by National Financiera (NAFIN) and the Mexican Association of Business Incubators and Technology Parks (AMIEPAT)	Just starting	Inadequate	Inadequate
5. Financing sources	Fair government support, limited venture capital	Very limited local (but considerable foreign) assistance	Many State sources but difficult to access	Limited local (but considerable foreign) assistance
6. Community support	Good from local industry and State Governments	Limited, some from expatriate nationals	Good support by industrialists and chambers	Growing number of private organizations
7. Government support	Good public-private partnership	Negligible	Just starting	Just starting
8. Buildings, facilities	Limited space	No space, poor environment	Good spaces available	Good spaces available
9. Technical infrastructure	Good in some areas	Good in the past, now being rebuilt	Good and improving	Good and improving

(a) Secrecy is very important to potential incubator tenants; there is serious concern that project ideas could be pre-empted by others. Management can give special attention to security to allay such fears;

(b) Tenancy laws may make it difficult to "graduate" (that is, evict) a tenant from the incubator after two or three years. Special legal arrangements would need to be adopted to get around this problem; indeed, the western nomenclature of "tenant" may have to be avoided;

(c) The recent unpleasant experience of State bureaucratic intervention is so vivid that business leaders want to avoid anything to do with Government. However, incubators in the industrial countries are built on a public-private partnership.

In the ESCWA context, the local business chambers and the city/provincial government authorities have to recognize the need for a new symbiosis, based on their relative strengths. The tasks of Government are to provide the enabling framework for incubators and the initial funding, leaving to private business the tasks of running the incubators in a businesslike manner and creating new jobs;

(d) In many ESCWA countries, financing from national/donor sources and new SME financing mechanisms are now in place; still missing are the motivated individuals with the skills needed to identify opportunities and mobilize all available support to develop and market products. The main task, therefore, is entrepreneurship development, through continuous training at all levels;

(e) The creative environment and trade/technology information for generating new business ideas are missing. Development of technical products and services requires a technology sourcing and intelligence system.

Providing this stimulus and support will be another task for the ESCWA incubator planners and managers. "Project profiles" along traditional lines have not proved successful; however, as part of an SME support system, capacity can be set up to monitor global trends in the context of local/export possibilities and to develop the feasibility data for advanced project ideas;

(f) The participation of women in "economic activities" (defined as excluding housework and much of the work within the informal sector) is low in the ESCWA region, despite the fact that jobs do exist which large numbers of imported workers have had to fill. The incubation modality encourages self-employment in a supportive working environment. This fits in well with the ESCWA approach of a "third choice" for women -- somewhere between Islamic cultural practices and the rigours of a full-time career;

(g) Businesses graduating from the incubator may need some continuing support -- unlike those in industrial countries, which are left to their own resources once they leave the facility.

The ESCWA incubators could be sited in conjunction with industrial/technology parks, so that the graduating businesses can be relocated to a work-space nearby. Further, incubator management can continue to provide advisory services, possibly at a fee based on percentage of sales;

(h) Unemployment is high (even among educated youth) and is further exacerbated by the returnees following the Gulf hostilities. The incubator is seen in some ESCWA circles as a major job-creator. Experience in industrial countries indicates that incubators themselves create limited direct employment; however, these are high-wage jobs, and some of the successful firms grow at exponential rates, creating additional direct and indirect jobs as time goes on.

Accordingly, the incubator management will have to provide more intensive support in order to shorten the stay inside the facility to, say, one to two years (rather than the more usual two to three years), thereby increasing the "throughput" of graduating businesses.

There are three major challenges facing the planners of technology incubators in selected ESCWA countries. First, incubator arrangements have to be designed specifically to meet the above-mentioned business conditions, economic needs and cultural propensities in the locations where they are sited. Second, the criteria for selecting entrepreneurs to enter the incubators must include: their potential capability to grow from micro into small businesses, and then -- by rapid expansion -- into medium- and large-scale enterprises; and their willingness and ability to move from trade/artisanal activities to technology-based manufacturing and services. The third challenge is to create partnership arrangements between the government ministries and business associations (as well as cooperation within these two sectors themselves), in the overall interest of developing successful incubators and entrepreneurial businesses. It is difficult enough to support existing small businesses; it is far more difficult to create new ones. Programmes to support the informal sector, to foster the growth of entrepreneurial businesses, and to help existing businesses must all proceed in parallel.

3. Case-study: Egypt

From among the ESCWA countries, Egypt now has sufficiently effective State and private institutions to support SMEs, although there is no overall strategy as of yet. The United States Agency for International Development (USAID)-backed Small and Micro Enterprise Project of the Alexandria Businessmen's Association (ABA) has, since 1989, dispersed over 22 million Egyptian pounds (LE) as commercial credits to 6,000 clients (1-15 employees each), with prompt procedures, high repayment levels (over 98 per cent), and significant improvements in local employment and production. The Credit Guarantee Corporation (CGC) for Small-Scale Enterprises has built up an efficient process of giving guarantees of around 50 per cent of bank loan value (LE 25,000 to LE 700,000) -- with no collateral -- to small industrial and medical establishments. The Cairo Foundation ($US 15 million) targets new cities and women entrepreneurs in existing businesses (typically those with 5-7 employees). These micro-credit schemes are now expanding their functions to provide training, technical assistance and related incubation services.

Existing government agencies such as the Industrial Development Bank, Industrial Design Development Centre, Academy of Scientific Research and Technology, Export Promotion Centre, and departments within the Ministry of Industry are in the process of reform, moving towards making assistance more helpful in private industrial development. Among the most dynamic is the Information and Decision Support Centre, which is applying informatics to support the Cabinet and local governorates, and is planning the Pyramids Technology Valley Project.

A key component of the Economic Reform and Structural Adjustment Programme for 1990 is the Social Fund for Development (SFD), which has total resources of over $US 600 million in grants and loans. Of its six core programmes, the Enterprise Development Programme, is aimed at expanding existing small enterprises and creating new ones through integrated packages of technical assistance, credit and training. SFD has become the key sponsor of the Egypt Incubator Programme.

Pilot business incubator and enterprise development programme

A UNDP-supported project will provide the framework for national/international expertise, local/overseas training, preparing business plans, and assisting with initial operations at pilot business incubators in selected locations. While an incubator advisory committee will provide overall policy guidance, assisted by a small operational unit at Cairo, the main preparatory work will be undertaken by organizing committees at each location.

Provisionally, pilot incubators with different objectives are being sponsored by the Alexandria Businessmen's Association (ABA) in Alexandria and by the Credit Guarantee Corporation (CGC) in Tanta. Each is expected to consist of a building (about 1,000 square metres total space -- about 700 square metres rentable) where 18-20 selected entrepreneurs will be given focused advisory services, shared facilities, training, and assistance in securing the needed investment/working capital. The incubators will be linked to industrial parks, so that tenants can be given space upon graduation, as well as continuing support.

According to preliminary estimates (to be confirmed by business plans during 1993), building renovations, office equipment, furniture, training, staffing, and preparatory and promotional expenses will cost around $US 500,000 for each incubator. Working capital for initial operating deficits will require about $US 100,000 per incubator. In addition, the entrepreneurs entering the incubator will need medium-term investment and short-term working capital through separate credit/equity arrangements.

The incubators will secure their income from the affordable rents and service costs paid by the tenants -- and from advisory assistance to firms outside the incubator. The incubators are expected to become self-supporting in three to five years, depending on the level of initial support provided by ABA, CGC and other local sponsors.

The incubators will be managed by a small team consisting of a trained manager, a deputy manager, a training/management expert, an executive secretary, a receptionist and support staff.

The planning and preparation phase will require about 12 to 18 months, although UNDP assistance would continue into actual operations. Based on the experience gained in the implementation of the pilot programme, incubators of modified design will be replicated in other parts of Egypt. This experience should also be of value in initiating and operating technolkgy and business incubators in other ESCWA countries.

4. Lessons for ESCWA planners

"Dos" relate to project success; "Don'ts" are causes of failure. The following eight lessons, based on experience world-wide, require serious consideration when incubators are being planned.

(a) Be realistic in expectations and schedules

While the incubator concept is relatively straightforward, its implementation is difficult in an environment where the entrepreneurial culture is still latent and the technical infrastructure is weak. Therefore, a prudent course is to start on a pilot basis in order to test assumptions, attitudes and community support; then move on to large-scale replication and sustainability based on the lessons learned. Special efforts are needed from the outset to identify and choose a committed institution as implementing agent and to harmonize the conflicting expectations the key players are certain to have with regard to the incubator. The temptation to target economically distressed regions or launch crash programmes on employment generation is best resisted;

(b) Business incubation is a location-specific process

This requires that each incubator be custom-designed to meet the special needs, circumstances and culture of the locality, with the target groups and local consultants participating in the preparatory process. International experience is useful in clarifying various operational aspects of this innovative mode, in guiding the project design, and in helping the incubator to avoid the mistakes made elsewhere. There are no fixed models, but rather many different approaches;

(c) Success depends on wholehearted interactive community support

All of the key players (State and city government authorities, business associations, banks, funding agencies, educational and research institutions) need to understand their role and responsibility very clearly: they are there to nurture the entrepreneur, not to demonstrate their personal power, enforce territorial claims, or promote their own agendas. Community and State involvement are essential, expressed in the form of both moral and financial support for the incubator itself and for its tenants. Also needed is a "champion" -- a person committed to the concept -- who can push to overcome all obstacles and harmonize relations between competing interests until success is achieved;

(d) "Entrepreneurship is people development"

The search for, identification of and growth of latent entrepreneurial skills will be the prime and continuing task of incubator management. This will involve carrying out comprehensive surveys to develop a profile for the entrepreneurs and determine their needs, which the incubator can then be designed to fulfil. This process involves both structured and informal training courses -- before the tenants are selected, while their business plans are being prepared, and again as businesses mature and run into a variety of "teething" problems. The incubator design for developing countries must incorporate provisions for training, compiling project profiles, and follow-up assistance, all of which are essential for success;

(e) Small-business development must run like a business

The incubator does have the longer-term social purpose of creating jobs, and some of the enterprises will grow at rapid rates, with commensurate growth in income, taxes, and exports. The incubator itself does not make vast profits, but it can overcome initial operating losses if the rental and service income (based on the tenants' ability to pay) is carefully calibrated against operating expenses (based on generous community support). A feasibility exercise is useful for assessing all variables and selecting appropriate sites, and for cash-flow projections and programme milestones;

(f) Sound technical infrastructure is a prerequisite

Political and strategic considerations require balanced regional development -- by pushing economic activity to the neglected periphery -- and rural incubators can contribute to this objective. However, entrepreneurs need a supporting infrastructure and access to technical services, so it is best to locate pilot programmes where such support is readily accessible, in order to improve the chances of success for the incubator and for the businesses it is nurturing;

(g) The incubator manager plays the pivotal role

He or she must understand the ingredients of business success or failure, and should (preferably) have business experience, together with a network of contacts in the local community. Managers need to be carefully selected, trained, motivated and supported;

(h) The incubator is a catalytic component of a national enterprise-development strategy

The incubator must be designed as a small-business development facility, within the context of long-term policy and legislation to support national SME development. Further, incubator management has to establish working linkages with other incubators and their associations abroad, and assist their tenants in accessing international know-how and capital.

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XV. THE EXPERIENCE OF BUSINESS INCUBATORS AND THEIR IMPACT ON THE PROMOTION OF TECHNOLOGY-BASED SMALL-SCALE ENTERPRISES

by T.A. Jones*

A. Introduction

This paper endeavours to set down the most relevant experience of the business incubator concept as one of the ways and means of removing obstacles to the creation of employment, within the wider perspective of economic and industrial development.

Business incubators are established to meet many and varied objectives. They take numerous forms, provide many services and are given many names. This report focuses on those developments which share the goals of both job creation and technology transfer. The paper looks at the history and evolution of the concept of the business incubator, examining the wide variations on the theme and identifying aspects of those developments most conducive to the creation of employment. Finally, a closer look is taken at some very specific examples before conclusions are drawn on their efficacy in job creation and industrial development.

B. Background

The aide-memoire setting the background for the meeting for which this paper was written describes the structure of the small-industry sector in the Economic and Social Commission for Western Asia (ESCWA) region. It states that "the prevailing structure of private, small-scale business activity in the region shares a heavy bias towards the trade and services sector". It identifies the major obstacles to entrepreneurship development: the lack of financing available to small businesses, the "low level of technical knowledge and skills, inadequate technology ... and lack of information on marketing and technology sources." The upgrading of technology is hindered "by the absence of links between universities, scientific research institutes and the small-scale industries." The aide-memoire goes on to say that "support institutions and infrastructure are especially lacking in the areas of small-scale technology-based industries", and that "new forms of institutional and infrastructure support facilities such as business incubators, technology parks, etc. are not yet known in the ESCWA region." These, the meeting organizers believe, "have expanded successfully in the industrialized economies [and] are good examples of promoting entrepreneurship activity in small-scale technology-based industries, through their provision of physical space, advisory services, shared services and access to seed capital."

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It is important to study this statement in the aide-memoire carefully because it provides insight into the hopes and aspirations of those concerned with promoting economic development in the region; more importantly, it also helps define what (for the purpose of this paper) is intended by "business incubators" and "technology parks." In the following pages, it will be clear that these concepts have quite different meanings for different interests, so it is helpful at this juncture to clarify the ultimate aims of establishing technology parks in the ESCWA region.

C. Definitions

There is no uniformly accepted definition of business incubators or technology parks; indeed, there are several other terms used to describe broadly similar concepts. This should not be a matter of any great surprise, as the range of objectives and diversity of perspectives in such developments is also very great. Research park, technology park, business park, business incubator, innovation centre, science park, and enterprise centre are all terms used in the literature, almost interchangeably, to describe a property-based initiative located near a college or university whose main objective is to facilitate the growth of knowledge-based industry -- but there are exceptions even to this wide-ranging definition.

The Newcastle Technology Centre in the United Kingdom, for example, provides no accommodation for its clients, emphasizing instead its services which facilitate technology transfer between the higher-education institutions in the city and local businesses, industries, and entrepreneurs -- all through a system or process of networking.

Nor do these developments necessarily have to be located near colleges or universities. Cambridge Science Park is located more than three miles from Cambridge University, demonstrating that physical contiguity is not a necessary condition for achieving the desired result of cooperation between industry and academia.

Additionally, it is not necessary that the sponsoring organization be an academic institution; non-academic organizations such as ICI in the United Kingdom have sponsored technology parks. ICI Teeside, where Belasis Hall Technology Park was developed, has one of the largest industrial research complexes in the United Kingdom.

And, of course, not all research parks are established to facilitate the growth of knowledge-based industries, although this might be one consequence of such development. These technology parks can, for example, be established to enable universities to earn revenue from the rental of campus property, which is sometimes located in high-rent areas.

In this paper, the focus is on the form of science/research/business park defined by the United Kingdom Science Park Association (UKSPA). According to the UKSPA, a science park is a "property-based initiative" which includes the following features:

(a) Has formed and created links with a university, other higher-education institution, or research centre;

(b) Is designed to encourage the foundation and growth of knowledge-based business and other organizations normally resident on site;

(c) Has a management which is actively engaged in the transfer of technology and business skills to the organizations on site.

This definition reflects the aims of universities and other technological institutions to develop a separate and unique entity whose strength derives from its formal relationship with a centre of technological excellence, and whose objective is encouraging the transfer of technology and business skills. The definition is thus intended to exclude those developments which are promoted solely as locations for high-technology firms but which have no organizational commitment or objective to stimulate or facilitate access to technology.

Science parks that are closely associated with universities -- whose aims are to encourage start-ups, the commercialization of research carried out at the university, and/or enterprise promotion -- are included in this project. However, science parks which are called thus simply to attract relocating industry and/or to give an aura of technological emphasis are excluded from the scope of this exercise.

There is, of course, a difference between science and technology, though there is a need to bridge the gap between academic science and industrial technology; in this context, technology as the application of science forms the backbone of industry -- and as economic development is generated through the transfer of technology, jobs are created.

For the purpose of this document, the term technology park will be used to describe parks that conform to the definition of UKSPA as outlined above.

With the evolution of technology parks there has (arguably) been a shift from the original aims of these developments, as will become apparent later. Possibly due to the increasing scale of new developments or to the growing focus on the property elements in these parks (or to some other reason), the small-scale entrepreneur has been squeezed out. In order to redress this imbalance, there has been renewed emphasis placed on efforts to cater for the needs of very small technology-driven companies. This has often occurred within existing technology parks; for the purpose of this paper, the term "business incubator" will be used to describe these programmes. A useful definition of business incubator is: "a supportive environment for new and growing businesses which incorporates affordable and flexible space, shared services, and managerial, technical and financial assistance." In describing developments of the business incubator, terms such as "innovation centre" and "enterprise unit" frequently appear.

D. History

The technology park concept sprang up in the late 1950s and early 1960s in the United States -- almost simultaneously in the Silicon Valley in California and on Route 128 in Massachusetts -- in the neighbourhoods of powerful universities and institutions of higher education. These parks took hold in areas where high-technology industry existed. They

provided an attractive environment for relocating existing institutional research facilities and also provided sufficient space for the expansion of new high-technology enterprises.

In Massachusetts the growth of new high-technology companies is closely associated with the Massachusetts Institute of Technology (MIT). Several studies link the economic boom in Massachusetts with the positive encouragement given staff and students at MIT to start their own businesses. To illustrate: faculty members were given one day per week on which they could practise consultancy. Often this consultancy led to design and development work, which in turn led to new business start-ups and eventually to full-blown manufacturing operations. Dorfman's study of developments in the Route 128 area of Boston concludes that "graduates and staff of MIT have provided the single most important source of entrepreneurs in the region." It is important to note that the Route 128 success was fuelled by a number of other factors. These included the presence of a wide range of resources (skilled labour, venture capital, physical infrastructure) as well as the "spirit of enterprise." There had been a history of industrial activity in the Boston area, and although many of the sectors (such as textiles) were in decline, there remained the legacy of a trained workforce and physical buildings. In this respect, developments along Route 128 were somewhat spontaneous.

In contrast, developments at Stanford University were more planned. Professor Frederick Tenman set out in 1951 to transform Stanford into one of the premier universities in the United States; as part of this plan, the Stanford Industrial Park was founded, mainly as a means of making money for the University. Companies in the Park and their technologies were closely linked to research at Stanford University.

Another of the original technology parks was located in North Carolina and was called Research Triangle Park. More like Stanford and less like Boston, Research Triangle was a deliberately conceived plan to attract industry to North Carolina. The Governor of North Carolina initiated the development of the Park in 1957 by enlisting the support of three local universities, with the intention of enticing large firms and institutions to establish rasearch and development facilities there. In this respect it had more in common with developments like the Technopoles of France than with Boston (as the latter was aimed at encouraging high-tech entrepreneurs). The Park enjoyed only modest success until 1965, when IBM decided to locate a major research and development facility there, creating 9,000 jobs. This provided an impetus for Research Triangle, which went on to attract additional large corporations to the area.

Developments at Boston, Stanford and North Carolina share several common features: proactive university research programmes, high-amenity locations, and also -- importantly -- their close associations with large and successful companies. In the case of Boston, the company was Digital Equipment Corporation (DEC); at Stanford it was Hewlett-Packard and later Fairchild; and Research Triangle had IBM. The success of these companies, from their start-up to their becoming major international corporations, created very significant numbers of jobs, both directly and indirectly. (DEC, for example, at one time directly provided 10 per cent of all high-tech employment in Massachusetts and indirectly provided up to 20 per cent.) More importantly, however, these companies employed scientists and engineers in a commercial and changing industrial environment;

these individuals, in turn, recognized new business opportunities and created further spin-offs. It thus becomes very difficult to isolate a single ingredient to which the success of technology parks can be attributed.

After the success of communities such as Boston and Stanford in creating employment, other communities followed suit and established their own technology parks, with varying degrees of success. As with other developments in industry, these ideas moved to Europe, and in the early 1970s the first parks were opened at Cambridge and Heriot-Watt universities.

The Cambridge Science Park (CSP) is the best known and most successful technology park in the United Kingdom and probably in Europe. In 1973 Trinity College, one of the constituent colleges of Cambridge University, decided that the University as a whole would benefit from the establishment of a research-based, high-technology-industry base at Cambridge, and so began the first technology park in the United Kingdom. Indeed, to many people, the growth of high-technology industry in Cambridge (now popularly termed the "Cambridge Phenomenon") and the development of CSP have long been regarded as one and the same. However, as Segal showed in his study, the relationship between the Phenomenon and the CSP is complex. "In a nutshell, the very success of CSP is due in the first instance to the fact of the Phenomenon itself, since the growing number of high-technology companies in the area has created a buoyant demand for space on the CSP; the causality is this, not the other way round." Indeed, the desire of industry to locate in the Cambridge area and draw upon the resources of the University predates the establishment of Cambridge Science Park; this is best illustrated by the decision in the mid-1960s to refuse IBM permission to establish a major research and development facility at Cambridge.

At about the same time CSP was beginning, a second park was established at the new green-belt campus at Heriot-Watt University, which was relocating from the centre of Edinburgh to the suburbs. The Heriot-Watt Research Park came into existence partly as an escape hatch for the ideas and developments which had evolved from the University's research. In the early days of the technology park movement, proponents presented the concept as a way of encouraging the transfer of technology from academia to industry. Academic spin-offs from Heriot-Watt University account for 60 per cent of the organizations in the Research Park and for 40 per cent of the people. In contrast, the Cambridge Science Park has only a handful of University spin-offs, but it has attracted a higher proportion of large companies than most parks.

The 1970s saw a continued, modest increase in the number of technology parks in Britain. In 1981, however, the University Grants Committee in the United Kingdom (the committee funded by the Department of Education and Science that is charged with allocating funds to the universities) decided to selectively reduce the budgets of British universities. Most devastating were the cuts of up to 44 per cent in grants to technological universities, forcing them to look for other sources of income. This turned them towards consultancy and led to greater emphasis on industry as a source of funds for research. This, in turn, led to a more dynamic and interactive association with industry.

While long regarded as leaders in research, British universities were behind in turning academic ideas into commercial gain. So, by reducing direct grants, the Government had provided the incentive to universities to improve both their industrial linkages and the commercialization of their expertise. North American technology parks were seen as models of university-industry interaction in providing the right conditions for the development of high-tech firms.

A wide variety of technology parks now exists. The United Kingdom pioneered the technology park explosion in Europe, but other countries -- particularly Germany -- are catching up. In France and Belgium, the early technology or research parks have been large-scale industrial estates whose emphasis has been on attracting already established research-based corporations. The United Kingdom and Germany have been oriented more towards the innovation-centre-based initiative.

Today there are approximately 400 technology parks world-wide; about 150 of these are in the United States.

In the United States, technology parks are more likely to be privately funded, while national and local Governments tend to be more active sponsors in other parts of the world. It should be recognized, however, that British developments fail to match those of the United States in one key aspect, and that is in the scale of activities. The whole of Cambridge Science Park, for example, could be placed in the car park of the Hewlett Packard factory near Stanford in California!

E. Evolution

Parallel to the development of large-scale technology parks has been the creation of business incubator facilities for new start-ups and young companies engaged in exploiting research. It is abundantly clear from studying their history that technology parks do not follow a single formula; this is equally true in the case of business incubators. In many instances these incubators are part of a technology park and can be seen as a second phase in the development of the park. The first phase might be the establishment of research-oriented operations on a medium to large scale, sponsored by existing corporations moving into the park; these operations would create the demand for a wide range of support services at the park. The second phase of the development then might be called the entrepreneurial stage. The seeds of this phase are generated once the critical mass of scientists and innovators start interacting.

It is necessary that a technology park exist for a business incubator to be established. Indeed, the business incubator can be an alternative form of organization to the technology park. It is likely that the business incubator will be linked to a university or research institution. Business incubators tend to put less emphasis on the property element of their concept and greater emphasis on a range of management services. These services can include business assessment and advice, seed money and venture capital, market and technical information, and education and training.

The technology park and business incubator, as described, may be part of either an evolutionary or a parallel process, but both concepts share the aim of enabling the transfer of technology. Both parks and incubators are often closely linked to universities or research institutes. Other variations on the theme -- determined mainly by the objectives of the projects' sponsors -- are described below.

One variation is the business incubator without close links to a college or university. Such an incubator might stress support such as commercial information and advice, administrative services, market data and venture capital. The degree of technology transfer can range from moderate to none at all, but there is not likely to be any significant transfer if the incubator is not closely associated with a university.

Whereas the type of business incubator defined above might be concerned with exploiting research, other types may be more interested in applying new technology to existing products or in some way improving product function or design. Such an incubator might have a link with a technical college, although it may be only a contractual one. Or an incubator might put very little emphasis on technology transfer and instead concentrate on providing production, marketing and financial-support services.

Unfortunately, numerous terms such as business incubator, enterprise unit and innovation centre are used interchangeably to discuss the same concept. While it is not within the scope of this paper to define standard usage, it is useful to note that differences do exist. One way of demonstrating these differences is by giving some examples.

In Ireland there many kinds of business incubators with similar titles but very different characteristics.

While Trinity College Innovation Centre is very much a gateway for business and industry to the College's expertise, it is primarily aimed at the development of products resulting from the research carried out at the College. Here the links between the University and companies in the Centre are very close. The degree of technology transfer is high; it might even be said that technology transfer is the objective of the Centre. The level of technology is high -- "leading edge" in the case of some projects.

At Plassey Technology Park, adjoining the University of Limerick, there is another Innovation Centre, but this one has a different focus. It operates like a production line, facilitating the progress of business ideas from the concept stage through to profitable commercialization. At the heart of this production line is a comprehensive venture-creation system comprising several support programmes. The Centre enjoys a close working relationship with the nearby National Microelectronics Applications Centre. This ensures that technical advice and services are available at an arm's-length, at-cost basis, but also through the inevitable contact that takes place between organizations located close to one another. The level of technology is moderately high, mostly involving the application of established know-how in microelectronics.

The Enterprise Centre in Dublin is very much a property-based idea, offering secure accommodation to new (start-up) companies at reasonable costs and on "friendlier"

terms than those typically available commercially. There are strong centralized support services, including accountancy, marketing and design services, and administrative backup. While some companies in the Centre are technically advanced, there is little technology transfer among the tenants, and the Centre has no association with a particular college.

The three examples mentioned above illustrate the differences among business incubators and their variations. There is further discussion of these examples later in the paper.

Before concluding the section on evolving trends in technology parks, mention should be made of networking and linking parks. Networks can be used to promote the transfer of technological know-how among parks, or the exchange of experiences in park management; the latter is particularly useful for new parks in more remote locations. In this way parks might also become a more powerful force in regional development.

It is important to understand that technology parks and business incubators are continually evolving, adapting to the varying objectives of their sponsors and promoters.

F. Technology transfer

Technology transfer is the common thread running through all the various forms of technology parks and business incubators, with the possible exception of those which concentrate heavily on property and support services. In the case of the earlier technology parks, technology transfer was seen as an inevitable consequence of bringing together a number of medium-sized to large research-oriented operations. However, it was clear from the very beginning of the technology park movement that the existence of the parks were not required for technology transfer to take place. For example, the process of technology transfer was well-established at MIT before any technology parks were planned. This suggests that technology transfer is more an informal or spontaneous process. Indeed, a 1984 study by ABT Associates on the factors affecting University spin-offs concluded that the greatest activity actually occurred at universities which had an indifferent policy towards technology transfer.

Technology transfer can be accomplished in many different ways -- formally through research and development (R and D) and licensing arrangements, or informally through industrial cooperation. It can be a direct process, with companies establishing research centres, or indirect, through graduate employment or informal networks. The nature of the technology-transfer process itself is complex and depends on a wide range of factors. There is, however, growing case-study evidence of the input of informal networks operating to facilitate the diffusion of knowledge. This transfer is initiated and cultivated when companies achieve a critical mass of activity.

While aiming to achieve technology transfer by building a critical mass of activity and then awaiting spontaneous interaction is a legitimate goal of technology parks, the same is not necessarily true of business incubators; in the latter case it is necessary to manage an active technology-transfer programme. It may be true that such formal processes (and the associated brokering activities) are no guarantee of success, but combined with other

services, they can be successful in building strong entrepreneurial, technology-oriented companies.

One opportunity lies in the area of "technology enhancement", where the concept is to bring together technology, market information and venture capital in such a way that the technology is not only transferred but also "enhanced" or made more marketable. These brokering services -- including technological consultancy and assistance -- should be the reponsibility of the incubator management.

In summary, technology parks and business incubators can facilitate technology transfer by creating an environment where there is informal interaction among companies and between their management and venture capitalists, and where faculty members of an associated university are encouraged to be enterprising and to establish new businesses. Managers of parks can take a more passive role in this process, but managers of incubators must be proactive in encouraging technology transfer.

G. Employment creation

Most job creation takes place when new businesses are started. David Birch, who has studied job-creation patterns in the United States, found that an average of 66 per cent of jobs were created by firms with twenty or fewer employees. Technology parks, whose aim is to attract relocating industry, offer few prospects for creating jobs. In parks and incubators, the major economic benefit is achieved when the environment fosters new business development by innovative entrepreneurs. New jobs are created in new companies.

Earlier in the paper the two phases of technology-park development were mentioned. The first -- or institutional -- phase offers little additional employment, except (mainly) in service and support organizations. The second -- or entrepreneurial -- phase offers better prospects for job creation. It is during this phase that new technology-based firms are founded. The evidence from existing parks and incubators shows that their contribution to job creation is greatest when they prompt the birth of new firms and nurture them through the critical stages of start-up.

In prompting the establishment of new firms, the park or incubator is only one factor; other important elements include the entrepreneurial spirit of the community, the status the entrepreneur holds in that community, and the reward system. However, incubators can improve the survival rate of new enterprises.

The provision of property is only one -- and often a small -- factor in helping a new idea become a reality. Business planning and advice, market data and venture capital are also crucial to the new entrepreneur; the success of the incubator will be measured by how effectively it provides these support services. Incubators that are less property-based and more planned-and-managed operations -- with "nursery" units, general management services and more direction from banks -- are more useful in promoting new industrial start-ups.

In summary, parks and incubators promote job creation when they create an environment where entrepreneurial activity is sparked and supported. This happens when informal contact among the tenants of technology parks causes technology transfer and results in new business start-ups. It happens when academic staff are encouraged to commercialize the results of their research efforts. It also happens when the seeds of a new business are cultivated and nurtured to maturity in a positive, supportive atmosphere. In time, parks and incubators can influence the attitude of a community towards industry and enterprise.

H. Management services

Technology parks and business incubators differ in the services their management provides to tenants. Parks are more facilitators of a process that ultimately involves technology transfer; the role of its managers is more passive. Incubators, on the other hand, are more active supporters of the entrepreneurs based there; their managers typically offer a range of services.

Business advisory services can be provided throughout a company's life. Some incubator managers play a role in helping an entrepreneur decide if he should start his business at all. The more proactive managers offer business evaluation services and other help, including guidance in preparing strategic plans which cover financing, production, technology and marketing.

The provision of suitable, flexible and affordable space is a standard service of incubators. The aim is to reduce capital outlay at the early, critical stage of a project's life by allowing the entrepreneur to occupy accommodation as he needs it and by providing power and other utilities, maintenance and security services, and meeting rooms.

In earlier incubators the provision of centralized administration services was quite common, but today -- with the availability of inexpensive personal computers, standard computer software, fax machines and telephone answering machines -- these services are less important.

The provision of seed money and venture capital is of paramount importance to the success of a new enterprise; this is particularly true in the case of technology-driven projects. The availability of venture capital is also essential in stimulating the growth of university-based start-ups and propelling them towards becoming full-fledged commercial operations; this can be sourced through private investors, university resources or government programmes. The role of the incubator should be one of a matchmaker, introducing the entrepreneur to the financial backer. If the incubator is also the source of capital, there is a risk of conflict of interest. This would certainly be the case were an incubator to specialize in a market or industry sector where the tenants were in competition with one another.

In summary, the services provided by the managers of parks and incubators are determined by the economic environment in which they operate, by the objectives of the sponsors and by the kinds of companies they are dealing with. In the case of incubators, managers can be very proactive in helping new enterprises survive the critical early stages.

I. Conclusions

1. It is very difficult to isolate the impact of parks and incubators from all the other factors affecting the development of entrepreneurship.

2. Technology parks and business parks are well-established in the United States but are relatively new in the rest of the world. Parks in the second or entrepreneurial phase act like business incubators in the way they support entrepreneurial activity.

3. It is implied that parks and incubators have great merit in their own right. However, they are only a means to an end, and the forms they take depend on what the "end" is.

4. Incubators are only one of the factors which promote enterprise development; more important is the attitude of the community towards the entrepreneur, i.e., the rewards for success and the tolerance of failure.

5. Where the general environment is supportive of the entrepreneur's efforts, the incubator can be the means of delivering specific help and advice. Part of this is the provision of accommodation; a larger part is the provision of business advice, strategic planning and market data.

6. In the case of university-linked incubators, technology is transferred from the research laboratory to industry, and employment opportunities are created in the spin-off companies.

7. In the case of incubators not associated with universities, there is little scope for informal technology transfer.

8. Incubators can facilitate the sourcing of seed and venture capital. Over time they can help define the attitude towards industry.

Annex

BUSINESS INCUBATORS: THREE EXAMPLES

A. Trinity College Innovation Centre
Dublin, Ireland

Focus: The primary aim of the Innovation Centre is to encourage the commercialization of research carried out at Trinity College. The potential entrepreneurs are the College faculty and researchers. Approximately twelve companies have "graduated" from the Centre and another eight are currently in incubation.

Technology transfer: The level of technology in the projects is high. By definition they represent a direct transfer of technology from the laboratory to commercial products and services. For example, TOLSYS has patented a "transparent stable memory" which is used in a new design for fault-tolerant computers. Projects have come from the health sciences, art, science, and engineering departments. Many of the projects are consulting services which will result in technology being transferred, on a wider scale, to their clients.

Job creation: The concentration of the Centre's companies in services such as contract R and D, design, and consulting services has meant that job creation has been relatively small. To date, about 100 jobs can be attributed to the Centre's activities.

Management services: The Centre provides accommodation close to the University on a very flexible basis. It organizes access to the College's research facilities. It also evaluates business plans and deals with issues of ownership of intellectual property. Companies are encouraged to move from the Centre after 18-24 months. The Centre's manager provides information on the Government's and the European Community's support programmes and acts as a coordinator for funding applications. Interestingly, two of the most successful projects established by College faculty were set up before the Centre was built.

Comment: The Centre is highly specialized and follows a model relevant only to universities with strong research activities. Job creation tends to be more indirect in the companies set up at the Centre.

B. Innovation Centre at Plassey Technological Park
Limerick, Ireland

Focus: The Innovation Centre was established in 1980 as part of the Government's regional development plan for the promotion of enterprise development. The Centre provides a wide range of support services oriented towards the formation and development of new, technology-based, export-oriented, indigenous-growth companies.

Technology transfer: The aim of the Centre is to encourage those people who possess a combination of business experience, skills and ideas and have a desire to start their own businesses to do so. The Centre has close links with the University of Limerick and with

the National Microelectronics Applications Centre, and through these links it offers technical assistance. Technology transfer takes place on a limited scale.

Job creation: Job creation is an important goal of the Centre's sponsors. To date, about 60 enterprises have been set up, with almost 1,000 jobs provided in manufacturing, trade and services, R and D and education projects.

Management services: The Innovation Centre operates a wide spectrum of support programmes and offers a range of services which include:

(a) Forty small workshops and incubation units;

(b) Secretarial services (word processing, fax, receptionist, photocopying);

(c) Meeting and conference room facilities, including catering;

(d) Access to financial incentives (administered by the regional development agency).

The support programmes include:

(a) START, an introduction to the essential elements for successful new business formation, including the sourcing of business ideas;

(b) ENTREPRENEURS, a comprehensive six-month, part-time training programme oriented towards the formation of venture teams;

(c) LICENSE and JOINT VENTURE, an ongoing programme designed to inform potential entrepreneurs of licensing opportunities;

(d) SHANNON VENTURES, a combined private-/public-sector local venture set up to provide seed capital to new businesses.

Comment: The Centre offers extensive advice and support systems to prospective entrepreneurs. Unlike the Centre at Trinity College, this Centre does not create business ideas; for those with ideas, however, there is encouragement and help.

C. IDA Enterprise Centre
Dublin, Ireland

Focus: The IDA Enterprise Centre was established as part of the Industrial Development Authority's (IDA) programme for economic regeneration in 1978. It is very much a property-based initiative, making accommodation available to new and small companies. It embodies several features of the original cooperative idea.

Technology transfer: The Centre is home to 50 enterprises ranging from crafts to high-tech companies, with little scope for technology transfer.

Job creation: The Centre was set up to facilitate job creation in the small-industry sector; it was also part of an urban renewal programme. The Centre has created over 600 jobs to date. Over half of the companies are essentially craft-based and employ two to five people.

Management services: The principal service provided is suitable accommodation, with some centralized administrative assistance. The Centre is a European Community Business and Innovation Centre (EC-BIC) and is a member of the European Business and Innovation Centre Network (EBN). It also coordinates some joint marketing and selling promotions for the craft business. As an EC-BIC, it provides specialized help to existing small and medium-sized enterprises. Companies have access to the skills and experience of BIC management, both nationally and internationally.

Comment: The Enterprise Centre began very much as a basic support system for local craftsmen and small businesses. It has widened its scope of activity over the years and now offers a full range of services, including access to venture capital.

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XVI. THE ROLE, IMPACT, POTENTIAL AND COMPETITIVE BEHAVIOUR OF SMALL ENTERPRISES IN PRODUCT AND PROCESS INNOVATION

by Amr Armanazi*

A. Introduction

This study investigates the role, impact, potential and competitive behaviour of small enterprises in product and process innovation. Most studies and research on industrial structure, organization and practice -- and on research and development (R and D) and innovation in particular -- have related to the perspective of the larger firm. This is explained partly by the historically rooted and widespread belief that such firms are the mainstay of industrial activity and the engine of industrial growth and development. Small and medium-sized enterprises (SMEs), by contrast, have played a relatively secondary role. Furthermore, large firms lend themselves to the development of a more coherent and comprehensible theory of industrial structure, organization, and economics. Such a task has proven to be far more elusive and complex where SMEs are concerned, partly due to the diffuse, fragmented and relatively unstructured presence of SMEs in the industrial economy.

Since the 1970s, however, definite signs of a rising interest in the study and promotion of SMEs in developed economies have emerged, including the elaboration of focused government support plans for such enterprises. This has reflected the growing recognition that the role, impact and potential of SMEs in industrial and economic activity, and innovation is indeed far greater and more pervasive that had been assumed, particularly in the more recent (and still emerging) industrial paradigm.

The present study focuses on this theme and uses a variety of perspectives to elaborate the various issues involved. The backdrop of large firms will also be used where appropriate to accentuate these issues.

Although the main emphasis of the study is product and process innovation in SMEs, a broad rather than narrow technical perspective will be maintained for two essential reasons. First, such an approach is more compatible with the overall structure of the present meeting and its objectives. Second, and more important (as this study clearly demonstrates), successful enterprise in product and process innovation -- especially in the present state of dynamic technological change and turbulent global industrial and market environments -- must of necessity encompass a broad holistic perspective which accentuates such central issues as competition, competitive behaviour and competitive advantage. Such

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a perspective finds expression in the shift of focus that has been taking place in the theoretical debate on innovation -- a shift from purely technological aspects to those related to the behaviour of firms in innovative processes. At the same time, this broader perspective stresses the specific and cumulative character which makes these processes (somewhat) rooted in the context in which they take place.[1/]

There are numerous aspects of and dimensions to innovation. The perspectives on invention, R and D, innovation and technical change expressed in the available literature have been widely diverse.[2/-15/] The broad spectrum of innovation activity provides, in a sense, a wide range of opportunities for entry by both large firms and SMEs. For a particular firm, innovation can encompass any or a combination of activities, beginning with invention and idea-generation and ending with successful exploitation, commercialization and diffusion. This further implies that innovative activity is associated with both producers and users of innovations. Where a firm positions itself (possibly in a dynamic sense) in this spectrum is a major decision that derives from its technical, business and marketing strategies (explicit or implied).

A firm's success in the current dynamic and competitive global environment very much depends on the compatibility between the aforementioned strategies on the one hand, and on the other, the firm's endogenous resources and capabilities, the exogenous support and resources it can tap, and the general environment it operates within.

In subsequent sections of this study several of these issues will be explored and elaborated upon in relation to SMEs and their capabilities and potential for successfully competing in various areas within the innovation spectrum; particular emphasis will be placed on product and process innovations.

This paper draws largely on studies and empirical data relating to SMEs and product and process innovation as practised in developed economies. Some sources cover newly industrialized countries, while a few relate to developing countries. This partly reflects the unfortunate state of affairs in the Arab region -- characterized both by a low rate of product and process innovation in industrial enterprises (both large and small), and the dearth of available or published information and statistics related to such activities. Nevertheless, there is much to be learned from a critical study of the rich and varied experiences of industrial enterprises in other contexts and cultures. This will facilitate the identification and subsequent adoption of those strategies, approaches and practices that may be characterized as universal, and of those which require adaptation and modification to better suit local circumstances, cultures and environments.

The major conclusion drawn from this study is that the success of product and process innovation in industrial enterprises in the Arab region (both large and small) will require: the judicious adoption, adaptation and modification of external experiences; a fundamental change in internal organization, management, practices and work culture; the build-up of technical capabilities; and the availability of a supportive environment.

B. Small and medium-sized enterprises (SMEs): A broad view of their role, impact and potential in technical change and industrial innovation

The role that SMEs play in technical change, innovation and economic growth has been a subject of debate for many years. A series of studies in recent years emanating from researchers at the Science Policy Research Unit (SPRU) at the University of Sussex have contributed to a clearer understanding of the evolution of this debate and the issues associated with it. These studies have drawn on empirical data from the SPRU database and have related to significant British company innovations introduced and brought into commercial use between 1945 and 1983. These studies have also considered other data and contributions related to the topic from the United States and some European countries. Much of the material in this section derives from the works of Roy Rothwell and some of his colleagues at SPRU.[11/], [16/-22/] The Italian experience in industrial innovation will also be discussed, based on a recent important investigative study by Archibugi and others[5/] which provides some valuable empirical data. Other important sources which specifically cover the American experience will also be drawn upon, particularly recent studies by Acs and Audretsch.[23/]

1. Evolving perceptions of the role of small firms

Notable economists such as Galbraith (1957) have argued for the importance of large size and monopoly power. Others, such as Schumaker (1973), have argued strongly that small is beautiful. Schumpeter (1910; 1943) suggested initially that it was the exceptional drive of independent entrepreneurs, undertaking risky innovative developments, that led to the launching of radical new products and new industry sectors which changed existing market structures. Later, it was "endogenous" science and technology, with the R and D laboratories of large firms playing the dominant role, since such firms were better equipped with the technical and financial resources needed to cover the costs and risks (of R and D). Freeman and others[24/] have termed these two successive modes of Schumpeterian innovation as "entrepreneurial" innovation and "managed" innovation. Firms that are small, new and dynamic -- but fast-growing -- play the key role as innovators in the first industry cycle.

This suggests that the relative roles of small and large firms in technological change and industrial production might vary considerably over the industry cycle, necessitating the adoption of a dynamic view of the role of different-sized firms in innovation. Such a view also emphasizes the crucial significance of time of entry into the industry cycle with respect to successful competition by SMEs with larger enterprises.

An approximate example of Schumpeterian industrial evolution, and one which illustrates the importance of large firm/small firm complementarities, can be found in the evolution of the semiconductor industry in the United States, as described by Rothwell and Zegveld.[21/]

Historically, the attitudes of Governments towards small firms have varied considerably, both among countries and, over time, within countries.

From the early to mid-1970s onward, European government attitudes shifted sharply in favour of small firms, and many public policy measures were introduced to support them.

Most of the evidence supporting the employment-creating role of SMEs came from the United States. Similarly, American examples of economic prosperity created by "local" industrial agglomerations, including many small high-technology firms (specifically Silicon Valley and Route 128), highlighted the important and flexible role that small new-technology-based firms (NTBFs) could play in regional economic renewal and development, and as important actors within a network economy enhanced by value-added partnerships. It is to be noted, however, that in contrast to the situation in the United States, NTBFs appear to have played only a limited role in the economies of Europe up to the early 1980s. During the remainder of the 1980s, European public policies, while supporting small firms in general, focused increasingly on measures designed to stimulate the creation and growth of NTBFs, largely influenced by electronics/informatics-related developments. Support for SMEs in Europe also finds strong justification in recent statistics indicating that, in general, SMEs provide around 75 per cent of total employment and represent 65 per cent of the gross national product (GNP) in the European Community.[25/]

2. Varied perspectives on the role and impact of small firms

Apart from the role of small firms vis-à-vis radical innovation and the emergence of new industrial sectors, as previously described, Rothwell notes other ways in which large and small firms are a necessary complement to one another. Small firms, for example, can innovate to fill narrow market niches considered too small by their larger partners, or can develop customer-specific "add-ons" to large-firm products; additionally, large, modern corporations cannot survive without an appropriate "hinterland" of small subcontractors and suppliers.

Another important perspective relates to the relative contribution of small firms to innovation within different industrial sectors; this, as expected, varies considerably. The following four sectors of industry have been considered (based on information from the SPRU innovation data bank): pharmaceuticals, general chemicals, scientific instruments and electronic computers. In pharmaceuticals and general chemicals, where R and D requirements are very large and capital costs very high, SMEs have played a very major role or no role at all in total sectoral innovation; the entry costs here are generally prohibitive for small firms. In aerospace, motor vehicles and shipbuilding, small firms' innovation share has also been small. In scientific instruments, by contrast, where technical, capital and marketing start-up costs are relatively low, entry by innovative SMEs is entirely possible. It is a field in which many specific market opportunities occur for small specialist companies, with market segmentation making it difficult for large firms to achieve across-the-board domination. SMEs have consistently enjoyed, on average, about a 40 per cent share of total scientific-instrument innovations. Specialist machinery is another area where the small firms' innovation share has been significant and growing.

Archibugi and others,[5] in line with Pavitt's approach,[26] emphasize further intersectgral differences as opposed to size differences among firms in explaining the intensity and nature of the innovation phenomena.

Apart from counting innovation shares, a useful indicator of SME innovative activity is relative innovation efficiency, measured as innovations per unit of employment. Another indicator is relative R and D efficiency, measured as innovations per unit of R and D expenditure. Utilizing the SPRU innovation data and employment statistics, Wyatt[20] has compiled relevant data for firms in bive employment (size) categories. On the basis of these data, R and D efficiency is much, much higher in the smaller firms. A possible explanation for this is that there is a lower degree of functional specialization in small firms, with a higher proportion of innovative activities occurring outside of what is formally defined as R and D -- a point emphasized by Segal and others[27] in their study of small, new firms in Cambridge. This would imply, however, that the informal R and D performed in small firms is very considerable indeed. These observations have been more recently confirmed in the Italian context -- specifically, in the study of sources of innovative activities and industrial organization in Italy referred to earlier, in which the authors have noted that there are many cases where the formal R and D activities do not represent the main input for innovative processes. Innovations, on the contrary, have very often derived from activities carried out in SMEs devoid of formal R and D departments, and these constitute a significant part of the innovation process in Italy. In fact, out of a total of 16,700 innovating business units (large and small) covered in the study, 13,986 of these declared themselves innovative without having performed R and D.

Based on evidence of growing SME involvement in industrial activity and innovation, it should come as no surprise that some observers see in today's technological changes the dawn of a new form of industrial organization, with SMEs returning to a leading role in promoting innovation. Factors such as the age of the technology, the industrial cycle phase, the scale of capital and R and D, and manufacturing and marketing requirements are all determinants of where the comparative advantages lie in small and large firms. It is clear from the discussion and with reference to table 1 that the main advantages of small firms relate to people and behaviour: entrepreneurial dynamism, internal flexibility and responsiveness to changing circumstances. Large firms, on the other hand, possess in the main material advantages and are predominantly resource-oriented -- i.e., financial, technological and production resources.

Large firms, however, are exposed to potential problems related to bureaucracy, internal inertia and risk aversion, and often lack the dynamism and flexibility necessary for the initiation and successful conclusion of radical innovation. (A notable exception here is Japan, where large and long-established companies have proved to be remarkably flexible and dynamic with regard to the introduction of innovations.) Many recent studies have severely criticized the decline in the effectiveness of industrial innovation in large (Western) firms,[28-30] and have cited numerous case-studies of major innovation failures among these firms. By contrast it has been the smaller firms that have translated the concepts and ideas developed by the large firms into practical, economic products for the market-place.

Table 1. Advantages and disadvantages of small and large firms in innovation

	Small firms	Large firms
Marketing	Ability to react quickly to keep abreast of fast-changing market requirements. (Market start-up abroad can be prohibitively costly.)	Comprehensive distribution and servicing facilities. High degree of market power with existing products.
Management	Lack of bureaucracy. Dynamic, entrepreneurial managers react quickly to take advantage of new opportunities and are willing to accept risk.	Professional managers able to control complex organizations and establish corporate strategies. (Can suffer an excess of bureaucracy. Often controlled by accountants who can be risk-averse. Managers can become mere "administrators" who lack dynamism with respect to new, long-term opportunities.)
Internal communication	Efficient and informal internal communication networks. Affords a fast response to internal problem-solving; provides ability to reorganize rapidly to adapt to change in the external environment.	(Internal communications often cumbersome; this can lead to slow reaction to external threats and opportunities.)
Qualified technical manpower	(Often lack suitably qualified technical specialists. Often unable to support a formal R and D effort on an appreciable scale.)	Ability to attract highly skilled technical specialists. Can support the establishment of a large R and D laboratory.
External communication	(Often lack the time or resources to identify and use important external sources of scientific and technological expertise.)	Able to "plug-in" to external sources of scientific and technological expertise. Can afford library and information services. Can subcontract R and D to specialist centres of expertise. Can buy crucial technical information and technology.

Table 1 (continued)

	Small firms	Large firms
Finance	(Can experience great difficulty in attracting capital, especially risk capital. Innovation can represent a disproportionately large financial risk. Inability to spread risk over a portfolio of projects.)	Ability to borrow on capital market. Ability to spread risk over a portfolio of projects. Better able to fund diversification into new technologies and new markets.
Economies of scale and the systems approach	(In some areas scale economies form a substantial entry barrier to small firms. Inability to offer integrated product lines or systems.)	Ability to gain scale economies in R and D, production and marketing. Ability to offer a range of complementary products. Ability to bid for large turnkey projects.
Growth	(Can experience difficulty in acquiring external capital necessary for rapid growth. Entrepreneurial managers sometimes unable to cope with increasingly complex organizations.)	Ability to finance expansion of production base. Ability to fund growth via diversification and acquisition.
Patents	(Can experience problems in coping with the patent system. Cannot afford time or costs involved in patent litigation.)	Ability to employ patent specialists. Can afford to litigate to defend patents against infringement.
Government regulations	(Often cannot cope with complex regulations. Unit costs of compliance for small firms often high.)	Ability to fund legal services to cope with complex regulatory requirements. Can spread regulatory costs. Able to fund R and D necessary for compliance.

Source: R. Rothwell, "The role of small firms in the emergence of new technologies", OMEGA 12, No. 1 (1984).
Notes : The statements in brackets represent areas of potential disadvantage. (Abstract from Rothwell and Zegveld, 1982). "R and D" refers to research and development.

Many large firms have recently sought to circumvent the inertia/bureaucracy handicaps by introducing so-called intrapreneurial small-firm-type structures, thereby attempting to combine both material and behavioural advantages to enhance their overall innovativeness. Those (bigger) companies which are able to build up a value-added network or to exploit, in parallel, both economies of scope and economies of scale will maintain their ability to change, to adapt to the environment and to be flexible.[31/] The counter-trend towards increased size through mergers and acquisitions has received more publicity; however, its long-term viability as a "big business" strategy has been called into serious question by management gurus such as Tom Peters.[32/]

3. Small firms in industrial innovation: the evidence from American empirical data[23/]

A recently published American study provides valuable insight into the role and impact of small firms vis-a-vis industrial innovation, drawing on recently released data sources so that the relationship between firm size and innovation may be better understood. The statistical evidence confirms that small firms are playing a more prominent role in all sectors of the American economy, with the observed shift from large to small firms greater in manufacturing than in services or finance.

The measure of innovative activity used in the study is the number of innovations recorded in 1982 in several American industrial sectors. The data consisted of 4,476 innovations identified as occurring in manufacturing industries.

Table 2 lists the total number of innovations in those industries that had the greatest number of innovations in 1982, along with the corresponding number of large- and small-firm innovations. The data confirm an earlier assertion that small firms are more innovative than large firms in some industries, while the reverse is true in others.

One potential concern is that the significance and "quality" of the innovations might vary considerably between large and small firms. This was investigated by classifying the innovations into four categories (see table 3, which shows the distribution of innovative significance according to firm size). A significant conclusion deriving from the table is that there does not appear to be a great difference between large and small firms in the "quality" and significance of the innovations.

In comparing various databases, Acs and Audretsch conclude that they reveal similar patterns of innovative activity with respect to the distribution of innovations across manufacturing industries and between large and small firms. Other important revelations emanating from the American study which relate to innovation vis-à-vis firm size include the following:

(a) The relative innovative advantage of small firms over large firms is most pronounced in the industries that are the most innovative and in markets closely resembling the competitive model;

(b) The relative innovative advantage of large firms tends to be found and promoted in industries that are capital-intensive, advertising-intensive, concentrated and highly unionized, and that impose more significant structural barriers;

(c) Small-firm innovation is significant and distinct from large-firm innovation, and thus may respond to a different set of incentives and technological and economic environments;

(d) Small firms are more likely to prosper in industries in which the evolution of knowledge emanates from skilled labour and high levels of human capital;

(e) Small firms play in important role in introducing new products, even in industries dominated by large firms. It may well be that the internationalization of many products -- particularly in the high-technology sector -- has contributed to the increased presence and viability of small firms;

(f) Markets in which the knowledge accumulated from experience plays a crucial role in innovative activity (e.g., semiconductor production) will tend not to be accessible to new firms, while markets in which such knowledge is relatively less important in producing innovations will generate much more activity from outside and fringe firms;

(g) Small firms play a key role in the process of technical change, as well as in the process by which industries evolve.

C. Competitiveness, innovation and the achievement of competitive advantage in small firms

1. Issues of competitiveness in the evolving industrial and market paradigm

Since 1980, some very fundamental changes have taken place in the overall business environment as a result of rapid technological change and the growth of global markets and global marketing strategies. Both large and small firms are subject to pressures generated by these fundamental shifts, and must therefore apply appropriate business and technical strategies to secure and maintain a competitive posture. Individual firms and national industries in both developed and developing economies can no longer prosper behind the walls of protectionism that helped sustain them in earlier periods. Some of the dominant and compelling trends visible in numerous markets -- from consumer

Table 2. Number of innovations for large and small firms in the most innovative industries, 1982

Industry	Total innovations	Large-firm innovations	Small-firm innovations
Electronic computing equipment	395	158	227
Process control instruments	165	68	93
Radio and communications equipment	157	83	72
Pharmaceutical preparations	133	120	13
Electronic components	128	54	73
Engineering and scientific instruments	126	43	83
Semiconductors	122	91	29
Plastics products	107	22	82
Photographic equipment	88	79	9
Office machinery	77	67	10
Instruments to measure electricity	77	28	47
Surgical appliances and supplies	67	54	13
Surgical and medical instruments	66	30	36
Special industry machinery	64	43	21
Industrial controls	61	15	46
Toilet preparations	59	41	18
Valves and pipe fittings	54	20	33
Electric housewares and fans	53	47	6
Measuring and controlling devices	52	3	45
Food products machinery	50	37	12

Source: Z.J. Acs and D.B. Audretsh, Innovation and Small Firms (Cambridge, Massachusetts, MIT Press, 1990).

products to industrial equipment to components[33/] -- include the following: shorter product life cycles; greater product diversity, variety and complexity; fragmented markets; widespread alternatives; higher-quality products and services; sophisticated customers; and increased use of subcontracting.[34/]

It is clear that the evolving situation, while posing new and major challenges to both existing and potential manufacturing firms, also carries unique opportunities for small firms, as will be explored in more detail later. Numerous highly competent companies -- both global competitors and local firms -- will contest market share around the world. Particularly significant is that survival for local firms will depend on their ability to match the standards of regional, national and international competitors in the key areas of cost, quality, serviceability, innovation and value to the customer.

The above prognosis appears to carry special relevance for industries associated with developed economies or newly industrialized countries whose firms are competing for market share in the evolving global market. While some of the issues may not immediately relate to industries or to the state of industrialization in much of the Arab region, the implications should be all too clear for forward-looking Arab firms and national industries that wish to sustain themselves and maintain competitiveness in an increasingly "free-for-all" environment.

2. The evolving imperative for sustained innovation

A successful business strategy for a firm keen on competing and surviving within the dynamic environment previously outlined must be based on the concept of sustained innovation and continuous adaptive change. For technology-based firms in particular, industrial competitiveness will increasingly depend on a process in which new products and processes are continually introduced, improved and replaced. In this context, it is worth noting that traditional studies of innovation have looked upon innovation as a discrete event -- i.e., the launching of a new product or process, followed by a period of diffusion into the market. This perception is now considered oversimplified, since (original) innovations represent only the first step in a sequence which has been termed "post-innovation improvements".[35/] To compete, then, firms must be able to embark upon a sequence of post-innovation improvements if they are to survive in this environment. This concept is very strongly related to the resoundingly successful Japanese style of industrial competitiveness and innovation which has been characterized as incrementalist.[36/]

3. Small industrial firms and the achievement of competitive advantage

Competitive advantage can be defined as a unique position which a firm develops vis-a-vis its competitors. The outward evidence of competitive advantage is a position of superiority in an industry or market. Competitive advantages may include higher quality, lower costs and prices, better performance, better service, faster delivery, engineering

capacity, a brand image, etc. In pursuing product and/or process innovation, a firm seeks to enhance one or several of such competitive advantages.

Bamberger[37] has studied the factors determining the types of competitive advantage that are developed, particularly within the context of SMEs. He has examined the following from both a descriptive and empirical point of view:

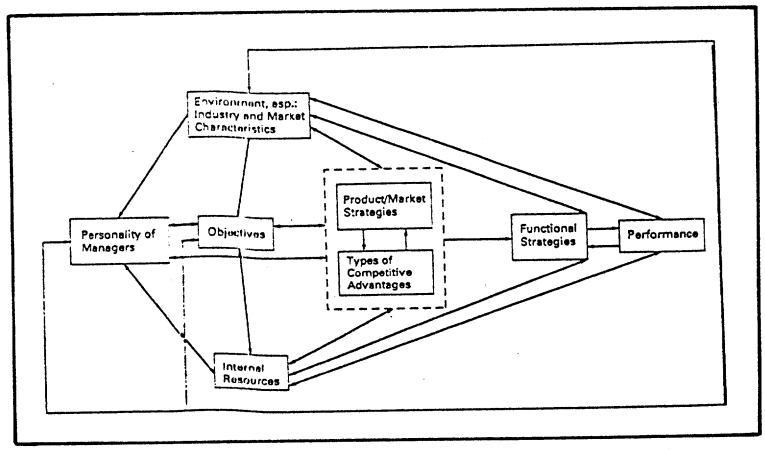
(a) What factors are used by SMEs to achieve a favourable position in their markets;

(b) Specifically, what factors determine the types of competitive advantage which are developed.

Bamberger's analytical framework is presented in figure I. It depicts five sets of variables which determine competitive advantage, namely: the characteristics of the environment and especially those of industries and markets; the internal resources of the firm (distinctive competencies); the objectives pursued; the personalities of the decision makers; and the firm's product/market strategies. It can be observed from the model shown that these five sets of variables, the types of competitive advantage, implementation (through functional strategies), and the firm's performance are all strongly interdependent.

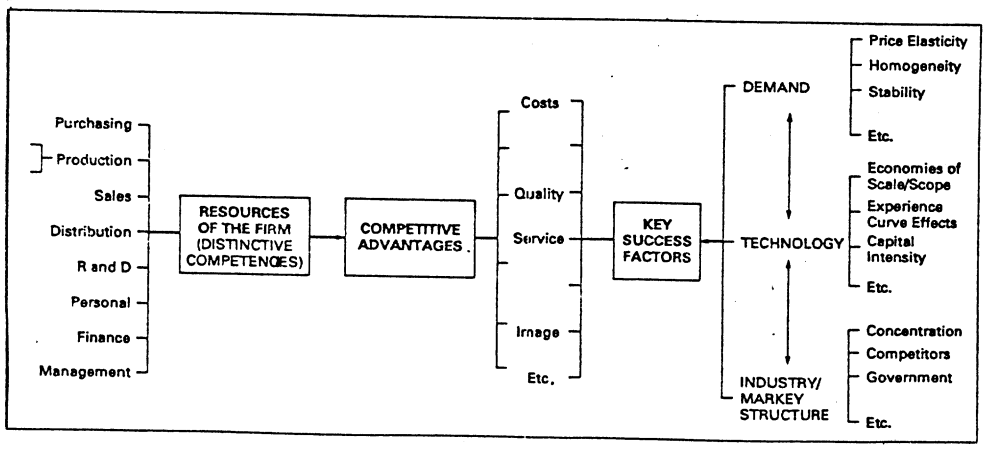
Key success factors, competitive advantages and distinctive competencies should be conceptually distinguished. Key success factors are characteristics/requirements of the market (including its "technology" dimension); competitive advantages are positional advantages in a market that a firm develops by the deployment of certain resources (distinctive competencies). This is depicted in figure II.

Figure I. Framework for analysis describing the relationships between competitive advantages and their (potential) determinants



Source: I. Bamberger, "Developing competitive advantage in small and medium-size firms", Long Range Planning 22, No. 5 (1989).

Figure II. Success factors, competitive advantages and resources



Source: I. Bamberger, "Developing competitive advantage in small and medium-size firms", Long Range Planning, 22, No. 5 (1989).

There is a dynamic relationship between the resources of a firm and the development of its competitive advantages. The available physical resources, know-how and the organizational culture of the firm determine what type of competitive advantage it can or should develop. The strategy of a firm should be based on its strengths; however, t'e achievement of competitive advantage may require the development of specific additional competencies. A firm's resources and competencies may relate to production equipment and facilities, R and D and design laboratories, trained and ex'erienced scientific and technical staff, competent technicians and production workers, available technologies, financial resources, a good knowledge of customers and their specific needs, and good management.

The choices of products and markets and of types of competitive advantage to be pursued are also related. In SMEs, the success of a specialization strategy depends on its coherence with the choice of its "bases of uniqueness". The firm's activities with respect to technology, products, customers and their needs, the region, the definition of the firm's "niche", and the determination of the type of competitive advantage the firm seeks to use in the market are all interdependent.

Since product/marketing strategies are a prime determinant of the product and process innovating strategies pursued by a firm, the issue is further elaborated below. Various studies that address this issue tend to express product/market strategies from one of two basic perspectives.

The first perspective relates to the attribute of the innovation itself, as expressed in the following classification:[23/]

(a) The innovation establishes an entirely new product;

(b) The innovation is the first of its type on the market in a product category already in existence;

(c) The innovation represents a significant improvement in existing technology;

(d) The innovation is a modest improvement designed to update an existing product.

SMEs have successfully competed at the various levels indicated above, with the first level posing the greater and riskier challenge, while at the same time potentially representing the most rewarding endeavour. Furthermore, the first two levels probably imply a "differentiation" strategy, while the latter two may imply a "cost leadership" strategy. It is also evident that each level of innovation would require a different set of firm and distinctive competencies.

Another perspective on product/market strategies emphasizes the marketing-related behaviour of firms. Brockhoff and Chakrabarti[38/] have developed an empirically derived marketing strategy typology related to innovation. This is expressed in the following four marketing-strategy clusters: innovative marketer; market penetrator; market defender; and defensive imitator.

Variations on the above classifications of product/market strategies have included the following categories: leader, challenger, innovator, nicher, follower, sleeper, and diverter.[39/]

From the above classifications of product/market strategies, the two viable broad strategies as envisaged by Porter can be restated as follows:[40/] the first strategy is oriented towards efficiency and low cost (e.g., "cost leader", "defender", "follow-the-leader", and "efficiency"); the second strategy is oriented towards proactive efforts to place the business in a "uniquely perceived" position (e.g., "differentiated", "prospector", "first to market").

To demonstrate the broad range of product/market strategies adopted by small companies, reference is made to the results of a recent study of product development activities in 40 small companies in Finland's metal and electronics industries.[41/] With regard to product life cycle, 62 per cent sought to be the first on the market, with little difference in this regard between the two industries indicated. Small firms were seen to apply this strategy more frequently than larger ones, suggesting they were more aggressive market innovators. In product development, it was observed that small product improvements and completely new products occurred with equal frequency. In the

electronics industry the main emphasis was observed to be on the development of totally new products; in the metal industry small product improvements were slightly more frequent. Overall, this leads to product/market strategies that may exhibit considerable sectoral dependencies.

It is also useful to distinguish between product/market strategies on a macro/national level and those on a micro/firm level. A look at past innovations by Japanese firms reveals that there were only a few cases where they introduced a new and original concept to the market.[42/] Instead, Japanese firms frequently showed a great ability to absorb and then improve the basic concepts already created in foreign countries. Japanese innovations mostly emphasized improving new commodities to meet the requirements of the users in the market, or devising even more efficient production methods. Their ability in these innovations far exceeded that of the firms in the United States and Europe.

The West, in contrast, has historically emphasized science, research, inventiveness and radical innovation. A high-level American committee has recently lamented this state of affairs by observing that it is becoming "increasingly difficult for U.S.-based companies to derive sustained competitive advantages from superior research capabilities alone". The committee's report recommended that higher priority be placed on helping such firms adopt and adapt technology more effectively, regardless of its origin. The report further asserted that much of American industry remained unreceptive to, ignorant of, or incapable of exploiting foreign technical advances and foreign engineering and management practices. The committee called for a more concerted effort at all levels to stimulate the myriad processes of adapting technology to new uses.[43/]

The Korean experience represents a more recent macro/national manifestation of the potency of a product/market strategy based on imitation/adaptation.[44/] A strategy of "imitation for creation" has been promoted as being very effective for those developing countries seeking to implement a "late industrializing" policy. Such a "winning" strategy has been viewed as a process of learning to cultivate technological capability and to save time, effort and capital.

The conceptual framework of figure I was the basis for an empirical study of the approaches used by SMEs to achieve competitive advantage in their markets. The study was carried out as part of the international STRATOS (Strategic Orientations of SMEs) research project.[37/] The sample consisted of 1,135 firms from three industries -- clothing, food and electronics. The empirical data reflected the relative importance the firms attached to 26 factors of competitiveness, which were grouped into six categories: (a) competence and image; (b) marketing capabilities; (c) technological competencies and service; (d) financial capabilities; (e) creativity and product differentiation; and (f) low cost and pricing policy.

Following are some of the important findings of the study:

(a) Product quality was considered by far the most important factor for achieving competitive advantage in the market;

(b) Differentiation can be achieved in several ways -- particularly through marketing capabilities, technological competence, creativity and product differentiation, or any combination of these;

(c) Subcontractors try to achieve competitive advantage more by the development of technological competence and service than by the development of marketing capabilities, creativity, product differentiation, or purchasing (compared with firms which do not subcontract).

A deeper analysis of the data also reveals considerable differences within each of the industries (e.g., firms acting or not acting as subcontractors, or firms producing industrial or consumer goods). Defining the specific sector of industry thus only serves to provide a rough indicator of the firms' competitive conditions. The study therefore proceeds to examine the kind of relationships that exist (regardless of industrial sector) among, for example, the characteristics of demand, market structure or technology, and the competitive advantage developed by the firm.

D. Product and process innovation in small firms and associated technical activities and sources of technological knowledge

This section specifically addresses and highlights key issues related to product and process innovation in small firms. Many of these issues relate to larger firms as well. A conceptual view is first presented, followed by an investigation of the propensity in SMEs for product and/or process innovation, and the underlying considerations. Sources of technological knowledge used in the innovation process and the impact of firm size and sectoral variations are then examined.

1. A conceptual view of products, processes and associated innovation activities

Researchers in science policy and innovation have focused on products and processes as important indicators of innovation and technical output.[45/] Other indicators include patents and publications.

There is a clear conceptual distinction between the activities associated with the creation of an object (i.e., the process) and the value embodied in the nature of the object itself (i.e., the product). Furthermore, process R and D (and design) may also be distinguished from product R and D (and design), with the former relating to an orientation towards decreasing costs and the latter primarily viewed as oriented towards increasing sales. While this may be an oversimplification, the two types of activities are usually easy to distinguish and the characterization remains generally valid.[40/] The term "process R and

D" is intended to refer to those in-house activities which explore, test, or engineer changes in the processes by which products are made. This typically, but not always, is undertaken with the aim of reducing the per-unit cost. Product R and D is intended to refer to similar activities which result in changes in the product itself, often for the purpose of achieving differentiation or enhancement of features (and possibly also to reduce cost).

Product R and D and process R and D are often key elements of product and process innovation. However, "innovation" and "R and D" are not synonymous terms. Innovation generally covers a broader spectrum of activities (including design), as was pointed out in previous sections. While invention and research activities have been and are being performed in SMEs, technical entrepreneurs are especially biased in favour of their prior orientation towards developmental activities, since development work, not research, is the much more fertile bed for immediately applicable advanced technology which can potentially become the basis for a new company. Only in the rare circumstance of a major breakthrough such as the transistor does research become the immediate basis for a product-oriented firm. Development, in contrast, takes research results and new technical knowledge and advances them towards and into application and use. Indeed, the recent formation of numerous new firms in the biotechnology and genetic-engineering field reinforces the evidence for this developmental tendency in a rather unique manner.[46/]

It is also worth noting in this connection that several levels of technological development are required before inventions or new ideas are transformed into actual commodities. In many cases development can create more profits for a company than invention. Furthermore, in many cases proprietary profit brought about by technological development will become higher in the marketing stage of the innovation process. The economic value of technological development is frequently higher than that of creative ideas.[42/] Furthermore, as the Japanese experience has demonstrated, it is more efficient for firms to import and learn an existing technology than to develop their own technology, as long as they have the capability to absorb and make full use of the technological knowledge.

2. The propensity for product and process innovation in SMEs

Studies on the innovation activities of SMEs generally confirm a stronger propensity towards product innovation than process innovation. This is clearly reflected, for example, in the empirical studies of SMEs in the European Community[47/] and in Finland.[41/] Reasons for such an orientation in SMEs include the following:

(a) Product innovation in several industries is knowledge- and skill-intensive rather than capital/equipment-intensive. This is particularly evident in electronics, mechanical/machinery, electromechanical and mechatronic, and scientific products development;

(b) As previously indicated, smaller firms are more likely to prosper in industries where the evolution of knowledge emanates from skilled labour and high levels of human capital;[23/]

(c) Product innovation has a strongly pronounced, externally focused market orientation which, coupled with the increasingly rapid product-development cycle in today's industrial/market paradigm, offers lucrative opportunities for entrepreneurs and SMEs possessing ideas, flair and a sensitivity to what customers might and do want;

(d) Entrepreneurs and SMEs are more likely to be drawn to an innovation strategy based on differentiation rather than one based on cost-leadership.

The issues are, however, more complex than the points above imply. SMEs involved in subcontract manufacturing, for example, would tend to adopt a process-oriented innovation strategy since they are basically involved in a service activity rather than in product innovation per se. Process-oriented innovation by such firms would be carried out to improve their ability to provide their customers with lower cost, better quality, and improved service.

Archibugi and others, in their study of innovative activities in Italian industry,[5/] obtained interesting empirical results on the propensity towards product or process innovation in relation to company size as well as among different industrial sectors. The evidence indicates that intersectoral differences are more important than size differences in explaining the balance between product and process innovation; the same result had been obtained by Pavitt and others.[48/] The machinery/mechanical, computer and office equipment, electrical/ electronics and scientific instruments industries all have an above-average propensity towards product innovation. Traditional industries, on the other hand, have a higher propensity towards process innovation.

The study also provides insight into the cross-industrial propensity towards introducing new (versus improved) products and processes. Both intersectoral and size variations appear to be equally significant. The study of the innovation process in small companies in Finland,[41/] referred to earlier, also confirmed the existence of sectoral variations.

3. Sources of technological knowledge used in the innovation process and the impact of firm size and sectoral variations

A central aspect of product and process innovation relates to the sources of knowledge used in the innovation process. Firms and business units acquire technological knowledge either through their internal activities or through various channels outside the company itself. According to Archibugi and others:[5/]

(a) The following factors are defined as internal sources of technological knowledge:

(i) Research and development;

(ii) Design and tooling up;

(iii) Patents held;

(b) The following are defined as external sources:

(i) Technological-scientific information obtained from professional organizations, technical centres, clients, trade fairs and exhibitions;

(ii) Patents and know-how acquired externally;

(iii) Acquisition of intermediate and capital goods.

The results for the Italian manufacturing industry as a whole show a preponderance of external (62.6 per cent) over internal sources of technical knowledge for the firm. The ratio between the two sources varies in specific industries, however. Some sectors show an above-average ratio for internal sources -- particularly those representing the highest proportion of innovating or "highly" innovating business units. The coefficient of variation was more significant across industrial sectors than across size categories. In all the traditional industries external sources appeared much more important.

Among internal sources it is interesting to compare R and D and "design and tooling up". It is not easy to make a hard and fast distinction between the two. However, the former could be taken as an indicator of business-unit functions specifically aimed at innovation and reflecting the procedures and content of scientific research. The latter may be understood to refer to stages complementary to R and D in innovative processes, and to sources of know-how different from R and D (in the field of design, for example).

The following important observations relating to internal sources of knowledge have emerged from the Italian industry study:

(a) The importance of both R and D and design/tooling up increases with business unit size, especially in the case of R and D;

(b) Among sectors, design and tooling up is particularly relevant -- compared with R and D -- to machinery, automobile components, and other transport equipment;

(c) R and D plays a dominant role in industries where knowledge of transformational processes and of the materials employed is important (e.g., pharmaceuticals and chemicals);

(d) R and D is also important in the aircraft industry, in which design and tooling up also play a relevant role;

(e) In the automobile and computer industries, both R and D and design/tooling up are equally relevant;

(f) R and D and design/tooling up are also relevant in the scientific instruments and the electrical/electronics industries.

The following important observations relating to external sources of knowledge have emerged from the same study:

(a) There is a clear relationship between the size of the business units and the importance of the various channels;

(b) Acquisition of patents and know-how plays a more significant role in the larger business units;

(c) Capital goods appear to be the major vehicle for the smaller business units;

(d) The acquisition of patents and know-how plays a significant role in those sectors where innovations relate to patents applied for, as in the pharmaceutical, computer, and aircraft sectors;

(e) The importance of the acquisition of intermediate products and capital goods is rather evenly distributed among sectors;

(f) However, when compared with the internal sources of technological knowledge, this channel appears particularly relevant for sectors such as food/beverages, textiles, paper and printing.

Table 4 is an illuminating classification of industrial sectors into a few groups, with the various entries reflecting the following for each group: technological intensity, propensity for product innovation, average size of innovating business unit, degree of concentration, propensity for using internal science and technology (S and T) knowledge, prominent internal source of S and T knowledge, and prominent source of external S and T knowledge.

It is to be noted that this table is a reflection of Italian industry, and caution should be exercised in drawing general conclusions about these industries globally. Furthermore, the classification of computers and office equipment and electrical/electronics under the category of "mass-production assemblers" along with automobiles and engines masks the fact that important segments of the electronics/computer/office equipment industries consist of highly innovative SMEs which would not be classified as "mass-production assemblers".

Table 4. Industrial organization and technological knowledge: a taxonomy

	Percentage of highly innovating business units	Propensity to introduce product innovation	Average size of innovating business unit (number of employees)	Lorenz concentration index	Propensity to use internal S and T knowledge a/	Prominent internal source of S and T knowledge	Prominent external source of S and T knowledge
Producers of traditional consumer goods							
Food/beverages Textiles, clothing and footwear Wood products and furniture Paper and printing Other manufacturing industries	Low 14.2	Low 0.91	Small 95	Low 0.38	Very low 0.76	Design and tooling up	Captial goods
Suppliers of traditional intermediate goods							
Non-metallic mineral processing Metal products Metallurgical	Low 16.8	Low 0.91	Small (large b/) 84 (587 b/)	Low (high b/) 0.36 (0.82 b/)	Low 0.95	Design and tooling up	Capital goods
Specialized suppliers of intermediate goods and equipment							
Plastic and rubber Machinery/mechanical Automobile components Scientific instrument	High 32.7	High 1.09	Medium 132	Medium 0.52	High 1.22	Design and tooling up R and D	S and T information External patents and know-how
Mass-production assemblers							
Computers and office equipment Automobiles and engines Other transport equipment Electrical/electronics	Very high 48.6	High 1.11	Large 3901	High 0.74	Very high 1.34	R and D Design and tooling up	External patents and know-how
R-and-D based							
Chemicals, petro-chemicals, synthetic fibres Pharmaceuticals Aircraft	Very high 45.9	High 1.07	Medium-large 704	Medium-high 0.63	Very high 1.31	R and D	External patents and know-how
Total	20.3	1.00	141	0.59	1.00		

Source: A. Archibugi, S. Cesaratto and G. Sirilli, "Sources of innovative activities and industrial organization in Italy", Research Policy 20 (1991), pp. 299-313.

a/ "S and T" refers to science and technology.

b/ Metallurgical only.

It is apparent from the above that research, development and design are key concepts in the overall product- and process-innovation chain. It is not uncommon to find all three activities being practised in large firms within formal R and D and design structures. While many small firms also perform R and D, this is often carried out within diffuse, loose structures. This point was clearly emphasized earlier in the context of the Italian manufacturing industry as a whole. Design, on the other hand, is a concept generally more akin to the specific activities associated with product and process innovation in small firms. The specific output of the design process, reflected in the final product and process configuration, largely accounts for the innovation edge (from a technical viewpoint) that such firms achieve. It is to be noted that the term "development" is sometimes applied interchangeably with "design".

The following three sections will cover (in greater depth) issues related to R and D, product design, and process innovation in small firms.

E. The effectiveness and productivity of research and development in small firms

In addressing the issue of R and D in small firms, one major question relates to the effectiveness and productivity of small R and D organizations. Are small R and D organizations able to bring new products to the market faster and at less cost? Are the designs more responsive to the desires and preferences of customers? As a corollary, should large companies divide their R and D functions into small groups (or new-venture teams or product-development teams) to improve the efficiency of their efforts to develop new products? These are the major questions raised by a recent study,[49/] and its major findings are presented in what follows.

The assertion that small R and D organizations are more efficient is not new. Based upon 25 interviews with R and D managers in both large and small companies, the consensus was that a large company typically spends from three to ten times as much as a small one to develop a particular product.[50/]

In tracing the origin of 61 major twentieth century inventions, it was found that 12 (i.e., 20 per cent) could be attributed to the laboratories of large corporations, whereas 36 (59 per cent) came from independent inventors.[51/] Similar results were obtained for 27 major post-World War II inventions. More recently, a study of 2,617 innovations introduced in the United States in 1982 by manufacturing companies in 35 industries known for innovation (e.g., computers, pharmaceuticals, and medical equipment) found that small firms (less than 500 employees) had an innovation-per-employee ratio which is 6.64 times that of large firms.

On the basis of various research related to the subject, the following factors appear to support the hypothesis that R and D in small firms is more efficient: higher technical competence; greater concern with costs; better communication and coordination; smaller interpersonal distances; closer coupling with the market; less dependence on formal market

research; a more opportunistic attitude and a greater response to change; less rigid planning; freedom from bureaucratic interference; and incentives for good performance.

F. The new product design perspective and its implications for SMEs

In recent years, growing emphasis has beef (and continues to be) placed on design as a key strategy for innovation in many industries. It is also being increasingly emphasized by Governments keen on promoting competitiveness for their industries in the global marketplace. This new focus derives from several considerations which are rooted in the design concept itself, in recent technological developments that have enhanced the effectiveness of the design process, and in the demands of the new industrial/market paradigm.

The impact of design activity on industrial innovation was particularly evident in the extensive study relating to industrial innovation in Italy (mentioned in previous sections).

1. Design and the design process: the imperatives for a new management approach

Design is a term that is often misunderstood because it covers the conception and specifications of all objects. One important aspect to consider is that, regardless of the object, the design decisions that are made determine the configuration of the elements, materials and components that give the object its attributes of function, shape, method of manufacture, etc.[52/] Design, therefore, affects not only non-price factors such as product performance, reliability, and appearance; it also affects price factors through its influence on the production process and how easy a product is to manufacture, on the choice of components, parts and materials, and on the life-cycle costs of the product to the user.

The new design perspective is thus related to a global concept of the design process. This concept encompasses the entire spectrum of design activities beginning with the conceptual design all the way up to the fully engineered design, i.e., the design that is ready for production. While a prototype design normally seeks to demonstrate a product's functional capabilities, a fully engineered design is one which incorporates all the design objectives and attributes of the product, including operability, manufacturability, reliability, quality, testability and maintainability, as well as cost and required physical configuration and characteristics.[53/]

In general, the effort expended in reaching a prototype is roughly equivalent -- in both cost and time -- to the remaining effort needed to achieve a fully engineered design, i.e., the final product configuration.[54/] It is also worth noting that since many products today are computer-based, product design often involves both hardware and software design.

Some recent studies have revealed that typically 80 per cent of product costs are determined by the end of the design phase, while less than 10 per cent of costs are actually

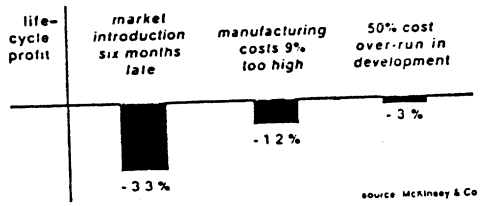
expended during it. Logic thus dictates that it must be considerably easier and much more efficient to optimize the design than to find costly solutions later in manufacturing.[55/]

In fact, several recent studies have shown that a crucial factor in a company's competitiveness and business success is how well its products are designed.[56/-57/]

The new market paradigm, which entails short product life cycles as well as short product development/design/production cycles, has added a new dimension to the impact of design on competitiveness and life-cycle profit. Companies make great efforts to measure manufacturing costs and scrutinize development/design costs, yet both of these have only limited effects on life-cycle profits. The relative impact on life-cycle profit of a delay in market introduction, relative to the impact of manufacturing or development/design cost overruns, is typically as shown in figure III.[55/]

Reaching the market early is a key strategy for new-product innovators, since ip allows the charging of premium prices for a lojger period -- before the competition catches up and squeezes the profit margins. Management of time has thus become the new imperative for competition, particularly for high-tech, short-life-cycle products. Under such circumstances the effectiveness and efficiency of the design process/cycle becomes extremely important, and time enters as a significant "design parameter". Several recent studies address this issue of time-based competition and its implications.[58/-61/]

Figure III. Managing product development



Source: J. Bentley, "Integrating design and manufacturing strategies for business transformation", International Journal of Technology Management, special issue on manufacturing strategy (1991).

In recent years, the product-development/design cycle has been greatly enhanced and speeded up through the use of so-called design automation tools such as computer-aided design (CAD) and computer-aided engineering (CAE). The growing proliferation in recent years of such tools and their adoption by design engineers and design departments can be directly linked to the market reduction in the cost of such tools coupled with the increased flexibility and performance capabilities they offer.

While the development/design cycle has a clear impact on time-to-market, the transition phase to production and the production cycle itself are also significant contributing factors to the total time-to-market. New management/organizational techniques associated with the development/design process itself (including the transition to production) are contributing significantly to overall firm productivity and efficiency in developing

products and transferring the designs to production. The new management/organizational techniques have been variously referred to as concurrent or simultaneous engineering,[53/, 62/, 63/] and are based on the concept of project/product teams consisting of specialists from the various functional departments (including production), working jointly and in unison to carry the project through in the most effective, efficient and rapid manner. This is a marked departure from long-standing development/design processes that were based on activities carried out in sequence by weakly coupled and disjointed functional departments.

It is important to note that these new management/organizational approaches have been made possible by technological tools such as CAD/CAM (computer-aided manufacturing) which allow the storage, manipulation, communication, and display of product design and production data in a timely manner for the team members to act upon individually or synergistically. CAD/CAM tools relate to and extend into the broader-concept technologies and tools of so-called advanced manufacturing technology (AMT), which will be discussed in the next section. The adoption of AMT is generally associated with process/production innovation and therefore has an impact on the production cycle, including "time-in-production". Judicious adoption of AMT is thus expected to contribute as well to an overall reduction in product "time-to-market".

It is apparent from the previous discussion that AMT carries implications for the development cycle as well. In fact, such computer-based tools as CAD, CAM, and CAE, as well as many other elements of AMT, may be viewed as bridging tools that consolidate the natural link and interface between design and production which traditional industrial organization and practice have long kept separate.

2. Product development and innovation strategies and the new market dynamics

As part of the new imperative to become more effective and efficient in project management in general, and in the development/design process in particular, businesses which use product innovation successfully as a competitive weapon must approach development work in a far more comprehensive manner. In fact, the new market dynamics generally impose on businesses the need to adopt a two-pronged managerial approach to product development -- one related to new-product development and another to old-product development. In a study of 40 American and British firms, it was observed that leading product innovators engaged in old-product development as well as in new-product development in order to achieve a balanced programme of rejuvenation. Furthermore, they managed the development of their old products differently from the way they managed new-product development.[64/] The introduction of new products is now thought to require revolutionary changes in the way companies handle the execution of new-product development -- specifically, these changes should involve everyone from the top down.[61/]

While the above approach may not be viable for many SMEs whose product-development scope may be much narrower, it does illustrate that the design output in most organizations simply must increase, and that they must accordingly emphasize design-driven strategies. While SMEs in developed economies have successfully competed in new-

product development or old-product development, or have adopted a combined product strategy as outlined above, the significance of old-product development (or product updating) requires further emphasis. In fact, product updating is currently the dominant product-development strategy at present, as demonstrated so convincingly by the Japanese. Most products sold today were here in slightly inferior form last year, and most competition is between variations of the same product.[36/]

The above approach is very much market-oriented. The Japanese, who are highly responsive to markets in a pragmatic way, have successfully used the incremental approach to technology, to product innovation and to design in order to respond to shifts in customers' reactions. The Japanese, in general, have not developed or designed the first wave of products based on frontier technology, any more than they have pioneered the technology itself.

3. Implications for SMEs

The above (and related) developments and modes of competitive behaviour should be carefully scrutinized by SMEs. Following are some of the major implications which are particularly relevant to them:

(a) Design-driven strategies based on the dominant concept of incremental product development do not necessarily require significant investments in capital/equipment or in the (costly) acquisition or local development of significantly new technologies;

(b) Design-driven strategies essentially depend on skilled design and engineering manpower, i.e., those who are knowledge/experience-intensive rather than capital/equipment-intensive;

(c) The effectiveness and efficiency of the design process has been greatly enhanced by the availability of low-cost aids for computer-based design;

(d) There is a proliferation of subcontractor production services; these could minimize the cost and overhead associated with the setting up of in-house production facilities;

(e) Both the managerial and the organizational styles (technical, commercial, and administrative) required for fast-innovation-based competition are well in tune with the behavioural patterns and characteristics of entrepreneurs and SMEs. Such organic styles stand in sharp contrast to the more mechanistic styles of larger firms;

(f) Rapid product innovation is also customer-driven, and SMEs appear better placed for interaction with customers and for sensitivity to their needs and requirements;

(g) Cost-effective design is increasingly evolving into a "configurational" design approach. This is particularly evident in the electronics and computer fields, but is becoming rapidly and increasingly apparent in other industries as well. Because of the significance and implications of this approach, it is further elaborated in what follows.

4. The configurational approach to product design: new opportunities for SMEs

Such an approach emphasizes product design which is largely based on purchased-off-the-shelf subsystems or modules. The design skills required are essentially integrative and system-based. The basic premise underlying this approach is that there is no intrinsic value, for example, in designing or manufacturing a car clutch system or, for that matter, a car engine, if the company in question is in the business of making and selling cars.

It is such reasoning that prompts even major companies like Sun Microsystems, the leading workstation company, to use any off-the-shelf technology to enhance the performance of its workstations[58/] or to reach the market sooner. One potential disadvantage of extensive use of off-the-shelf items is the resultant vulnerability to cloning. It has been noted, however, that copying something that moves faster than you can copy is not a good business to be in.[65/] Japanese engineers are past masters at browsing through catalogues for the right bits and pieces, and then melding them into market-winners. Ingenious mixing and matching of catalogue components can lead to products offering 90 per cent of the performance of the most carefully hand-tooled versions, but at 50 per cent of the cost.[66/]

It is apparent from the above that the evolving design trend, based on a building-block approach and emphasizing out-sourcing, offers interesting opportunities for SMEs. Furthermore, there are no fundamental incompatibilities between the technical requirements, capabilities and skills such an approach demands and what can reasonably be afforded or provided by SMEs.

5. Developing product design capabilities in SMEs: potential difficulties and sources of support

To successfully compete in product design, SMEs need to acquire, develop and master a broad range of skills and capabilities of both a technical and non-technical nature. Many of these are common to large and small firms alike, although the emphasis may be different. Furthermore, some of these skills and capabilities require special consideration in small firms, since they are not as readily available or accessible to them. A (not too recent) study of product design in small firms has addressed several SME-related issues, including the following:[67/]

(a) Possible shortages of personnel experienced in conducting project appraisal;

(b) Shortages of resources and specialist skills and the lack of access to sufficiently developed technology. (The latter is probably overstated, since technology is now widely available and/or embodied in components, materials and modules, as previously indicated);

(c) The difficulty of managing design projects, since effective management requires getting involved in a wider field than indicated by the problem as originally stated;

(d) Most difficulties arise through managerial rather than technical problems (for both large and small firms);

(e) SMEs tend to be overly optimistic in tackling new products;

(f) SMEs often feel the need of a "broker" for technical information; this indicates weaknesses in both the managerial and technical resources available;

(g) Technical aspects of product design may be especially troublesome for small firms, with the interface between design and production (in-house or subcontracted) as an example.

Table 5 represents an attempt to list some of the ways in which small firms can acquire extra skills, together with the possible limitations in each case. The ultimate limitation will always depend on the energy and determination of top management since, as table 5 indicates, most skills can be obtained from a variety of sources.[67/]

A good example of a government initiative which aims to promote management awareness of the importance of design and to support design investment in industry is the United Kingdom Department of Trade and Industry (DTI)/Design Council's "Funded Consultancy Scheme/Support for Design" (FCS/SFD), recently replaced by the DTI's "Design Initiative".[52/] The initiative was specifically developed for SMEs, whose managers had often expressed uncertainty regarding the value of investing in professional design expertise.

G. Process innovation in SMEs: the implications and impact of advanced manufacturing technologies

The extent and patterns of process innovation undertaken by a firm are strongly linked to its strategic orientations and the associated requirements for competition in the targeted markets. A firm seeking to compete in price in high-volume, standard-product commodity markets would seriously consider major investments in highly automated and dedicated production equipment. On the other hand, a small firm whose value added is based on product differentiation and the introduction of a rapid succession of new or modified products in low volume (the fast innovator) is less concerned about increasing efficiency and reducing production costs. As indicated earlier, time-to-market is a much more important strategic concern for firms which seek process innovation that results in flexibility, rapid response and short set-up time of the production system, rather than that which results in a stable, high-throughput production rate. In such a case, process flexibility allows for product-design flexibility, rapid product updating, and short batch runs. Here, "economy of scope" in the production function displaces the classical production concept of "economy of scale" as the dominant issue.[68/]

Table 5. Sources of extra skills available to small firms designing new products, as well as possible limitations

Examples of skills required	Possible sources of extra skills (with limitations in parentheses)
Finance	
Fund raising Project evaluation Financial management	Consultants (cost, availability, selection). Financial institutions (willingness to help, ability to understand problems). Small-firm advisory services (limited resources). Funding bodies such as NRDC, ICFC (may not be interested in small projects, may be unwilling to bear risk).
Marketing	
Market research Data analysis	Consultants (cost, availability, selection). Agencies (cost, availability). Business schools (speed of response, availability of staff/students).
Design	
Specialized technical design Drafting/testing General design Legal aspects	Consultants (cost, availability, selection). Temporary/casual employees (cost, quality, availability, control). Research/trade associations (membership requirements, fees, confidentiality). Universities/colleges, etc. (availability, coincidence of interest). Design Council and similar bodies (membership requirements, appropriateness of skills).
Production	
Production engineering Project management	Subcontractors (control, quality, cost). Consultants (cost, availability, selection). Joint venture with other firm(s) (suitability, compromises involved, confidentiality, interpersonal relations).

Source: M. Oakley, "Case study: alpha vending-product design in small firms", Managing Product Design, M. Oakley, ed. (London, Weidenfeld and Nicolson, 1984.

1. Trends in automated manufacturing and the emerging industry/market paradigm

Over the past two decades, computer-based technologies have progressively introduced an expanding range of automated production machinery and related concepts, as well as organizational modes of integrated and highly automated factories and production systems. These have progressed from computer numerical control (CNC) machines to machine centres to flexible manufacturing systems (including robotics), and finally to fully computer-integrated factories. Before the 1980s automation-oriented process innovations were largely intended to increase the efficiency of the mass-production systems dominant at the time.

However, the new market trends which began emerging in the 1980s (described earlier) started disrupting the mass-production strategies typical of the past, as well as the manufacturing choices that supported both mass-market approaches and the logic of economy of scale.

Subsequent process innovations employed to promote manufacturing-industry competitiveness in the 1980s and 1990s progressively reflected the new emphasis on flexibility, economy of scope and reconfigurability. This is epitomized by the current comprehensive and sophisticated production concept of computer-integrated manufacturing (CIM). The newer system produces highly customized products in a continuous flow using standard -- but flexible and intelligent -- production technology. However, this image of CIM masks some very significant realities; above all, the diffusion of the technology is nowhere near the level expected a decade ago.[33/] Although most firms have made some investment in the technology, only a few have made very significant commitments. It should be noted, however, that there have been reports of some major fiascos suffered by companies that have sought to implement CIM.

Many important reasons have been identified as possible causes for failure, or at least the achievement of only partial benefits. Some are of a technical nature, given the technical complexities; there are, however, other significant issues. Creating and benefiting from the new technology will necessitate new business strategies, different forms of organization, and revised administrative policies.

It can be inferred from the previous discussion that CIM, as a full-capability concept, has so far found application with major large firms only. The investments and technical complexities involved, as well as the other major institutional challenges it poses, are too daunting for SMEs to even consider. However, SMEs -- as well as other larger firms in general -- should maintain a constant evolutionary search for ways to use elements from the entire range of advanced manufacturing technologies (CNC, flexible manufacturing systems [FMS], CAD, CAD/CAM, computer database systems, etc.) to ensure maximum flexibility, the best integration of design and manufacture, and the best incorporation of market information into design and development trajectories.[68/]

2. The implications and potential of AMT adoption by small firms

In what follows, a closer investigation will be made of the implications of and potential for the adoption of advanced manufacturing technology (AMT) by SMEs.

Meredith[69] has argued that small firms are just as well or better equipped to implement and benefit from high-technology manufacturing programmes and advances. Table 6 lists and describes the new manufacturing technologies which in general offer many of the same benefits to both large and small firms. SMEs, in particular, might seek to capitalize on such benefits as flexibility, quality, and lead-time reductions. Clearly, the actual benefits and risks of any one of these technologies depend on the situation in which it is used, how it is employed, its fit with existing processes, and so on.

The implications of the adoption of AMT by small firms competing on the basis of a product innovation strategy are noted in figure IV, which displays the old-product life cycle along with the far more rapid new-product life cycle. Traditionally, large firms have pursued a "follower" strategy by pursuing the market aggressively as the product enters the "maturity" stage. AMT has resulted in much more rapid development and production cycles; this drastic shortening of product life cycles potentially gives start-up firms a strategic advantage over larger firms. This is based on the small firm's ability to quickly replace a product with a new product or variation, thus depriving larger firms of market advantages achieved in the growth phase through economies of scale.

One example of a small firm that can use AMT to more effectively compete in the market-place is that of the small job shop. Such firms can capitalize on the flexibility of AMT and on the opportunities it provides to reduce labour, space, inventory, and other costs. Furthermore, because the computer uses these new technologies to track the jobs, better managerial control is achieved, and the complexity and confusion that has long been rampant in job shops is largely eliminated, allowing the small firm to better compete on the basis of customization and variety, cost, lead time, quality, and the provision of better service to its customers.

Empirical evidence of selective usage of AMT by small firms has been provided by Acs and Audretsch in their study of small firms and innovation.[23] The study particularly noted the shift in the metal-working industries towards smaller firms; this is partly explained by their implementation of certain flexible technologies such as numerical control (NC) machine tools and programmable robots. These and other developments associated with AMT have allowed the cost of the small-volume production of complex parts to be reduced much more than that of the large-volume production of standard products. This constitutes an enormous advantage for small-batch production. However, the issue has remained controversial, and counter-arguments have suggested that the new technology may help larger firms more than their smaller counterparts.

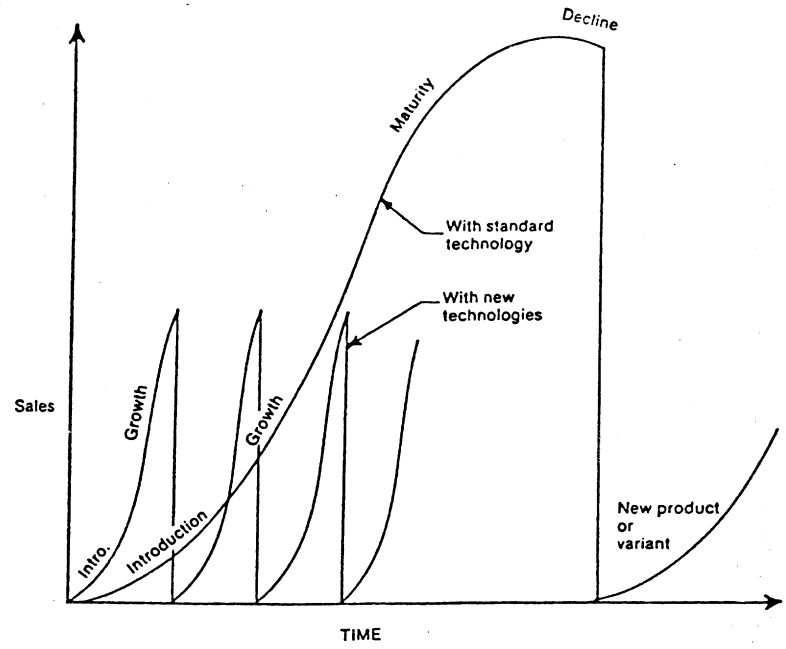
Table 6. New manufacturing technologies

Technology	Acronym	Description
Numerical control	NC	A tap-driven machine tool
Direct numerical control	DNC	Multiple machine tools controlled by a central computer
Computer numerical control	CNC	A machine tool controlled by a dedicated computer
Robot	—	A flexible, reprogrammable manipulator
Group technology	GT	Cellular production of part-families
Computer-aided design	CAD	Computerized software for product design
Computer-aided engineering	CAE	Computerized software for engineering analysis
Computer-aided process planning	CAPP	Computerized software for manufacturing routings, operations, etc.
Computer-aided manufacturing	CAM	Computerized software for the control of manufacturing machinery
Automated storage/retrieval systems	AS/RS	Computerized warehousing and materials handling
Flexible manufacturing systems	FMS	Large cells of computerized machine tools and conveyors
Manufacturing resource planning	MRP II	Interconnected computer software systems for manufacturing planning and control

Source: J. Meredith, "The strategic advantages of new manufacturing technologies for small firms", Strategic Management Journal, 8 (1987), pp. 249-258.

Note: "__" signifies that the item is not applicable.

Figure IV. The reduction in product life cycle due to new technology



Source: J. Meredith, "The strategic advantages of new manufacturing technologies for small firms", Strategic Management Journal, 8 (1987), pp. 249-258.

3. Problems, barriers and pitfalls associated with AMT adoption in small firms

Schroeder and others[70/] expressed a more critical view of the actual impact of AMT adoption by small firms. It was found that while AMT offered many compelling advantages, it could also involve firms in unforeseen and potentially debilitating problems; the study identified several of the latter that could create significant barriers for small manufacturers. These include the following:

(a) The initial price tag is generally higher;

(b) The time required to resolve technical problems is generally greater;

(c) AMT demands more training for effective use of the technology;

(d) AMT requires workers to be more technically literate; analytical skills replace motor skills in importance.

The results of the study suggested that adoption of AMT was not a simple answer to the problems facing small manufacturers. Overall, it was found that adopting new technologies was a necessary and regular part of doing business if a small manufacturer was to stay competitive. As with every aspect of business, however, adopting new technology requires effective management. Managers must know when it is important to adopt AMT, how to implement it effectively, and where to use it to create a competitive advantage.

The following elements were identified as being critical to successfully managing AMT adoption:

(a) Understand the technology;

(b) Understand market needs;

(c) Prepare internally and plan the implementation;

(d) Learn from adoption.

4. Productivity problems and their impact on AMT adoption by small firms

The relationship between productivity problems and technology adoption in small manufacturing firms was recently explored in a study which suggested that decisions by smald firms to adopt new manufacturing technologies were based more on short-term strategic plans.[71] Technology adoption in smaller firms is often justified on the basis of trying to solve productivity problems. Productivity in this context is not to be viewed merely as the lowering of production costs; increasingly, it has come to mean improvements in product and service quality, flexibility and dependability. This broader definition may apply particularly to smaller firms, since they have traditionally placed more emphasis on achieving economics of scope as opposed to economies of scale.

Causes of productivity problems were grouped into five categories: human resources, machinery and installations, materials, products and management. A study was conducted to assess the causes of productivity problems encountered by 100 small manufacturing companies and their corresponding technology strategies. Four industrial sectors were represented: garments, metal products, electrical and electronic products, and transportation products. The factors which represent the greatest differentiation between process innovators and other firms were identified in descending order of importance: capacity management, process design, availability of qualified employees, flexibility and timeliness, quality, and labour relations.

Other issues relating to competitive strategies, technological experience and AMT-adoption decisions in small firms have been addressed in several recent studies.[72], [73] These have included investigations of the reasons or factors which lead certain companies (innovators) to adopt new process technologies, followed by comparative studies of the relative importance of these various factors to firms at different levels of technological advancement.

5. Process innovation: interaction between technology and organization

Many recent studies have argued that technology and organizational structure are mutually deterministic. Technical systems interact with organizations at many levels and in many domains. Technology provides opportunities for organizational structuring that can be carried out in very different ways, depending on the social system that is serving as a context for the new technical system.

Recent studies sponsored by the European Community have suggested that one can design the best hardware, have the best equipment and develop the best software in the world, and yet still be faced with low efficiency, small productivity increases, or major technical failures. What the economy and the firm need is more and better human and organizational innovation, as well as integration among the technical, human and organizational elements.[25] This approach brings human resources back to centre stage by emphasizing "anthropocentric" (or human-centred) systems. Applied to manufacturing, this approach implies the design and implementation of the concept of CHIM (H for "human") rather than CIM. Management in the manufacturing industry must thus cast off the hardware-centric view it often takes towards automation. Indeed, successful practitioners say flexible manufacturing has more to do with good design practices, good information systems, and good employees than with brainy robots or super-fast assembly equipment. People who invest in equipment for flexibility and expect the purchase alone to solve their problems will be disappointed every time.[74]

The benefits from a new technical system, then, depend in large part upon an organization's capacity to change. The potential for the greatest benefits from new technical systems thus derives from a combination of organizational and technical change or innovation. Furthermore, the larger the technological investment, the larger the organizational investment required.[75, 76]

The organizational impact of new technologies can be far-reaching. The new factory will be marked by an entirely different set of desirable operating characteristics: decentralization, variety, flexible operation, responsiveness to innovation, production tied to demand, and closely coupled systems. These represent sharp changes for both practitioners of manufacturing engineering and teachers of manufacturing management. The above concept of the "factory of the future" reflects a flexible strategy of manufacturing that has recently been termed "agile manufacturing".[77] Speed in responding to market wil be the principal virtue of agile companies, which will produce-to-order rather than stock-and-sell. Such strategic behaviour requires an operational and organizational ethos that plays into the entrepreneurial and cultural strengths of SMEs; these include internal flexibility and adaptability, efficient internal communication and a strong customer orientation.

The "factory of the future" thus stands as the antithesis of traditionally structured large organizations. Such organizations now find that they have become over-complex, inflexible and overloaded with wasteful non-value-added work and unnecessary procedures so that they are uncompetitive. Functional structures advocated by Fayol many years ago

have become entrenched and excessively fragmented and bureaucratic. The cult of specialism of people and subsystems which was advocated by Taylor and Adam Smith, and which appeared successful for single-product manufacturing systems, falls into disarray with high product variety and the requirement for frequent product changes and new product introductions. The consequence is a rapid increase in organizational complexity, excessive paperwork, progress-chasing activity, and a requirement for personal heroics to push crisis jobs through the system. These all add up to an increase in overhead costs and a lack of responsiveness to the needs of the market and business environment. There is a need to redesign businesses in such large companies to create simpler structures based on natural process groups so that they take on some of the characteristics of small companies.[30/, 78/]

The above illustrates that in principle, SMEs are inherently better poised -- from an organizational, cultural and behavioural perspective -- to take advantage of the promises and potential of AMT and agile manufacturing.

6. Process innovation in process and non-process industries: a conceptual view

The previous discussions on process innovation and the adoption of AMT have related essentially to "non-process" industries, i.e., industries with production processes that are largely mechanically based and which may involve the machining and processing of parts and materials, the simple or complex assembly of parts, and subsystems as well as final products. Competitive strategies in such industries are largely based on product innovation and marketing policies.

It is primarily such products that have been the focus of the new market paradigm characterized by the highly dynamic competitive environment of rapid product innovation and short product life cycles. "Process industries", in the stricter sense of the term, are those industries where the inextricable link between product and process is obvious, e.g., paper-making and oil refining. In such industries, process innovations are more likely treated as part of a strategic capability, and the firm output normally consists of relatively limited variety of products largely consisting of infinite batch sizes of identical molecular products, e.g., gasoline, coal or wheat. The presence of SMEs is far more dominant in the former "non-process" industries, and this has been reflected in this study's emphasis on AMT and process innovations in such industries.

Skinner presents an interesting comparative evaluation of process-innovation strategies in both types of industries.[79/] He notes that process-innovation strategies are rare in traditionally "non-process" industries, particularly across the plant process-innovation spectrum. By contrast, in process industries such as chemicals, plastics, steel and paper, process-based strategies are common and typically successful. Processes are thus central to the competitive position of the firm, and process innovation is carried out more or less continuously. Skinner offers various examples of successful large-scale process innovation undertaken essentially by large firms. He cautions, however, that process innovation is not an easy road in any industry.

Skinner goes on to uncover a very real and understandable problem for non-process-industry managers: it is that there is no such thing as a non-process industry. Every industry has a production process, but in the non-process industries there are generally a dozen or more processes, compared to between one and three in most process industries. Thus, in managerial terms, the two types of industries present entirely different problems. Successful innovators in the non-process industries appear to recognize that changes in processes which create competitive advantage can range from many small ones to a few big ones. SMEs focusing on process innovation can therefore find many opportunities which fit in well with their strategic behaviour and capabilities.

Another interesting comparison between process and non-process industries relates to the fact that in the former, enough is known about the behaviour of matter in the fluid state to be able to design and optimize a new process on paper and on the computer, and to build a test-scale pilot plant before companies make large-scale investments. Conversely, there are not many pilot plants for mechanical-based industries, nor is there a sense of confidence in related scale-up factors.[33/]

H. Entrepreneurs, SMEs, and the process of acquiring and accumulating technical knowledge and experience

The level of technical competence and capability embodied in entrepreneurs and SMEs and the acquisition of externally generated knowledge and know-how are crucial elements in achieving market success through product and process innovation. Furthermore, sustaining a market presence, particularly in the present dynamic and highly competitive environment, requires a process of continuous renewal of the relevant competencies and capabilities and the process of external acquisition of knowledge and know-how. Related considerations have already been addressed in previous sections of this study, particularly with reference to a firm's distinctive competencies, the sources of technological knowledge used by firms for product and process innovations (including R and D and design expertise), variations in technological knowledge requirements reflecting intersectoral differences, and the type of innovation being targeted.

In this section several important issues related to the acquisition and accumulation of technical knowledge and experience by entrepreneurs and SMEs will receive specific emphasis. The focus will be more on processes beyond the formal educational and technical training system. It will therefore be assumed that the relevant formal education and training have already been acquired by the entrepreneur or the various members of personnel involved in the innovative activities of the SME. The relevance of this education or training clearly depends on the scope of the innovation, i.e., whether it relates to research-based radical innovation, or new or modified product or process development. The former may require the capabilities of highly specialized Ph.D.s, while the latter may require a first-level engineering background.

It is also to be noted that many SMEs are created by entrepreneurs who bring with them the experience gained in previous employment. Spin-offs from high-tech institutions or firms are an interesting case in point. The technological base of such spin-offs has been addressed in a recent study.[46/] These cases are not at present considered relevant in the

Arab region, due to the notable absence of source organizations for such spin-offs, as well as the absence of an environment conducive to nurturing such spin-offs.

What is more relevant is the significant point made earlier in relation to innovation activities in Italian industry. The empirical evidence clearly indicated that much of the innovation was performed outside formal R and D structures, and that the key personnel involved often included entrepreneurs, foremen and technicians working in small companies. It was thus emphasized that lower forms of knowledge constituted a significant part of the industrial innovation process in Italy.

A point of related interest was made in a study of technology and industrial innovation in technology-based firms in Sweden.[80/] Empirical studies of a sample of such firms revealed that there was absolutely no relationship between the founder's level of education and the commercial success of the firm.

Based on such considerations, it is valid to assume that entrepreneurs and SMEs use a variety of ad hoc and not very structured methods in the acquisition of technical knowledge and experience, the value and practicality of which can be very significant indeed. Such approaches are particularly relevant in the "learning by doing" strategies that characterize innovations introduced through "small technology", i.e., the gradual acquisition of know-how at the local level. Technology backed by science, on the other hand, generally requires more formalized, technically profound approaches. Examples of the ad hoc, less structured approaches are presented below.

1. Learning from borrowed technology

Successful techniques employed by Korean companies have emphasized later industrialization by learning.[81/] The learning process involves borrowing technology from other countries and figuring out how to use it more effectively. Small firms study foreign machinery and technical manuals. Large companies buy technical assistance from equipment suppliers and hire retired foreign engineers as consultants. Because borrowed technology is central to late industrialization, firms must concentrate their resources on the shop floor, where the technology is made operational and, ultimately, improved. The engineers or technicians involved are crucial because their hands-on technical knowledge allows them to act as gatekeepers for foreign technology, as well as trainers for shop-floor workers.

2. Idea generation and information gathering

The nurturing of technical creativity in SMEs is linked with the process of idea exploration and generation. A study of small companies in Finland[41/] examined the processes adopted by firms in the electronics and metal industries to explore new product ideas. The most frequent practice was contacts with customers. Other important starting points for ideas were fairs, competitors, other companies in the same industry, and marketing. Small companies relied more on books than others.

Methods used for information-gathering by SMEs in Japan were studied for comparison. Business and technical papers were considered most important, while clients and customers ranked eighth. The most important information-gathering activities for product development in Japan were determined to be the following: establishment of closer relations with major customers, improvement and reinforcement of day-to-day business activities, and establishment of closer relations with major suppliers.

3. The role of chambers of industry and commerce in technology acquisition and transfer

Concerning the acquisition and transfer of technology, a major study of European SMEs[47] has revealed that the typical entrepreneur of an SME principally turns to specialized organizations (i.e., chambers of industry and commerce, trade associations, etc.), which, as a rule, have collaborated with him for some time. If chambers of industry and commerce and other relevant bodies that enjoy the full confidence of entrepreneurs can assist technology-transfer agencies and specialized university departments in efforts to prepare entrepreneurs for technology transfer, they may have a strong economic impact on the level of regional technology transfer.

4. Issues associated with technical skills and infrastructure for SMEs in developing countries

A study of entrepreneurs in developing countries[82] has revealed some of the important characteristics and limitations associated with industrial enterprise in these countries, as well as the process of technical-knowledge acquisition. Much of this is summarized in the following:

(a) Many potential small-scale entrepreneurs discover that the technological skills they need to run a manufacturing operation have to originate from within themselves, and that access to other sources of industry-specific technology is difficult, if not impossible, to obtain;

(b) Previous employment is the most important source of skill and know-how, and provides a sufficient basis for subsequent learning by doing, which is an integral part of a small producer's struggle for survival and expansion;

(c) Larger small-enterprise units are very much dependent on the facilities usually contained within an industrial estate, especially those facilities which are technical in nature such as repair workshops, foundries, electroplating shops, tool-and-die shops, heat-treatment shops, wood-working shops, and quality-control labs;

(d) The limited effectiveness of this infrastructure, or lack of access, could prevent an entrepreneur from taking his development plans beyond the preliminary stage;

(e) Nearly everywhere, a number of the wide and at times overwhelming array of extension/support programmes for small entrepreneurs have somehow failed to positively influence continuity or performance. One reason given has been their emphasis

on overcoming negative points, with no real attempts made to start from the stronger points of the entrepreneur, the small enterprise, or the sector as a whole;

(f) A great many entrepreneurs are most comfortable with the technology that they either learned in paid jobs or acquired in the early stages of their businesses. Adapting technology to changing trends is tantamount, to many of them, to a leap in the dark; it is often accompanied by considerable hesitation and agony. The small entrepreneur has little knowledge about or understanding of new technologies;

(g) This hesitation, however, is at odds with the continuous and at times urgent need for technological adjustment -- even within certain seemingly simple industries. A study of a few such industries in Italy has revealed a significant rate of technological intensity (ratio of R and D employment to total employment). The industries in question include: timber/furniture/wooden products; food, beverages and tobacco products; and rubber and plastic products. A significant part of the related technology was, in Italy's case, developed within the respective enterprises themselves.

The above highlights some of the issues that can confront SMEs (in developing countries) seeking to expand their industrial base by drawing on some of the experiences of SMEs in newly industrialized countries, with emphasis on some of the processes related to the acquisition and accumulation of technical knowledge and experience. Further and deeper investigation is required, however, taking into account the significance and impact of environmental and other related factors overall -- factors such as government policy towards SMEs, the role of extension/support services, and the particular historical context of national industrial development.

5. The impact of socio-cultural issues on technological innovation

One important point to be made is that culture strongly influences the approach to and conduct of managerial activities within the small manufacturing enterprises in a developing country; the socio-cultural situation could promote or hinder a firm's effective functioning and/or technical performance. For technological innovation to take strong root, an adequate socio-cultural environment is an absolute necessity.[44/] Educational systems and methodology should be geared towards strengthening creative powers and drive, which are key attributes of successful entrepreneurial enterprise.

An examination of the sociological and "culturalist" view of technology has been presented by d'Iribarne.[83/] He emphasizes in his study that technology bears traces of social relationships which are just as strong at the design stage as they are at the operational stage. This could partly explain why certain countries enjoy considerable success in the design of some items of equipment, but have difficulties with the design of others. Cultural attitudes also partly explain why the relative status of pure knowledge and empirical knowledge, of technological and administrative work, and of "designers and manufacturers" differs widely from country to country.

I. Conclusions

This study has confirmed the important and pervasive role played by SMEs in the industrial economies of developed countries. The study relied both on analysis and on empirical data to highlight the many issues associated with the role, impact, and potential of SMEs in product and process innovation. A holistic approach was adopted in which both technical and non-technical issues were addressed; the significance of this dual emphasis is clearly borne out in the study. In particular, it is becoming increasingly evident that technology, in the strict sense and in its varied forms, is in general a necessary but by no means sufficient factor for successful industrial enterprise. The characteristics of the present dynamic industrial/market paradigm have brought to the fore new competitive challenges which can only be confronted by adopting a broad view of the innovation process. This broad view emphasizes that successful competition -- particularly sustained competition -- can only be achieved through appropriate and interrelated technical, managerial, organizational and cultural responses. The study has therefore addressed the significance of these issues for SMEs and has highlighted in particular their inherent behavioural advantages relative to larger firms, while confirming that the latter's advantages are largely resource-based.

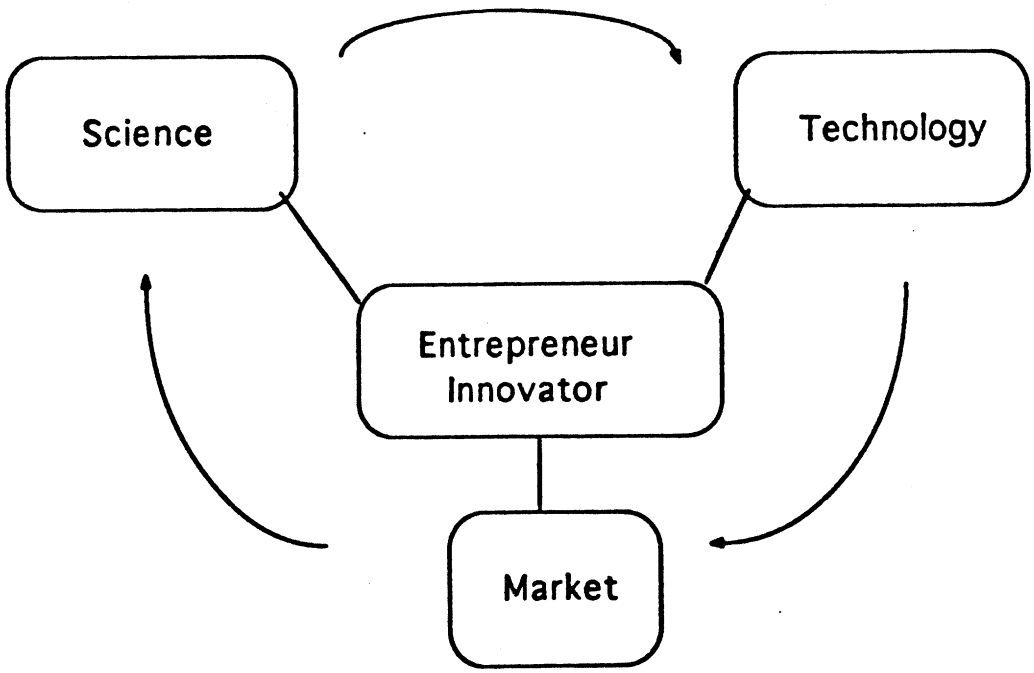
The study has demonstrated that, overall, SMEs have successfully competed in a broad range of industrial/market sectors, characterized by varying degrees of technological intensity that range from "radical" innovation to "simple" innovation. The innovation spectrum thus provides in principle a great many opportunities for SMEs. However, successful competition is by no means a straightforward matter in what has evolved into a very highly competitive global environment.

The adoption of a broad perspective in the study allowed for a discussion of competition and the competitive behaviour of SMEs in today's dynamic markets, characterized in particular by short product life cycles. The significance of these developments and their impact on SME product- and process-innovation strategies were also elaborated.

New trends in product and process innovation were investigated in some detail, along with their implications for SMEs in particular. A significant point worth noting from the study relates to a marked shift in innovative activity in general away from the hardware-centric view which characterized previous decades. There is presently a growing recognition that physical facilities -- including a seemingly superior product -- seldom provide a sustainable competitive edge; they are too easily bypassed, reverse engineered, cloned or slightly surpassed. Instead, a maintainable advantage usually derives from outstanding depth in selected human skills, logistics capabilities, knowledge bases, and/or other service strengths that competitors cannot reproduce and that lead to greater demonstrable value for the customer.[84/]

Herein lies a new opportunity and a challenge for SMEs in the Arab region and for Governments and institutions interested in supporting an environment conducive to innovation. It is, however, not yet clear whether this challenge will prove to be more or less formidable than the previous one.

Annex figure. The creative process of innovation development according to Christopher Freeman



Source: S. Nilsson, "Role of S & T networks in supporting R & D and innovation", Planning Research and Development, Arab School of Science and Technology, Damascus, 14-20 July 1992.

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XVII. THE ROLE OF THE UNIVERSITY IN SUPPORTING MEDIUM- AND SMALL-SCALE INDUSTRIES: A CASE-STUDY OF THE OUTREACH-CONSULTATION PROJECT AT THE UNIVERSITY OF JORDAN

by Kamil Jabbar*

A. Introduction

Industrial development in the countries of the Economic and Social Commission for Western Asia (ESCWA) region is relatively new. Industry which existed before the 1950s and 1960s, notably in Egypt, Iraq and the Syrian Arab Republic, was subjected to an abrupt transfer from the private sector to the public sector during those decades. The dominance of the public sector continued until the 1980s. Since then the private sector has been gaining ground, as the trend towards privatization has become universal. The private sector in the region is thus relatively inexperienced, having never enjoyed a tradition of industrialization.

In order to support industrial development, many countries have established science and technology institutions which extend assistance to industrial enterprises in the form of research work, training programmes, consultations, etc. In Egypt these institutions include, among others, the National Research Centre (NRC), the Industrial Design Development Centre (IDDC) and the Managers' Development Centre for Industry (MDCI). NRC is a multidisciplinary research and development (R and D) institution. In the field of industry, it conducts research relating to the textile, food, pharmaceutical, chemical and other industries. NRC also organizes annual training programmes in various scientific and technological areas -- e.g., textile weaving, food smell and taste additives, energy, scientific and industrial equipment, etc. -- and provides consultation for industrial enterprises. IDDC is involved in a number of activities, including: research, design and development related to consumer and industrial electronics products; the building of prototypes and low-volume production units; the provision of industrial information from local and international sources; diagnostic and technical studies for improving productivity of industrial firms; and the design and implementation of modern management systems which incorporate quality control, maintenance, and material-handling systems. IDDC also offers extension services to small- and medium-scale industries, with these services supported by assistance and expertise from international organizations such as the United Nations Industrial Development Organization (UNIDO) and the United Nations Development Programme (UNDP). The contribution of IDDC to industrial development is particularly significant in view of its practical orientation and strong linkages with small- and medium-scale industries. Also significant is the contribution of the MDCI. In response to the need to

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strengthen industrial enterprises at the top decision-making level, MDCI was established as a special training centre to prepare future managers. The trainees are selected from industry and are exposed to diverse topics in management and strategic planning.

In the Syrian Arab Republic, the most significant institutions are the Scientific Studies and Research Centre (SSRC) and the Management Development and Productivity Centre (MDPC). The fields of interest of SSRC include applied science and technology, management, economics, and the promotion of selected industries -- especially electronics. One of its affiliated institutes, the Higher Institute for Applied Science and Technology, conducts research in electronics, physics, mechanics and other fields, and organizes special training programmes in engineering for high school graduates, by the end of which they are capable of doing applied research and tackling real problems. In the area of industrialization, SSRC aims at linking R and D with industry, transferring new technologies into the country, and assisting the public sector in conducting studies for industrial projects. SSRC has been undertaking industrial training on an ad hoc basis, but has recently taken measures to make it a continuous and formal function of the Centre. The potential fields for industrial training include optics technology, metal casting (steel foundry), computer maintenance management, industrial automation, national standards and calibration, computer-aided design and computer-aided manufacturing (CAD/CAM), and industrial production. SSRC maintains strong linkages with regional and international institutions and organizations, including the Arab School for Science and Technology. The MDPC has two main functions: advisory services (including the preparation of studies), and training relating to industrial engineering, personnel management, and other fields.

In Jordan, the main science and technology institutions are the Royal Scientific Society (RSS) and the Centre for Consultation, Technical Services, and Studies (CCTSS) at the University of Jordan.

RSS, which was set up in 1970 to be the leading centre for applied research in Jordan, has greatly expanded its role since then in order to satisfy the needs and priorities of the country. Those of its activities most pertinent to industry include: the testing of construction materials; the maintenance of electronic industrial equipment; the establishment of national technical standards and specifications in cooperation with the concerned agencies; the calibration of electronic equipment (as its laboratories are officially certified to do so); and technical consultation on paints, lubricants and plastics. RSS conducts R and D which results in the production of industrial product prototypes which are made available to potential investors, e.g., solar water heaters. It also carries out training related to its own facilities, projects and capabilities, with laboratories for agro food, detergents, textiles and paper, inorganic raw materials, and electronics. The training function at RSS is not sufficiently strong, as it is decentralized and divided among many departments, and training plans are subject to change on short notice.

CCTSS was established at the University of Jordan in 1981 with the aim of conducting studies and offering expert service and consultation to the public and private sectors in Jordan and neighbouring countries. Its fields of interest cover the entire range of disciplines at the University, and it relies mainly on the expertise of faculty members. The continuous education programme is one of its most energetic programmes, and consists

of short and intensive courses in many areas -- including industry. The courses are suggested mainly by the Centre or by faculty members; occasionally they are requested by industrial enterprises on a contractual basis. A sample of the courses offered during 1992 includes: design and analysis of steel structures, design and manufacture of electronic circuits using computers, safety engineering in chemical industries, and maintenance planning. The continuous education courses are normally given to participants who know little about the subject.

The contribution of national science and technology institutions to upgrading the performance of the industrial sector has not been adequate. This conclusion was reached through a number of studies conducted by regional and international organizations, notably the Arab Industrial Development Organization (AIDO), ESCWA, and UNIDO. ESCWA's study on assisting existing industries, which investigated the performance of the industrial sector at the plant level -- and which covered many Arab countries including Egypt, Jordan and the Syrian Arab Republic -- clearly illustrated that a large number of industrial enterprises were facing problems. This state of affairs may be attributed to different factors, including:

(a) Weak industrial know-how and expertise at all levels within the enterprise including, and perhaps especially, at the leadership level;

(b) The immensity of the problems facing industrial enterprises vis-a-vis the capabilities of national science and technology institutions. In addition to their limited numbers, some of the staff of these institutions do not have enough industrial experience to offer practical solutions to real problems;

(c) The fact that national institutions tend to overextend their material and manpower resources to cover a wide spectrum of fields and activities, at the expense of in-depth and sustained attention to a few priority fields and issues;

(d) Inadequate coordination among national science and technology institutions, which further strains their limited resources;

(e) Weak linkages between national science and technology institutions and the industrial sector at the plant level, which could obscure the actual needs and priorities of those enterprises.

In line with the efforts made by national science and technology institutions to assist the industrial sector, the Industrial Engineering Department at the University of Jordan has been carrying out the "Outreach-Consultation Project" (OCP), which is presented as a case-study in this paper. The Project, which is financed by the United States Agency for International Development (USAID), was launched in January 1992.

B. The Outreach-Consultation Project (OCP): objectives, strategy and achievements

OCP has the following objectives:

(a) To increase the familiarity of Industrial Engineering (I.E.) faculty members and students with local industries;

(b) To increase local industries' awareness of the human and technical resources available within the I.E. Department;

(c) To promote the principles of I.E. within the industrial sector;

(d) To assist I.E. graduates in finding employment opportunities, and to arrange summer training for I.E. students at local industrial facilities;

(e) To establish linkages with the industrial sector, identify its problems, and implement measures to solve these problems by means of providing consultation services and organizing seminars, training sessions and workshops.

The strategy of OCP emphasizes the fieldwork approach whereby the University reaches out to industry -- and not vice versa -- at the plant level. OCP seeks the participation of industrial enterprises in identifying the major problems common to them all and in formulating appropriate measures to resolve those problems. The activities undertaken by OCP were conceived as a chain of logical actions leading to the stated objectives, rather than unrelated or isolated actions. And although OCP was intended to deal with the entire industrial sector, it has been directed more towards medium- and small-scale industries. The above-mentioned elements of Project objectives and strategy, together with the Project's limited field (it is confined to industrial engineering), distinguish OCP from efforts made by other institutions.

OCP achievements have been numerous. During a period of 11 months more than 100 enterprises from all industrial subsectors were visited by OCP personnel. Summer training opportunities were made available to all interested I.E. students. All I.E. graduates found employment, at a time when many graduates in other disciplines were facing unemployment. A database system for I.E. graduates was prepared by OCP personnel as well. Moreover, three activities were organized -- a "promotional activity", Seminar I and Seminar II -- and are described below.

1. OCP promotional activity

The OCP promotional activity represented the formal launching of the I.E. Department's campaign to establish linkages with the industrial sector. More than 80 officials and top executives were invited to participate. They represented industrial enterprises, financing institutions, the Ministry of Industry and Trade, the Chamber of Industry, RSS, the Higher Council for Science and Technology, and other universities, all of which contribute to industrial development in Jordan. The faculty of the I.E. Department first presented the Outreach-Consultation Project, then explained the principles of industrial engineering and demonstrated the Department's laboratories -- including the computer-integrated manufacturing (CIM) lab.

Industrial engineering was described as a discipline which originated in industry for the sake of serving it. Industrialists were in fact responsible for its conception, as competition forced them to develop new disciplines concerned with reducing production costs and increasing the efficiency of manufacturing facilities through the proper utilization of available materials, energy, and human resources. Thus, a distinguishing feature of industrial engineering is the integration of humans, machines and materials to achieve optimum performance in operating systems.

It was pointed out that there had been an increasing emphasis on the systems approach in manufacturing and on the use of computing systems. These developments have been employed in industrial and service enterprises in the areas of production, design, policy analysis, information management, automation, selection of materials, planning and designing industrial facilities, management of personnel, quality control, and material handling, among others.

The I.E. Department was briefly described. The Department was established in 1986, with financial and technical support provided by USAID. Its specific objective is to address industrial problems and issues related to quality control, productivity, human-factors engineering, safety, and manufacturing technology. The Department offers Bachelor of Science (B.Sc.) and Master of Science (M.Sc.) programmes. Its facilities include many workshops, a laboratory for the properties of engineering materials, a metrology lab, a human-factors engineering lab, a control and instrumentation lab, and a computer-integrated manufacturing (CIM) lab. The last laboratory is an integrated flexible manufacturing system with two robots, two computer numerically controlled (CNC) machines, a complete conveyer-belt system, and other state-of-the-art equipment. It simulates a modern automated industrial plant, with product development traced from start to finish.

2. Seminar I: The Role of Industrial Engineering in Industrial Development

This Seminar was directed at upper management in industrial enterprises. It aimed at promoting industrial engineering principles and concepts among top decision makers, whose better understanding would consequently facilitate the tasks of the engineers and specialists affected by management decisions. Given this focus, the material presented during the Seminar centred more on the management and policy (rather than the technical) aspects of industrial engineering. Lectures were delivered by members of the faculty on the following topics:

(a) Quality control. Since the basic goal of industrial production is to supply consumers with products they want, in the amounts they want, when and where they want, then the primary concern of the industrial enterprise becomes the quality of its products and services. Within the enterprise, quality is not the responsibility of any one person or department, but instead the responsibility of everyone. This responsibility begins when marketing determines the customer's quality requirements, and continues until the product is received by a satisfied customer. In order to implement its quality policy, the enterprise must develop and implement an appropriate quality system which comprises many

activities: marketing, sales and distribution, new-product development, purchasing and procurement, production, inspection, storage and handling. The quality system should ensure that the product satisfies the customer's needs, and should concentrate more on problem prevention than problem correction. This necessitates the development of a management system which would plan, implement, coordinate, control and assess all of the activities and elements which are a part of the quality system;

(b) Manufacturing technology (automation). There are three major types of automation: fixed, programmable, and flexible. Each type is different in terms of required investment, production rate, degree of flexibility and suitable applications. Flexible automation came out of developments in programmable automation, robotics, and automated material-handling systems. These combined developments, together with CAD/CAM, make up flexible manufacturing. The latest developments in flexible manufacturing systems and computers have paved the way for computer-integrated manufacturing (CIM), which integrates all of the activities of an enterprise, from conception of a product to the time it is shipped out. CIM appreciably reduces engineering design costs, overall lead time, and work-in-process, while at the same time dramatically increasing product quality and the productivity of managers, engineers, and other workers. Flexible manufacturing, including CIM, became necessary in the industrialized countries for many reasons, including high labour costs and/or unstable management-labour relations, the desire of the consumers for ever-changing products, keen competition from rapidly developing countries (mainly South-East Asia), and the realization that the key to cutting manufacturing costs and lead time was to design and manufacture products "to order" rather than "for stock". For Jordan, an analysis of these factors makes it clear that there is no justification for installing these systems, which require very high investment. However, the country cannot afford to stay unfamiliar with these technologies, as it will face strong competition later -- even from developing countries. Automation should therefore be introduced in steps -- e.g., robotics in hazardous jobs, CNC machines, and then fully automated machining centres. The I.E. Department can support such development by introducing appropriate automation courses;

(c) Human-factors engineering. This is defined as the analysis of human/systems/environment interfacing, with the goal of improving safety, productivity and job/customer satisfaction. A number of topics related to this field were discussed in the Seminar, namely:

(i) Application of human factors (H.F.);

(ii) Information processing, the stimulus-organism-response (S-O-R) loop for human work, task assignment, and training;

(iii) Design of displays for efficient sensory input (visual and auditory);

(iv) Work physiology, safe limits and fatigue reduction;

(v) Design of controls;

(vi) Efficient design of the workplace;

(vii) Design of hand tools, and control of related occupational diseases;

(viii) Environmental control and safety, and personal protective devices for workers.

It was pointed out that by performing simple actions, such as changing the position of tools and furniture, it was possible to increase productivity by up to 30 per cent. Moreover, with increased human-factor knowledge, the workplace should become safer; this is particularly relevant to Jordanian factories, where safety is inadequate. In this respect, the University of Jordan plans to organize training sessions on safety engineering for engineers in industrial enterprises. It will also permit graduate students to prepare their theses on safety;

(d) Production planning and control. A production system consists of inputs (workers, managers, equipment, material, facilities, energy, information), outputs (goods, services and knowledge), operations and transformations (forming, assembly, mining), performance measures (productivity, quality), and external feedback from clients and customers. The types of decisions made with regard to production planning and control pertain to the design of production systems (layout, location, capacity, etc.), material planning and control, scheduling, etc.

The lecture covered various types of productivity and profitability, and identified possible options for increasing them. It illustrated the relationship between profits, sales, labour costs, and material costs, and demonstrated how change in any of those parameters might affect the profits achieved.

After the lecture, the participants were asked to evaluate Seminar I. The main comments were as follows:

1. The orientation of the Seminar towards top management was a good initiative.

2. The Seminar was useful in acquainting industrialists with the I.E. Department and its laboratories, and with the role of industrial engineering.

3. The lectures were useful, although some of them were largely theoretical. There should be more emphasis on practical aspects in the future.

4. Faculty members will gain a better understanding of the issues and problems of industry if people from industrial enterprises come to the University and organize special seminars for the faculty.

5. The curriculum of the I.E. Department should reflect the findings of OCP so that future I.E. graduates will be more useful to industry.

3. Seminar II: Industrial Engineering in Jordan

This Seminar concentrated on two topics: quality control and maintenance. It was directed at engineers and specialists directly engaged in those activities, and was therefore more technical than Seminar I. Seminar II had three objectives:

(a) To identify major issues relating to quality control and maintenance that were of common concern to industrial enterprises, and to suggest practical measures to address those issues. OCP involved the quality-control and maintenance engineers and specialists in this exercise because they live with these issues and understand their priorities;

(b) To present actual cases from different industrial subsectors where certain problems had been encountered and solved. This information would be useful to other enterprises which might face similar problems;

(c) To present current and projected developments in quality control and maintenance in developed countries. This task, undertaken by I.E. faculty, is in line with the role of the University to introduce new technological developments into the country.

The following sections discuss quality control and maintenance separately.

(a) Quality control

The agenda for quality control consisted of the lectures listed below.

(i) Quality control in pharmaceutical industries. Case-study: the Arab Pharmaceutical Manufacturing Co. Ltd. (APM). In general, pharmaceutical industries are heavily regulated because their products have a profound impact on end-users, and they adhere to international specifications and standards because normally they are export-oriented. In Jordan the law states that every pharmaceutical firm must have an independent quality-control laboratory. Until 1982, judgement of quality at APM was based solely on laboratory testing of the product. During that period there were two basic weaknesses: improper documentation of operating procedures, and the lack of solid statistical specifications (not included in laboratory testing) such as the thickness and diameter of tablets and capsules. In 1983, APM introduced the quality assurance (QA) concept; this was the first sign that APM had started to consider factors other than laboratory testing for judging and raising the quality of its products. The new concept stipulates that QA is concerned with quality before, during and after manufacturing; that quality is everyone's concern and that the most suitable person to ensure the quality of work is the person who performs that work; and that there is a need to develop a company-wide common language concerning quality issues, and to establish a QA department responsible for monitoring and approving or rejecting activities.

One interesting investigation carried out by the QA department aimed at improving the quality of intravenous fluids. It was determined that the problem came from the intravenous bags, which were contaminated with foreign matter due to manhandling. The problem was minimized by requiring workers to wear lint-free clothes, to use leather towels to clean surfaces in the area, and to keep their movements to a minimum in the area of empty bags. These simple measures saved more than 5 per cent of the units produced annually, and increased APM net profits by about $US 100,000, while the amount spent on conducting the study and implementing its results did not exceed $US 30,000.

APM attributes the main quality-control issues and problems to the following:

a. There is an inadequate understanding and appreciation of statistical quality-control techniques. Intensive courses for supervisors and managers, and simplification of those techniques for use by technicians of lower educational levels, can improve this situation;

b. "Quality is everyone's concern" is a concept not adequately appreciated by all workers, especially those who are not involved in production (but rather in marketing, finance, services, etc.);

c. Inadequate coordination exists between R and D and production departments. At APM, technical committees representing R and D, production and quality control were formed to solve this problem;

d. Preventive maintenance is inadequate, which negatively affects the calibration of measuring devices, etc.;

e. Post-marketing surveillance to measure customer satisfaction is still obtained by verbal communication. There is a need to obtain this feedback in a more precise manner -- for example, by measuring the relative share of the market for a certain product;

f. Upper management does not adequately appreciate the impact of quality on the well-being of the company. This situation can be improved if costs related to quality issues -- and the savings obtained as a result of these expenditures -- are quantified and presented to top managers;

g. Some supporting industries, such as suppliers of packaging materials, do not conform to quality standards, which in turn reflects negatively on APM products;

h. There are no efficient national programmes for quality enhancement/quality control. Such programmes should serve as guides to industry and as regulatory references;

(ii) Quality control in engineering industries. Case-study: the National Cable and Wire Manufacturing Co. (CABLECO). The quality-control department was set up in the factory right from the beginning and was linked directly to the factory manager to keep it independent from production. The department ensures that cables and wires produced by CABLECO comply with national and international standards and, if so requested by customers, issues test certificates showing how closely the final product meets Jordanian, British, German, and/or international standards. The department provides the Ministry of Industry and Trade with information related to the tests carried out during each month. This enables the Ministry to verify the degree of compliance by the Company with standards and specifications, since the company has been granted the "Mark of Quality". CABLECO also sends samples of its products to the Royal Scientific Society to verify its adherence to specific standards. It has instituted a programme to evaluate the degree of customer acceptance of its products. The company, through its agents and distributors, accepts returned merchandise from customers, and investigates whether the fault(s) originated in the factory. This feedback is essential for developing quality products.

According to CABLECO, quality-control issues and problems can be attributed to three factors:

a. The human factor. The lack of professionalism on the part of workers is manifested by low productivity and high turnover;

b. The technical factor. Inadequate adherence to standards of quality in the global sense means that although the company's production may be of high quality, the final product may not be so because the packaging material which is procured from other industries may be of low quality;

c. The economic factor. Since enhancement of quality affects the cost of the product, a company may decide to manufacture similar products with varying quality levels and prices. Striking the right balance between quality and cost is a major management preoccupation;

(iii) Quality control in food industries. Case-study: the Danish Jordanian Dairy Co. Ltd. Quality-control tests were conducted from the day the Company started production. Scientific advances improved the accuracy of quality tests; whereas initially it was enough to boil milk to ensure its suitability, it later became necessary to test its bacterial count.

Moreover, as consumers' tastes became more refined, new tests to ensure their satisfaction were sought and developed; nowadays consumers distinguish high-acidity milk from normal-acidity milk, and so on.

Quality control at present covers four stages:

a. Controlling the raw material at the source of supply. Quality is controlled by ensuring that cows are free from epidemic diseases, that farm workers are healthy, and that milk cans and pots are uncontaminated;

b. Controlling the raw material upon its arrival at the factory. The milk is subjected to colour, smell, temperature, impurity, specific gravity, acidity, fat content, bacterial count and antibiotics tests;

c. Controlling the raw material during the manufacturing process. The chemicals used to treat the machines are controlled (i.e., the percentage of chlorine in the water, the percentage of caustic soda in the chemicals used for cleansing machines and pipes, etc.);

d. Controlling the final product. Physical, chemical, and bacteriological tests are performed on the final product. The results must comply with internationally established standards.

Based on the experience of the Danish Jordanian Dairy Co., the main quality-control issues and problems are:

a. The quality of local raw milk, which is in some cases below standard. The milk often contains antibiotics and has a high bacterial count, which forces the company to reject it. Standards for raw milk must therefore be established, and subsequently adhered to by milk producers;

b. A lack of coordination among the government agencies involved in this industry;

c. Low worker productivity and morale;

(iv) Quality control: present status and prospects. This lecture was delivered by a faculty member. It identified a number of measures which could enhance quality in Jordanian industries, including the following:

a. Changing the psychological profile of workers by means of group meetings, discussions, tangible incentives and acknowledgment of good performance would likely be of some

benefit. It was pointed out that Singapore had limited natural resources and could be compared with Jordan. Yet the most important factor in its success was its workers, who were dedicated and willing to produce quality products;

b. Competition can improve quality. In order to benefit from this concept, however, management would have to agree to make some necessary changes. One such change would be to abandon the work-in-process concept, which is an ideal mechanism for hiding problems -- including quality problems.

During the open discussion which followed the lectures, the participants made the following remarks:

1. Government agencies should establish and/or enforce quality standards in all industrial subsectors.

2. Industrial enterprises ought to establish a quality-control association that would increase the awareness of quality control among industrial enterprises, and allow them to share experiences.

3. National institutions concerned with enhancing the quality of industrial products ought to focus on one subsector at a time to achieve tangible and faster results.

4. The I.E. Department ought to introduce training courses in statistical quality control, in simple form, for technicians and non-technical workers.

5. The Outreach-Consultation Project should organize a special seminar on quality control for upper management. The seminar should be realistic, with case-studies which quantify costs and benefits.

(b) Maintenance

The agenda for maintenance consisted of the lectures listed below:

(i) Maintenance in textile industries. Case-study: the Global Carpet and Rug Industries Co. (GCR). The maintenance system at GCR was established with the help of a foreign company manufacturing similar products. Early in its operation, GCR encountered two major problems: the shortage of spare parts and inexperienced workers. These problems were solved by instituting a biannual programme for procuring spare parts in cooperation with machine suppliers, and by organizing training sessions locally and abroad. The Company also made efforts to produce some of the spare parts within its facilities and in local workshops, and was able to reduce its dependency on foreign sources by 10 per cent. All these measures enabled the Company to decrease its machine down time significantly.

According to GCR, the major issues in maintenance are:

a. The attitude of top managers and owners of industrial enterprises, who are reluctant to replace working (and seemingly good) machine parts as required by preventive maintenance schedules;

b. The quality of locally produced spare parts, which are not always up to standard;

c. The failure of many companies to follow basic maintenance practices (e.g., they do not keep accurate maintenance records);

(ii) Maintenance in engineering industries. Case-study: the Rum Metal Manufacturing Co. From the first day of its operation, the Company followed an organizational chart in which maintenance was considered a separate, centralized function. During the last two years, all maintenance tasks have been divided into three groups:

a. Tasks performed by the staff of the maintenance department, including the maintenance of machines and equipment;

b. Tasks performed by other departments in the Company, but part of the responsibility of the maintenance department, such as the manufacture of spare parts;

c. Tasks performed by outside contractors, but under the supervision of the maintenance department, such as the maintenance of forklifts, transportation vehicles and office equipment.

Based on the experience of Rum, the major causes for concern in maintenance are:

a. Problems related to upper management, including boards of directors. Because they possess limited technical knowledge in many cases, top managers fail to act swiftly or appropriately in making serious decisions relating to the work of the maintenance department (e.g., making certain improvements or modifications in existing machines or equipment);

b. Problems related to workers. Some workers lack self-confidence or technical ability. This applies even to graduates of vocational training centres;

c. Technical problems. As one example, some of the existing machines are very old, and technical information about them is

not available. Also, production plans and schedules are sometimes changed suddenly, and this confuses preventive maintenance schedules;

d. Inefficient supporting industries which are underdeveloped, use old machines, and rely only on experience because they have a poor scientific background. Rum, for example, deals with supporting industries in the field of heat-treatment and metal-coating;

(iii) Maintenance in the paper industries. Case-study: the Fine Hygienic Paper Co. Ltd. At the beginning, the Company carried out corrective maintenance (repair) only. Preventive maintenance was then introduced gradually, and two years ago a special department was established for that purpose. The Company has been able to reduce machine down time by between 15 and 20 per cent by properly managing the maintenance function. It also manufactures most of the spare parts it needs, including gears, pulleys and shafts. The most difficult problem the Company encountered was overcoming the misconception, by managers and workers, that as long as the machine was working and producing there was no need or justification for stopping it for maintenance. This problem was solved, thanks to statistics which showed clearly that preventive maintenance led to better machine efficiency at lower cost.

Based on the experience of the Fine Company, the elements of a good maintenance system are:

a. Regularity of maintenance, based on calendar time or machine running time;

b. Comprehensiveness of maintenance, which means that the schedule laid down by equipment manufacturers should be followed faithfully;

c. Availability of spare parts;

d. Proper procedures;

e. Documentation and analysis of all maintenance activities;

(iv) Preventive maintenance: present status and prospects. This lecture was delivered by a member of the I.E. faculty. It described the various applications of computers in maintenance management, including the following:

a. Information gathering and analysis;

b. Decision-making related to the scheduling of maintenance activities and the coordination of production plans with maintenance plans;

c. Diagnosis of faults through the use of "expert systems", which utilize information obtained from previous cases to diagnose new faults;

d. Maintenance system management (i.e., factors related to personnel, inventory, financing, planning, etc.);

e. Monitoring the performance of the maintenance systems;

(v) Predictive maintenance: present status and prospects. This lecture was also delivered by a faculty member. It was pointed out that although (time-based) preventive maintenance had been an important improvement over run-to-breakdown maintenance (repair) in terms of production planning and reduction of the likelihood of catastrophic breakdowns, it nevertheless had certain disadvantages. Preventive maintenance does not guard against unexpected failures, and it can interfere with smoothly running machines; it also becomes very costly, and to some extent inefficient, as production systems grow in size and complexity.

During the last 20 years there has been increasing interest in developing new maintenance techniques which could overcome the disadvantages of preventive maintenance. One such technique is predictive maintenance, which uses modern measurement and signal-processing techniques to diagnose the condition of equipment during operation. In essence, predictive maintenance replaces fixed-interval repairs with fixed-interval measurements. Maintenance is thus carried out when measurements show it to be necessary in the light of signs of deterioration and/or imminent failure. Predictive maintenance concentrates on monitoring the secondary effects associated with machine operation -- such as temperature, pressure, vibration and noise -- and measuring any changes or deviations in those parameters. In order to carry out this type of maintenance, the following information must be made available:

a. Normal running conditions, so that the parameters to be monitored can be selected;

b. Measurement of deterioration, requiring the selection of proper instrumentation;

c. Detection of deterioration, which requires the selection of techniques and instruments to be used for the analysis;

d. Establishing a relationship between the deterioration level and its cause;

e. Defining the limits of normal and abnormal operation, which requires setting normal and allowed levels of the secondary effects to be monitored.

A major limitation of predictive maintenance is its high investment costs. Sizeable expenditures are required for: identifying and selecting monitoring parameters; selecting and purchasing equipment for measuring, monitoring, and analysis; and recruiting highly qualified personnel.

Finally, it was pointed out that the I.E. Department had some instruments which could be used in predictive maintenance. They could be made available to Jordanian industry, provided they were taken along with their operations.

During the open discussion which followed the lectures, the participants made a number of suggestions:

1. There is an urgent need to establish a national spare-parts manufacturing industry which would serve various industrial subsectors. Such an industry could subcontract some of its work to smaller enterprises (workshops) in the country, and various national institutions could become involved in different aspects of the industry, i.e., training, R and D, consultancy, and maintenance.

2. A specialized centre should be established, perhaps in the I.E. Department at the University of Jordan, where industrial enterprises could join and gain access to the available equipment and the results of R and D programmes. The centre could also prepare a directory of companies offering services in maintenance.

3. OCP ought to organize special seminars for upper management to make them more aware of how important proper maintenance is to the success of their companies.

4. Industrial enterprises should upgrade the morale of their workers through incentive measures, fair treatment, etc. They should also organize training programmes, in cooperation with national institutions, to improve the skills of their workers.

C. Future activities of OCP

In seminars I and II it was possible to identify a number of issues and problems common to many industries. Those issues and problems fall within three categories:

(a) Issues and problems relating to quality-control and maintenance in industrial enterprises;

(b) Issues and problems relating to upper management in industrial enterprises;

(c) Issues and problems affecting industrial enterprises but originating outside them, e.g., weak local support and feeder industries, ineffective government regulations, etc.

OCP formulated a proposal for future activities to resolve issues and problems in the first two categories with which it could deal directly, and sent the proposal to a large number of enterprises for their comments. The response was positive. The proposal consists of three activities:

(a) Quality-control workshop. A three-day workshop would be held, open to quality-control personnel including quality-control managers. Lecturers would come from industry and the University. Lectures would be very technical and detailed and would cover every component of the quality-control system -- e.g., establishing quality standards for the final product, raw materials, and intermediate products; utilization of computers and information systems in quality-control; coordinating the work of the quality-control department with other departments in the industrial enterprise; coordinating the work of the industrial enterprise with government agencies concerned with quality control; preparation of quality-control reports for upper management; and preparation of campaigns to improve the quality of performance in all departments of the enterprise;

(b) Maintenance workshop. This workshop would be open to maintenance engineers and specialists, and would follow the same format as the quality-control workshop;

(c) Industrial management seminar. This is designed especially for top industrial executives. Lecturers would come from industry and the University. The lectures would focus on three topics:

(i) Quality control: the concept of integrated quality control, quality-control management, decision-making relating to quality control, and case-studies illustrating the experiences of selected industrial enterprises;

(ii) Maintenance: along the same lines as the quality-control lecture;

(iii) Management of human resources: job description, performance evaluation, incentives, training, and case-studies illustrating the impact of personnel management on the well-being of the industrial enterprise.

In addition to the above-mentioned activities (which represent in-depth treatment of topics previously covered in the area of production systems), a number of activities relating to other areas were proposed by the I.E. faculty, as shown below:

(a) Workshop on manufacturing and engineering materials. This workshop was proposed in view of the need for the design and manufacture of dies, moulds, and

spare parts. It would consist of lectures by faculty members and laboratory sessions, and would cover such topics as material properties, manufacturing processes, heat treatment, inspection and measurements;

(b) Automation workshop. This workshop would aim at creating an awareness of automation technologies and their impact on future industrial development in Jordan. The workshop would consist of lectures afd demonstrations by the I.E. faculty on the following topics: flexible manufacturing, computer-integrated manufacturing (CIM), programmable-logic control, CNC machines, robotics, and CAD/CAM.

OCP also plans to formulate and implement special activities to solve the problems of smaller enterprises (i.e., those with not more than 5,000 Jordanian Dinars [JD] capital and five employees, according to the Directory of Industrial Enterprises prepared by the Chamber of Industry). OCP personnel has begun by visiting about 50 such enterprises in 10 different subsectors in order to identify their problems, construct profiles, and plan appropriate activities. So far, the following profile can be drawn:

(a) These are family businesses: the owner in most cases is also the manager;

(b) The manager is either a technician (by education or practice) or a layman, but very rarely an engineer or a college graduate;

(c) Most enterprises are actually small workshops providing services upon request;

(d) The facilities in most cases are primitive, unsafe, and unhealthy;

(e) Invariably, managers and workers do not understand basic concepts properly (for example, replacing parts before they break down is unthinkable). Many do not realize they have problems;

(f) Each worker performs many different tasks, as there is no specialization;

(g) These enterprises are not willing to pay for expert advice and consultation -- nor are they capable of doing so;

(h) One of their big problems is lack of information -- about each other, about larger enterprises which may need their services, and about where and how to seek expert advice (for example, on material-testing laboratories, the calibration of instruments, etc.);

(i) Most of them complain about the negative attitude of local workers towards the enterprise.

Although the results of the fieldwork have not yet been analysed, it is possible to make the following tentative proposals:

(a) The I.E. Department could cooperate with the Chamber of Industry in carrying out a comprehensive survey of those enterprises which, inter alia, identifies their capabilities and needs. The results of the survey could be published in the form of a directory to be distributed among all of the enterprises in the industrial sector;

(b) The I.E. Department could cooperate with vocational training centres to offer training programmes at a level compatible with the level of workers in those enterprises;

(c) To finance the above activities, the Chamber of Industry could establish a special fund from fees collected from larger enterprises. The role of OCP would be to promote this idea to the Chamber of Industry and the Ministry of Industry and Trade.

D. Conclusions and recommendations

In order to assess the effectiveness of OCP, it is necessary to determine how much of its stated objectives were achieved within the 11-month period covered by this paper. The assessment takes into account the responses of the managers, engineers and specialists who were requested to comment on the effectiveness of OCP activities.

OCP succeeded in increasing local industries' awareness of the human and technical resources available within the I.E. Department, through more than 100 field missions by OCP personnel to industrial enterprises, and through the promotional activity and the two seminars. Likewise, the faculty of the I.E. Department gained more insight into the issues and problems of local industries through the field mission reports and through the case-studies presented by local industries in Seminar II. Moreover, the I.E. students who underwent summer training at local industrial facilities had the opportunity to become more familiar with certain industries. The first two stated objectives were thus addressed quite satisfactorily by OCP.

OCP was very successful in convincing industrial enterprises to hire I.E. graduates and to train I.E. students. In fact, local industries hired all of the graduates and provided summer training for all of the students concerned. Moreover, OCP convinced well-established companies like the Jordan Cement Factories Co. to seek advisory services from the I.E. Department. The third and fourth stated objectives were therefore addressed rather well.

Finally, OCP was able to establish very strong linkages with the industrial sector by means of extensive field visits at the plant level, and through the promotional activity and the two seminars. This conclusion was reached through analysis of the feedback received from industrial managers and engineers who participated in the above activities. Thus, the last stated objective was also achieved, though it must be taken into acount that accomplishment of the objectives is an ongoing process for OCP.

The features that distinguish OCP from efforts made by other national science and technology institutions also represent its strong points. They include the following:

(a) The field of work is confined to industrial engineering, which enables OCP to deal with issues of concern in greater depth;

(b) Precise identification and prioritization of issues and problems facing the industrial sector are possible because OCP involves the industrial enterprises in this exercise and in proposing appropriate solutions;

(c) The I.E. Department reaches out to the industrial enterprises, and not vice versa; it will take time and effort to convince those enterprises to seek assistance from the Department. OCP has carried out extensive fieldwork in all industrial subsectors;

(d) The involvement of the industrial enterprises in presenting their own experiences as case-studies in the seminars organized by OCP gives a realistic dimension to the activities of OCP;

(e) Emphasis is placed more on medium- and small-scale industries, which are mainly private-sector companies.

To conclude, a number of recommendations are listed below.

1. In order to maximize its effectiveness, OCP ought to direct its efforts towards current issues; although other issues like future technological developments are important, they are of second priority as far as industry is concerned. Likewise, OCP should concentrate more on seminars, workshops and training and less on consultation, because in order to have a real impact on industry in the area of consultation, the I.E. Department would require much more expertise than it could possibly acquire.

2. The University should solicit funds for OCP from new sources in order to supplement, or later replace, the funds provided by USAID. This money will be needed to hire short-term experts and consultants from industry, which is essential for making OCP activities practical and useful.

3. In parallel with its direct assistance to industry, the I.E. Department ought to assume the role of catalyst or coordinator in involving other agencies and institutions (such as the Bureau of Standards and RSS) in the activities of OCP.

4. The results obtained in the course of implementing OCP should be reflected in the syllabus of the I.E. Department in order to improve the quality of its graduates.

5. Other Arab countries could initiate projects like OCP, because their problems and those of Jordan are similar.

XVIII. POSSIBLE COOPERATION PROGRAMMES BETWEEN UNIVERSITIES AND SMALL BUSINESSES

by Mazen A.H. Kadhim*

A. Introduction

In addition to teaching and academic research, universities have other specified aims including positive interaction with society in general -- and with industry in particular, for the purpose of providing technical guidance, cultural leadership and the updating of working trends. However, universities have not extended these aims to small industries to an acceptable degree.

There are many reasons for this, some of them complicated, and both universities and small businesses share the responsibility. However, while industry (especially small businesses) lacks information about the important role universities and their academic staff (faculty) can play in this regard, the same cannot be said about universities, which should be -- and are -- aware of their responsibility to this sector but do very little about it.

Factors pertaining to these issues are discussed from the perspective of both parties in this paper, and some examples reflecting the author's own experience are quoted. Some of the problems are not so difficult to overcome -- related to each side's lack of information on the other's capabilities and needs -- but other factors, such as overloaded faculty timetables, the lack of funds, and restrictive university policies, might present quite a challenge. The following sections address the main factors in more detail.

B. University aims and programmes

1. Aims and limitations

Universities are public institutions. They are run very carefully by academics and administrators within well-defined frameworks that are at best restrictive, but more often quite prohibitive. One usually thinks of universities as purely teaching establishments; however, they have other very important declared aims[1/] that include:

(a) Guiding society towards positive change through cultural leadership;

(b) Interacting with industry and other sectors in order to improve existing working trends;

(c) Providing consultation whenever and wherever needed;

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(d) Taking a major responsibility in updating industry through technology-transfer schemes;

(e) Making university facilities available to outside users.

Universities in the Economic and Social Commission for Western Asia (ESCWA) region have traditionally remained teaching establishments able in most cases to conduct academic research and very limited industrial research. These universities have so far failed to adequately observe the other, above-mentioned aims for numerous reasons, some of which are listed below:

(a) The very extensive teaching programmes would overload faculty and facilities, leaving very little time for other functions;

(b) Only very limited funds are available for such noble aims at universities, and the beneficiaries are unwilling to share the costs;

(c) Internal university regulations often restrict faculty activities off campus;

(d) Financial benefits, if and when offered, seldom reach a faculty member in an amount proportionate to his or her real contribution;

(e) Faculty promotion is based on original and novel scientific research. Working for small industries does not usually provide the right opportunities, as applied research at this level rarely requires the originality expected for promotion.

2. Possible programmes

Having mentioned the main difficulties in fulfilling non-teaching aims, it should be said that most universities do attempt to get involved with one or more of these activities. Differing conditions mean that some universities perform better than others in promoting cooperation programmes with small businesses. The programmes are not custom-designed for individual businesses or industries, but represent an activity within which special functions can be arranged. Some important university activities related to this function are listed below:

(a) Continuous education;

(b) Feasibility and consultancy studies;

(c) Two-way training programmes;

(d) Direct departmental and faculty involvement with industry.

Private-sector utilization of these programmes is currently very limited; both universities and small businesses share the responsibility for not achieving satisfactory working programmes (a point which is discussed later, in section D).

C. Small businesses: their background and needs

1. An overview

Production ventures vary in their investment and working capital. It is very difficult to determine the scale of businesses based on capital investment and number of workers alone.

In Arab countries it is uncommon to find businesses which would be considered large or medium-sized by Western or Japanese standards. Most private-sector industries were started as -- and in general remain -- "family ventures"; only in a few cases have they expanded into shareholding firms. In this study it is assumed that businesses within the sector under consideration are privately owned and receive no backing from public funds. These circumstances have resulted in the development of some negative attitudes that have characterized the sector:[2/]

(a) Interest in short-term success;

(b) Limited industrial ambition;

(c) No-risk attitude;

(d) Lack of awareness of available university and research-establishment programmes useful to industry.

2. The needs of small businesses

Universities and research establishments have a lot to gain from small businesses, and vice versa. The author's own experience in Iraq and Jordan indicates that faculty members are very aware of the role they could play in this respect; the university bureaucracy could be an obstacle, but not one difficult to surmount. Left to themselves, small businesses might be expected to face difficulties of a special nature, such as those summarized below:

(a) The lack of accurate feasibility studies could reflect badly on the long-term prospects of a venture;

(b) Foreign companies have a monopoly on solving small-scale technical and maintenance problems, and are expensive to consult;

(c) Small businesses need continuous readjustment of their production programmes to take into account changing local trends and needs;

(d) Very few businesses in the region are able to assess export possibilities on their own;

(e) Small businesses often fail to appreciate the importance of periodically updating the theoretical and practical skills of their managers, engineers and workers.

Naturally, the difficulties stated above are not the only ones of concern to small industries. They have been pointed out here because they are the problems that universities and research establishments can help to solve.

D. Cooperation programmes

1. The first move

In the two previous sections possible programmes of interest to universities and small industries were mentioned. Some of these programmes have been in existence for a number of years and are well established. For the small business, lack of information on these programmes and on university capabilities in this regard are understandable; however, the lack of information at universities on the needs of small businesses is inexcusable. Universities are not asked to impose themselves on the outside world, but they are most definitely called upon to make themselves and their facilities known to industries -- both small and large. This could be achieved through the use of the following:[3/]

(a) Information circulars. These would be distributed throughout the appropriate sector as an introduction to the university's consulting, training and technical capabilities, particularly those that could be of use to the sector;

(b) Media advertising. Due to their non-commercial nature, universities in the region seldom use the media to announce functions or programmes. Television, radio, journals and newspapers could be used to inform the appropriate sector of available programmes. It is in no way suggested that this should be done to promote commercialism;

(c) Other functions. These would involve arranging seminars, encouraging direct faculty visits to industry, and making a point of involving managers in certain university activities.

The above functions and others clearly indicate that universities, not businesses, should make the first move.

2. Existing programmes

The older universities in the region trace their establishment to the beginning of this century.[4/] New ones are being established every year all over the region. The programmes under consideration in this paper were not considered university functions until the late 1970s or even the early 1980s. As one example, the University of Technology in Baghdad earnestly set out to implement many of these programmes as early as 1975, the year the University was established. By the late 1970s and early 1980s, the success of these programmes had encouraged other universities to do the same. The types of programmes in existence that have served all sectors of industry and could be of use to small businesses are described below.

(a) Continuous education

Universities frequently offer various courses of a theoretical and/or practical nature to interested people who are not registered students. The courses offered vary from the simple (updating ideas) to the quite advanced, i.e., those that could lead to useful technology transfer to certain industries. Some problems associated with these programmes -- and their suggested remedies -- are summarized below:

(i) Problem: Courses are proposed mainly by faculty rather than the industrial sector. Clearly, this might result in a lot of courses being offered which are of no real benefit to industry.

Suggested remedy: More efforts are required from departments and staff members to bridge this gap, possibly by incorporating some of the resources mentioned in the first part of section D (circulars, advertising, etc.);

(ii) Problem: The level of remuneration for the educators is usually discouraging. While the continuous-education offices at the various universities would enjoy reasonable financial benefits, regulations would generally leave staff members with benefits inferior to those they could expect from their involvement in other activities.

Suggested remedy: University authorities must revise and update many of the financial aspects of their programmes;

(iii) Problems: The private (industrial) sector in most cases is unaware of the benefits these programmes could offer to individual ventures. The owner-manager might think the cost and time required to bring himself or others in the business "up to date" are not worth the effort. Another point is that many who take these courses give the impression that, for them, the course amounts to little more than a short vacation.

Suggested remedies:

a. When publicizing a course, the university should try to stress the direct benefits to the persons nominated and (through them) the indirect benefits to industry;

b. A more serious assessment of persons attending the course should be made, and later sent confidentially to firm managers;

c. Continuous-education offices should try to arrange courses outside the university. There are no reasons why some public-sector firms should not try hosting some of the courses given to related private-sector firms. This could encourage greater understanding between the two groups and among the various parties concerned;

(b) Consultation and feasibility studies

Consulting offices now exist at most universities in the region. Engineering and industrial consulting offices are available at every Iraqi university that offers engineering courses. If the same is assumed to be true of other universities in the region, then the remarks below apply to other countries as well as Iraq.

Most of the work undertaken by these consulting offices is for the public sector in general and important government projects in particular. Only in very few cases have these offices made studies of the private sector. Some have been carried out on specific problems related to small businesses in the fields of chemistry (cosmetic products, paint, glue, etc.), agriculture, food industries and solar heating. Neither the consultation offices nor the small businesses, however, appear to fully appreciate the enormous possibilities which exist. The main problems are discussed below:

(i) Problem: the usefulness of feasibility studies. Feasibility studies which justify embarking on certain ventures are probably required as prerequisites for obtaining permission for projects to go ahead in all countries in the region. These studies are generally done (a) to justify legality and (b) to induce industrial banks to provide financial backing. In most cases, however, it is debatable whether the banks have experts who are able to analyse the details and complications of the project accurately. The owner or owner/manager is concerned only with his immediate objective -- that of obtaining the grant or loan; he might therefore be satisfied with submitting a rather hurried, imcomplete study. Most owners and managers fail to realize that a careful, comprehensive study would enable them to better predict long-term aspects of the venture and would possibly prevent future losses and set-backs.

Suggested remedies: Authorities granting permits should be encouraged to help applicants realize the importance of investing in good feasibility studies, as they increase one's chances for a successful venture. It should be emphasized that the study would be done by university experts known for their impartiality and independence of thought. Authorities themselves could also be encouraged to seek the independent and expert opinions available at universities whenever confirmation of the findings of the study or report is needed;

(ii) Problem: lack of experience at universities. University consulting offices are run by faculty. Although they have high academic qualifications, staff members usually have little experience with market or commercial issues. They often have even less experience in dealing with small-scale enterprises, as they have generally been involved in large-scale government projects.

Suggested remedies:

a. Universities are advised to offer incentives for staff members to undertake studies related to small-scale industries. Incentives could take different forms, such as financial rewards or making such studies a sub-requirement for promotion;

b. University consulting offices could make taking on such projects by staff members a condition to being offered large-scale projects;

c. Experts in small-scale enterprises working outside universities could be employed by consulting offices on a per-job basis. The interaction would give the university staff some much-needed experience;

(iii) Problem: financial rewards for consultants. Small enterprises cannot afford to pay for the studies required to start a business. Even if they can afford it, they hesitate to invest in a study forced upon them by legal requirements. By other standards, the required payments fall short of being acceptable rewards for university experts or of compensating for consulting-office expenditure on the work.

Suggested remedy: as university consulting offices generally make large profits from their usual large-scale consultations, small-scale consultations and other studies could be subsidized from the former. No appreciable losses (or any losses at all) are expected. Even if there is a small financial loss, it can be thought of as a long-term investment in the whole society;

(c) Training programmes

Problem: Training, though agreed to be necessary, is not usually welcomed by any of the parties involved. Universities, being basically teaching and research establishments, are afraid that opening their laboratories to non-students would interfere with daily programmes and could lead to the damage of expensive equipment.

Both large and small industries think that taking on students from universities for training would disrupt production and would be of no apparent benefit to the firm.

In Iraq, small-scale industries do agree to train some university students, and universities, in turn, hesitantly accept some trainees from outside the university -- normally through continuous education programmes.

The point here is not what training programmes can or cannot do for the different parties involved, in terms of technical standards, skills, updating, etc. Rather, the emphasis

in this section is on the links these programmes might create between universities and industry; the scope and possibilities are enormous.

Suggested remedy: Staff members who supervise student training outside the university should be encouraged to forge technical and other vocational links with firm managers and engineers in order to explore possibilities for cooperation and identify field-based problems. Through training programmes, possibilities might arise for other types of cooperation.

E. Activities of other establishments

1. Research centres

Countries in the region structure their research councils and research and development (R and D) centres in very similar ways. Normally there is one major research academy or council and several R and D centres of various types.

Research councils are mainly occupied with research of national importance. However, they also have the funds, facilities and (occasionally) the time to establish limited cooperation programmes which benefit small industries. The Iraqi Scientific Research Council,[5/] for example, was involved in some joint projects with smaller industries, including those in the fields of solar heating, special agricultural machines, and computer software (among others).

R and D centres usually exist within the ministries of industry, planning, communications and commerce. The centres are normally heavily loaded down with their own programmes, and the ministries have strict central control over their activities. At this point, R and D centres have practically no cooperation programmes with small industries.

Both national research councils and R and D centres play a limited role in the development of small-scale industries; this role is much weaker than their capabilities allow. Greater efforts are needed to develop cooperation programmes in this sector.

2. Higher technical institutes

The type of educational establishment which is perhaps most relevant to the issue under consideration is the higher technical institute. These institutes can, in most cases, be of more help to the private-industry sector than can universities or research establishments. The reasons for this are as follows:

(a) The types of laboratories and workshops available at the institutes are more useful to small industrial businesses than are their counterparts at universities;

(b) Staff members, engineers and technicians at the institutes are rather more practically oriented and are more experienced, giving cooperation programmes a much better chance of success;

(c) The institutes, like the universities, have consulting offices, and are possibly better suited and more qualified to help small industries deal with problems of a technical nature.

There are, in fact, several cooperation programmes between institutes and smaller firms (production assembly lines, general maintenance, evaporation cooling equipment and others).

F. Concluding remarks

In this paper an overview has been provided of the existing cooperation programmes between universities and small businesses. Working concepts and conditions prevailing at universities and in the relevant industrial sectors have been discussed and the needs and limitations of both parties exposed.

Several obstacles to the success of cooperation programmes have been revealed. Some of these have been generated by the small business, but most have been attributable to university rules, regulations and procedures. Universities must be encouraged to adjust and improve their existing programmes, so that they may provide the help and guidance so badly needed by small industries.

Later in the paper, it was argued that higher technical institutes could play a much more predominant role, as it was well within their objectives and capabilities to do so. In many cases, their efforts could bear more fruit than similar university programmes. It is recommended that efforts be made at all levels to achieve what is necessary.

Footnotes

1/ See, for example: Iraq, the Higher Education Act (Act No. 80-1980); Jordan, the Higher Education Act (Act No. 28-1985); and Jordan, the Jordan University Act (Act No. 52-1972).

2/ A.J. Al-Salloum, "Contemporary problems of Jordanian private industries and their proposed immediate solutions" (unpublished), Amman, Jordan.

3/ Personal interview with the Managing Director of Petra Systems, Amman, Jordan.

4/ This does not include well-known religious schools like Al-Azhar in Cairo, Al-Najaf in Iraq or others.

5/ Abolished in 1989.

XIX. PROGRAMME FOR PROMOTING THE COOPERATION OF UNIVERSITIES AND SCIENTIFIC RESEARCH INSTITUTES WITH SMALL INFORMATICS AND MICROELECTRONICS BUSINESSES

by Mohamed A.R. Ghonaimy*

A. Introduction

Business activities are not isolated efforts; they are affected by a number of local and international factors. If one concentrates on small businesses related to technological sectors such as informatics and microelectronics (as has been done in this paper), the following must be taken into consideration:

(a) The status of the businesses related to them at the international level (whether large, medium or small), and the pattern of relationships between and among them;

(b) The scope of informatics and microelectronics applications, identifying which sectors are suitable for small businesses and the manner in which they are related to others;

(c) Identification of the characteristics of a successful business in these high-technology fields, including the following: high-level continuing education programmes; the ability to innovate rapidly to gain a competitive edge at the local, regional and international levels; the means to implement joint research and development (R and D) projects, or at least benefit indirectly from the R and D carried out at universities and research centres.

This paper will present a number of paradigms for promoting cooperation between universities and research centres, on the one hand, with the small businesses involved in informatics and microelectronics, on the other. Cooperation might be either direct or through national programmes supported by governmental or international agencies that might ultimately benefit from these small businesses.

The paper will cover the following topics:

(a) The relationship of the small businesses in the chosen sectors with national and global industrial policies and/or strategies;

(b) The scope of informatics and microelectronics applications and the possible areas where small businesses could develop a competitive advantage;

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(c) Characteristics needed for competitiveness (such as the level of training, research and development efforts, channels for technology transfer, and marketing strategies);

(d) The role of universities and research institutes in meeting the needs mentioned above with respect to qualifying personnel at all levels (e.g., specialists, expert users, and other end-users). Suggestions for improving qualifications -- through formal professional education, the establishment of vocational education programmes, continuing education, and project-oriented R and D -- will also be discussed in greater detail;

(e) The role of universities and research institutions in supporting R and D for the businesses described above, with some examples taken from developed countries, newly industrialized nations, and developing countries (e.g., Egypt);

(f) The concept of software as an industry and its relation to informatics. This concept was first promoted by the United Nations Industrial Development Organization (UNIDO) in 1991; it was decided that the most important elements of informatics technology were industrial software applications, software as a small-scale industry, new production technologies for software, and the standardization and legal aspects of both hardware and software.

B. Factors to be considered in small-business policy development

Planning and implementing successful small-business policies for informatics and microelectronics enterprises cannot be done in isolation, but must rather be considered within the wider national, regional and international contexts. On the other hand, such technology may play a crucial role in economic, social and political developments. The point is, these policies may both affect and be affected by outside circumstances and events.

In developing a national policy for informatics and microelectronics, it is important to review the policies existing elsewhere in the world (for either individual nations or regions as a whole).

The following should be taken into account when formulating national policies:

(a) The relationship between technical change and the need for labour -- for example, the effects of miniaturization integration and automation on industry in general and on manufacturing processes in particular.

It should also be emphasized that attracting investments -- whether from local or international sources -- is not governed by labour alone. A number of other factors are becoming more important, such as the type of product, tax incentives, start-up costs, government policies, and other aspects of international trade and labour legislation (Friedrichs and Schaff, 1981);

(b) The international distribution of scientific and technological capabilities. If the balance is not in one's favour, local efforts and bilateral and international cooperation programmes might be able to compensate for the deficit. It should be noted in this respect that science and technology are now at the core of a stable wealth-creation process, so these issues should be given appropriate attention;

(c) The information infrastructure of society, including the readiness of the society to absorb these new technologies and participate in the promotion and enhancement of the existing situation. It is therefore essential to establish norms for measuring the national capacity to absorb information technology and apply it indigenously. Importing complete turnkey systems will generally not help in digesting and applying the technology; in this respect, the competitive role of information systems should be studied. A basic concept is the value chain (Portar and Millar, 1985), which is defined as the chain of activities that create a product's value to customers. A competitive advantage is established when a product's "chain" outperforms that of rivals. Information systems are one key factor through which a company can enhance competitive advantage; such systems then represent strategic information systems (Alter, 1992);

(d) Since microelectronics and information technology require a global market, a national policy with a global perspective is essential. Because transnational companies dominate in some technological areas, it is necessary to strike a balance between accepting transnational companies' investment (thus speeding up the rate of transfer of technical know-how) and dealing with the greater economic and technological dependence that may result from that;

(e) Study relationships between different industries and the components of each industry, and develop an appropriate dependency network. In this respect it is essential to study the effects of integrating many processes into a single process, due to the rapid usage rate for different levels of integrated circuits. This could identify areas where system design might assume prominence in the production cycle.

C. The scope of informatics and microelectronics technologies

Before discussing the areas of informatics and microelectronics which are relevant to small and medium-sized businesses (and where they can develop a competitive advantage), the general scope of these technologies should be defined. Also, since product quality and productivity are increasingly vital in terms of international trade and market diversification, it is essential to consider the scope from a socio-economic/technical perspective (see figure I). It is also necessary to bear in mind that the application of informatics and microelectronics technologies represents the greatest technological innovation in the manufacturing industry since the industrial revolution. Therefore, whatever the scale of business enterprises may be, developing countries should plan for action within the context of automation in the microelectronics industries (using the different mechatronic innovations as much as possible), so that they will be able to compete in the international market.

Figure I. General environment needed and factors to be considered in planning informatics and microelectronics policies

Socio-economic changes

Changes in the local and international environment

Recognition of the necessity of market diversification

Recognition of the need to improve quality and productivity

Automation as the basic element in manufacturing

Computer-integrated manufacturing (CIM) and flexible manufacturing systems (FMS) as the nucleus of automation

Informatics and microelectronics as major elements in CIM and FMS

1. Informatics

The scope of informatics can be divided into two main categories: (a) information technology; and (b) information- and knowledge-based systems.

(a) Information technology

This category includes the following:

(i) Computers and their architectures. This includes the whole spectrum of computers, from laptops to supercomputers;

(ii) Computer network systems and elements. This spans the whole range -- from local area networks (LANs) to wide area networks (WANs), and any other supporting communications elements;

(iii) Mass-storage devices, including disk storage (magnetic, optical, magneto-optical), magnetic tape units in their different forms, and static mass-storage elements. Such units should cover the whole range necessary for the different computer configurations;

(iv) Other peripherals, including: terminals; different input devices such as electronic mice, printers and plotters; and virtual-reality-related devices such as head-mounted displays and data gloves;

(v) System software, including: operating systems suitable for the whole spectrum of computers; different compilers for procedural, logic, and functional programming languages; and any other relevant system software;

(vi) Intelligent database-management systems which combine the following into a single package: support for conventional databases, object-orientation, hypermedia, on-line information retrieval, and expert systems;

(b) Information- and knowledge-based systems

This category includes the following:

(i) Information systems that use hypermedia facilities, including voice and text. Many applications spanning all sectors are emerging;

(ii) Intelligent computer-integrated manufacturing (CIM), which is becoming the basis for a whole range of manufacturing facilities;

(iii) Knowledge-based systems, including machine translation, expert systems, and other artificial-intelligence applications;

(iv) Intelligent tutoring systems, based on multimedia and virtual reality. This is being developed as a basic foundation for all levels of the educational process, from kindergarten to post-graduate studies;

(v) User-interface systems that are based on the Arabic language. This cannot be implemented effectively without the participation of Arabic-speaking countries.

Figure II summarizes the above-mentioned list.

Figure II. Layers of microelectronics technology

Embedded systems

Electronic and optical-based systems

Stand-alone devices

Basic building blocks (add-on boards)

Components

Materials technology

2. Microelectronics

The scope of microelectronics includes the following:

(a) Materials technology -- including new materials and the technologies needed for electronic, optical, bio-, and hybrid components;

(b) Components -- including integrated circuits at all levels, integrated optical and biocomponents, passive components, and sensors (with special emphasis on microsensors);

(c) Basic building blocks -- including add-on boards for microcomputers to support neural-network applications, and enhancements for parallel processing (using transputers, for example);

(d) Stand-alone devices -- such as microcomputers and workstations, and other microelectronics-based devices;

(e) Completely electronic and optical-based systems -- such as electronic telephone and data exchanges, or integrated services digital networks (ISDNs);

(f) Embedded systems: this refers to computers and other microelectronics-based devices are physically embedded within a larger system and whose primary purpose is to maintain the relationship between the components of the system in order to achieve the overall system objective (Ralston and Reilly, 1993). Embedded systems have certain characteristics that greatly complicate the process of structuring the software, which means that microelectronics and informatics technologies should be closely integrated for these applications. One of the most significant characteristics is the real-time, reactive nature which is essential to process-control systems; many of them are safety-critical embedded systems, and a run-time failure can result in death, injury, loss of property, or environmental harm.

Figure III shows a summary of the above.

Figure III. Layers within informatics

User-interface systems	Information- and knowledge-based systems
Intelligent tutoring systems (multimedia and virtual reality)	
Knowledge-based systems	
Intelligent computer-integrated manufacturing (CIM)	
Information systems (hypermedia-based)	
Intelligent database systems	Information technology
System software	
Peripheral devices	
Mass-storage devices	
Computer network elements	
Computers	

To indicate which areas are relevant to small and medium-sized businesses, each layer in figures II and III is divided into three phases: (a) education/learning and research; (b) acquiring technical know-how, prototyping and development; and (c) actual production. Figure IV shows the phases (at different layers) at which small and medium-sized businesses -- in cooperation with universities -- can start immediately. Of course, not all layers are equally relevant; some of them may be more appropriate than others. It also might be more appropriate to start with specific elements from within these layers. The numbers inserted in some of the phases for the different layers represent a proposed sequence in which these phases may be implemented.

D. Attributes needed for competitiveness

The following considerations should be studied carefully, since they represent the attributes needed for competitiveness in the microelectronics and informatics fields. Of course, it is assumed that the points discussed in the previous section (regarding selecting the microelectronics and informatics elements appropriate for small and medium-sized businesses) have been given proper consideration.

1. Level of training

Microelectronics and informatics technologies require highly qualified personnel for most of their activities; some of these are labour-intensive, and involve design activities (for all the layers mentioned in the previous section) and software-development activities. Since gaining a competitive advantage requires stressing innovation, training policies and the level of proficiency achieved are important attributes.

The training policy should include university-level (and possibly pre-university) education schemes, on-the-job training, continuing education, and training. Information systems and computer communications networks could also be of some help in this regard by facilitating "current awareness" and the selective dissemination of information; such systems would enhance the environment needed for innovation.

2. Research and development (R and D)

In microelectronics, the R and D at the component and materials-technology levels represents the most difficult and expensive phase for developing countries in general, and for small- and medium-scale businesses in particular. However, it is possible to carry out R and D at the other levels (from basic building blocks to embedded systems).

In informatics, developing countries can engage in R and D (for small- and medium-scale businesses) at the following levels: certain areas in the computer, network-component, and systems-software fields; information systems (multimedia-based); and knowledge-based systems, intelligent tutoring systems, and user-interface systems (Arabic-based).

According to Friedrichs and Schaff (1981), developing countries can (and should) intensify R and D efforts in software and man-machine interface:

Figure IV. A proposed implementation plan

Phase / Category	Education, learning, and research	Acquiring technical know-how, prototyping and development	Actual production
I. Informatics			
User-interface systems			8
Intelligent tutoring systems			1
Knowledge-based systems			7
Intelligent computer-integrated manufacturing (CIM)		2	14
Information systems			6
Intelligent databases			11
Systems software			5
Peripheral devices		10	13
Mass-storage devices		9	12
Network elements			4
Computers			3
II. Microelectronics			
Embedded systems			
Electronic and optical systems			3
Stand-alone devices			2
Basic building blocks			1
Components		4	5
Materials technology		6	7

Note: = can start immediately; numbers signify the order in which the various categories might be implemented.

"Software and man-machine interface are areas where some developing countries could play an important role, providing they possess a degree of specialization and forceful government policy. It must be understood, however, that an important level of dependence will continue to exist at the component level. This should encourage developing countries to pool resources in order to reach economies of scale on a regional basis, even at the software level. Software is a complex skill, but at the same time remains an extremely labour-intensive activity which demands close contact with the end-user for most applications. India, with its large portion of highly educated people and its low labour costs, has successfully been able to export software to developed countries."

E. The role of universities

1. Creating a strong "core" of specialists

It is becoming much more important to form a strong core of informatics and microelectronics specialists. This objective can be achieved through the following: specialized formal education, taking into account the advances made in the different fields indicated in the scope of these technologies; and the establishment of intensive continuing education programmes which will enable these specialists to cope with new developments in these fields.

2. Reorientation of other specialists

Many engineering disciplines need reorientation to cope with their now intensive use of computer-based systems. One such field is communications engineering. Advances in this area (e.g., electronic telephone exchanges and emerging ISDNs) mean that an intensive reorientation programme is needed for both senior and junior engineers, through formal education at the university level or less formal training elsewhere.

3. Expert-user qualification

The entire spectrum of end-users, from top management to operational personnel, have to be qualified to make proper and optimal use of microelectronics-based systems; it is essential for them to know the capabilities and scope of such systems.

The wide spectrum of available systems confuses many users with regard to the optimum choice for their needs. Even if the needs are known, they are often not communicated in terms that can be understood by suppliers.

User qualification is an area where much effort must be expended, especially at the top management level. Decision-making procedures and decision-support systems should be emphasized.

4. Qualification of end-users

It is essential at this stage to start thinking of educating the general class of users -- and even the general public -- about the impact of microelectronics and informatics.

General education programmes could be started, and it seems probable that the mass media could be of much help in this area.

5. Suggestions to improve qualifications

(a) Enhancing formal professional education

Formal professional education at both the undergraduate and post-graduate levels should be enhanced: curricula that can be adapted to changing environments at the local, regional, and international levels have to be designed; appropriate laboratories should be set up; and close cooperation with both industry and end-users should be encouraged;

(b) Establishing vocational-education support programmes

Support in the form of vocational education is now essential in all branches of microelectronics and informatics. Personnel with the appropriate vocational training could take over some of the more routine jobs that are currently done by specialists;

(c) Continuing education

This form of education exists only on a limited scale. It should be made a basic part of engineering training at all establishments. The possibility of creating a national continuing education engineering centre should be investigated;

(d) Project-oriented research and development

The current rate of development in the microelectronics and informatics fields makes it necessary to intensify project-oriented R and D. This would allow developments in the field to be closely followed, and would also help form a core of highly qualified experts who could make decisions regarding the establishment of new projects and help to implement these projects.

F. The role of universities in research and development

The role of universities and research institutions in carrying out R and D that may help support small- and medium-sized businesses will be discussed in this section; some examples are taken from developed countries, newly industrialized countries and developing countries.

1. First example

The first example of interaction between universities and industries pertains to informatics in a developed country -- the United States. The James Martin Associates (JMA) university programme offers a tailored package of software, documentation and educational material dealing with computer-aided systems engineering (CASE) as one of the information engineering methods. In this respect the Information Engineering Facility (IEF) is used as a framework for system development, providing no restrictions on

standards. Information engineering provides a comprehensive framework for meeting the information needs of a business or organization. It encompasses all phases of the software life cycle, from strategic information planning to system construction (Texas Instruments, 1990).

2. Second example

The second example is in the field of microelectronics. The cooperation programme between the California Institute of Technology (Caltech) and the Xerox Palo Alto Research Center (PARC) increased student/faculty interaction with industrial researchers and stimulated research on both sides in the field of very-large-scale integration (VLSI) system design. Details of these activities are reported in a well-known book by Mead and Conway (1980). Another reference (Mead, 1989) goes even further, including analog VLSI and neural networks among the activities listed.

3. Third example

A third example is related to concurrent engineering. An R and D programme called the DARPA Initiative in Concurrent Engineering (DICE) aims to promote concurrent engineering in American industry (Sprague and others, 1991). From the top-management point of view, a concurrent-engineering environment should: shorten the time needed to market total-quality, affordable products and services that have flexible options; enforce sustained improvement; and provide a high ratio of benefits to costs. The DICE programme has adopted the "human team" concept as a model for concurrent engineering. Its strategy is to use computer and communications technologies to enhance the capabilities of interdisciplinary teams. These "enhancements" include the following: the integration of frameworks, tools, and other services; a networked collocation of multimedia communications among experts, applications, and services; information sharing; team coordination; and a corporate memory bank with electronic documentation of the evolving and final product or system configuration.

This programme is distributed among both industrial and university centres. For example, General Electric is participating, and West Virginia University is involved through its Concurrent Engineering Research Center.

4. Fourth example

The fourth example is from Japan and covers the TRON project, which is under the leadership of Ken Sakamura of the University of Tokyo. The aim of the project is the design of an open-system computer architecture (Sakamura, 1987; Sakamura, 1990). TRON stands for The Real-time Operating-system Nucleus, and encompasses the development of an open architecture, a family of VLSI chips, and system software. TRON comprises several layers, each with its own set of specifications. The layers are: the instruct-set-processor, or ISP layer; the operating-system (OS) kernel layer; the OS shell layer; and the application and man-machine interface layer.

This project involves more than 140 companies from Japan, the United States and Europe. A future is envisioned in which electronic appliances become intelligent objects containing microcomputers, sensors, and actuators that can offer intelligent services. The intelligent objects can be connected by a network so they are able to offer sophisticated services. A highly functional distributed system (HFDS) will connect 10,000, 1 million, or even 1 billion such intelligent objects and operate as a cooperative distributed system.

5. Fifth example

The fifth example is from Europe, and involves a neurocomputing project of the European Strategic Programme for Research and Development in Information Technology (ESPRIT) called "Pygmalion" (Angeniol, 1990). This project aims to promote the application of neural networks within European industry and to develop European computation standards for neural networks. Pygmalion applications span the areas of image processing, speech processing, and acoustical signals. In image processing, two areas of application domains were chosen: remote sensing and factory inspection. Remote sensing includes pattern recognition and the interpretation of spot images on the Earth's surface such as road traffic, fields, and various kinds of soils. Factory inspection covers the recognition and classification of work-pieces in a factory-automation context. The Pygmalion project brings together many of the leading neural-computing research groups from European industry, research institutes, and universities distributed over six countries.

6. Sixth example

The sixth example deals with automation-technology programmes in a number of Asian countries (Asian Productivity Organization, 1987). In the 1960s, automation technology was used for very-large-scale production of the same types of items. Nowadays, however, microelectronics and informatics have enabled automation to be introduced in the small-scale production of a large variety of goods. Since product quality and productivity are increasingly vital in terms of international trade and market diversification, automation is assuming an essential role, together with its main pillars -- computer-integrated manufacturing (CIM) and flexible manufacturing systems (FMS). This environment is beneficial to small- and medium-scale enterprises, assuming an appropriate national policy is formulated. The Asian Productivity Organization (APO) recommends that automation be promoted among small and medium-sized enterprises, since without their healthy growth, neither export expansion nor economic growth can be expected. One of their important recommendations is to disseminate information on automation, together with its functions and effects, among these enterprises. Specific information would include automation technology, application procedures, and production and management techniques. To achieve this, a promotion centre must be established to consolidate the training of engineers and R and D for various automation-related machinery including industrial robots, CAD/CAM and sensors.

In Singapore, for example, robot-leasing was initiated to provide consultancy services on automation and reduce the cost of leasing industrial robots and other related automation machinery.

In Taiwan, the Factory Automation Task Force also provides consultancy services on automation, mainly to small and medium-sized enterprises.

In the Philippines, the Industrial Automation Training Centre was set up at the University of the Philippines' Institute for Small-Scale Industries. It is a training centre equipped with experimental facilities containing the complex technology and machinery of mechanical, pneumatic, electrical, and electronics engineering. It also organizes low-cost automation training courses. There are similar centres in India and Hong Kong.

7. Seventh example

The seventh example is concerned with the situation in Egypt. Small enterprises related to microelectronics have design capabilities, together with small-capacity manufacturing systems, in the fields of control, communications and data processing. Sometimes these enterprises act as subcontractors, designing, constructing and installing equipment that is needed within research and development projects that are being conducted between universities/research centres and large enterprises. In other situations, they can benefit from research projects supported by international establishments such as the United Nations Development Programme (UNDP) and executed through joint cooperation among a number of entities (universities and industrial enterprises, for example). Some examples of such small enterprises or industrial-development projects are given below.

The products of these small enterprises include different computer add-ons such as data acquisition cards, some special graphics adapters, programmable logic controllers (PLCs), and special control cards.

There are also development projects supported by the Academy of Scientific Research and Technology that are aimed at enhancing industrial organization. The necessary equipment is sometimes provided by small enterprises. Some of these projects are as follows:

(a) The development of Jacquard looms whose mechanical functions are taken from magnetic disks instead of punched cards. When this project is completed it will be possible to convert all looms, and this is likely to clear the way for more innovations in the future. It will also promote small enterprises which can produce, upgrade and maintain the resulting systems;

(b) Another project is concerned with an integrated control system for a large textile company. The project aims at designing and implementing a pilot system for the control of the spinning and weaving production processes;

(c) A third project is concerned with applying computer-based technology for the development of a computer-based process control system for a food company. The main target is to improve both production and productivity through the introduction of automatic control systems and process computer control, by improving material handling, and by upgrading the technical abilities of the company's technical staff. The team responsible for the implementation includes members from university and research centres;

some systems are implemented by small enterprises specializing in the design and construction of computer-based control systems;

(d) A fourth project is concerned with the development of computer-based process control for the calciner and DC casters of an aluminium company. Among the project's objectives are the development of supervisory control systems, microprocessor-based control, and PLC systems for a number of sub-processes;

(e) A final example of a research project supported by UNDP is the development of an expert system for the sintering process in an iron and steel factory. This also involves cooperation among university, industry, and private-enterprise team members -- in this case, to supply the platform on which the system is implemented.

G. Software as an industry

The concept of software as an industry and the steps that developing countries could take to promote this industry have been developed by the UNIDO Secretariat through the Consultative Group on Information Technology (COGIT) (United Nations Industrial Development Organization, 1992). The focus is on the approach to software production and guidelines for organizing software houses. Following are the major factors behind the development and promotion of this concept:

(a) Increasing demand for software, especially in the area of distributed system software and applications software which support easy-to-use man-machine interfaces and integrated hardware-software solutions;

(b) The globalization of the software market. The standardization of computer hardware due to advances in microelectronics and the availability of a global communications infrastructure (e.g., Internet) has led to close transnational cooperation among software professionals. Therefore, a product either succeeds globally or disappears; even niche markets are being globalized;

(c) The need for high-quality product, documentation and development processes. Due to the globalization of the software market, only products of high quality will succeed. Rigorous, structured development is therefore needed; many software users demand full accreditation of the software-development process;

(d) The increased cost of entry into the software market. The emphasis on software quality assurance has increased the cost of entering the software market -- especially for small enterprises. UNIDO is promoting joint-venture cooperation and risk-sharing between companies in industrialized and developing countries to resolve that problem.

To improve product quality and effectiveness in the small- and medium-scale industry sector, demonstration projects that yield tangible and measurable improvements in productivity must be executed. In this respect, it is essential to understand that the most

critical input to software development has to do with the quality and capabilities of the available human resources.

In Egypt, the Regional Information Technology and Software Engineering Centre (RITSEC) has been established with the support of UNDP and the Arab Fund for Economic and Social Development (Saleh, 1993). The mission of this Centre is to support and help develop information technology and software industries in the region, so that the latter may become a world-class industry able to compete at the international level.

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