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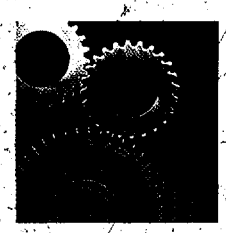
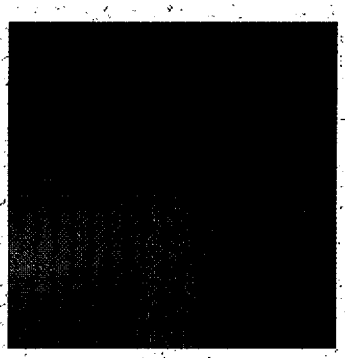
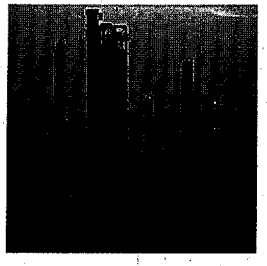




UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

INDUSTRY FOR GROWTH INTO THE NEW MILLENNIUM



INDUSTRY FOR GROWTH INTO THE NEW MILLENNIUM

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

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Foreword by
Mr. Carlos Magariños
Director-General of UNIDO

This publication is intended to serve as a UNIDO contribution to the ongoing debate on the role of industrialization in socio-economic development in a globalizing world. This was the core issue of discussion in the Forum on Sustainable Industrial Development held in Vienna on 29 November - 1 December 1999 in conjunction with the eighth session of the General Conference of the United Nations Industrial Development Organization (UNIDO). The publication is structured in two parts: Part A outlines the main issues discussed and conclusions drawn, while Part B presents the full papers and lectures delivered at the forum by the various panellists and other distinguished speakers.

The Forum was conceived as a means of presenting an occasion to the Organization and its Member States to discuss seriously, on a technical basis and by analyzing case studies, the evolving role of industry in development. Coming at the close of the last millennium and twenty-five years after the international community met in Peru to adopt the ambitious and wide-ranging Lima Declaration as the cornerstone of UNIDO, this Forum provided a valuable opportunity to exchange views on substantive issues of industrial development in a lively and more interactive manner than is customary in the framework of the General Conference. In particular, it enabled us, the Organization and its Member States, to assess jointly both the achievements of the past 25 years and the challenges for the future. These challenges arise principally from the many changes in global patterns of industry and trade that have taken place in the meantime through the process commonly referred to as globalization.

In this context, three features of today's global picture are of particular interest:

- First and foremost, industry has retained its role as an important driving force behind economic growth and improvement of material standards of living;
- Second, there is a strong tendency towards the spatial agglomeration of industrial activities; and
- Third, the observed uneven spread of industrial activities offers good prospects for a coupling of less developed economies with more developed ones.

The corollary that can be drawn from these three statements is that while industrial development remains the principal foundation of economic and social development, the forces of spatial concentration that often drive industrial development tend to exacerbate developmental inequalities at both the national and international levels. This trend can be reinforced by the process of globalization, which removes regulatory barriers to the movement of industry and enhances the forces of global competition that are increasingly driven by non-price factors such as product quality, delivery speed, design factors, product-related services etc. In order to reduce the risk of marginalization implicit in these developments for some countries, specific measures such as continuous skill upgrading and the build-up of national innovation systems need to be taken to integrate industries in the disadvantaged countries into global production networks and value chains. In formulating and implementing these measures, the countries concerned continue to rely to a considerable extent on external assistance, such as that provided by UNIDO.

To address these critical issues in a rigorous and consistent framework, the Forum was structured into four substantive panels, followed on 1 December 1999 by a brief session summarizing the major insights gained from the foregoing deliberations. The first of the substantive panels showed, on the basis of historical evidence and economic analysis, both the continued importance of industry and its agglomerative tendencies. The second panel examined how the globalization of value chains in many industries, and the strategies and organization of global firms in those industries, could enhance the dynamics of industrialization of developing countries and economies in transition. The third panel considered the relationship between the development of industry on a global scale on the one hand, and crucial environmental concerns on the other. The fourth panel, finally, presented UNIDO's new concept of multi-sector partnership programmes for supporting the integration of industrial enterprises in developing countries into global value chains, and illustrated the benefits to be derived from such programmes with particular reference to such a programme currently being implement to assist the automotive component industry in India.

The principal lesson learned from the Forum is that the new challenges to industrial development arising from the process of globalization will need to be confronted with new instruments and methodologies. One is not going to solve the problems of the future with the tools of the past. In the future, industry will increasingly have to be used to "reconnect" the populations of developing countries to the global economy, and this will only be achieved by stimulating sustained productivity increases in these countries. It is for this reason that I strongly believe that the economic reform process initiated some years ago with measures to establish macroeconomic stability, which was followed by a second generation of reforms aimed at institutional strengthening and good governance, needs to supplemented by a third generation of reforms. These latest reforms will have to focus on the mobilization of information, technology, skills and knowledge to support the dynamic and enterprising private businesses in developing countries in order to enable them to "connect" with global production systems.

Highlighting the need for these additional measures was precisely the purpose of the Forum on Sustainable Industrial Development. As such, this Forum represented yet another milestone in the transformation of UNIDO that began two years ago with the aim of directing the Organization's services towards the production of public goods which would help to reconnect the population of the developing countries with the process of globalization. As I suggested above, this process has the potential to be both beneficial and harmful for developing countries and countries with economies in transition. It must be our common goal and endeavour to maximize the benefits and minimize the threats.

A large number of persons, including UNIDO staff, contributed to the success of the Forum. Messrs. Ghislain Robyn, Frederic Richard, Zoltan Csizer and Wilfried Lütkenhorst led the process, leading to the organization of different panels and acted as moderators during the Panel discussions. Mr. Nilmadhab Mohanty coordinated their responsibilities, assisted by Mr. Sarwar Hobohm who was instrumental in preparing and editing the various papers for publication. I would like to place on record my appreciation for their work. I would also like to thank the experts, other resource persons, UNIDO staff and representatives of the member states who participated in the discussions and contributed to the Forum's success.

Finally, my special thanks are due to Ambassador Shaukat Umer of Pakistan who presided over the Forum and guided the discussions to meaningful conclusions.

Carlos Magariños

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A. SUMMARY OF PROCEEDINGS

Panel 1
The New Geography of Industry
Insights from Economic Analysis

Moderator:	*Ghislain Robyn*
Panellists:	*Ghislain Robyn* *Sylvia Delgado* *Yuko Konishita* *Stephen Machin*
Distinguished speakers:	*Fabrizio Onida* *Murtaza Rakhimov*

Introduction

1. This panel was intended to elicit insights into current worldwide trends in industry, and in particular to ascertain answers to a number of difficult questions of fundamental relevance to UNIDO: Is industry still the key for growth? How does industry spread? How does industry grow?

2. While for many the link between industry and growth is crystal clear - after all, growth has been driven by industrialization for the best part of three centuries - the growth-inducing capability of industrialization is nevertheless being questioned in some developed countries where this link has become more tenuous. This is due mainly to the fact that industrial productivity in those countries grows faster than production; therefore jobs decrease and the social importance of manufacturing appears to be fading away.

The Role of Industry

3. The panel first addressed the issue of industry's role in growth. On the basis of both historic and more recent evidence culminating in the emergence of the Asian "tiger" economies, it was shown that industry had always been, and remained, a crucial factor in economic growth. While it is true that in some of the more advanced countries there is a trend towards an increasing importance of services and info-based industries, this is based on a coupling of services and industry, as in the case of Hong Kong and its industrial hinterland in the rest of China. Although the share of industry in production accounts is on the decline, growth of the whole production sector continues to be fostered by industry. This is due to a productivity effect - specifically generated by industry and transmitted to the rest of the economy.

4. The reason for industry's dynamism is that it is based on innovation leading to continuous shifts in the boundaries of the set of production possibilities. Three important reasons were identified for the importance of industry in driving economic growth:
   - The domain in which industry operates - manufacturing
   - The technology of industry, which is characterized by increasing returns to scale
   - The input-output linkages of industry.

5. With reference to the first of these points, it was argued that industry was so important because it takes manufactures (intermediate goods) and transforms them through manufactures (capital goods) into manufactures (final products). As innovation derives mostly from advances in the sciences (physics, chemistry and biology) the domain of material artefacts where manufacturing is performed lends itself better to utilizing research and development.

6. The domain of industry lends itself to invention through the application of sciences. But science-based inventions involve high expense (because creative science is done by man) and are easily copied (because scientific knowledge is by essence universal). Thus in the economic domain there is an incentive-failure when it comes to undertake innovation. But industry can surmount this failure thanks to increasing returns. Increasing returns provide profit margins that can absorb the risk-premium needed to handle innovations.

7. Turning to the input-output linkages of industry, it was pointed out that this was also linked to the first point in that it involved manufacturing activities all the way down. The major client of industry were industrial firms, which had the increasing returns characteristics just described. This served to boost the performance of enterprises and the economy as a whole, leading to self-sustained growth.

The Location of Industry

8. The panel then moved to discuss the issue of the geographical concentration of industry. It was found that the same factors which give industry its dynamism also prompt it to agglomerate in geographical concentrations. The dynamics of input-output linkages, for example, prompt firms to locate near other firms, who are their buyers and suppliers, in order to minimize transport costs. Such a geographical concentration also facilitates face-to-face interaction between firms, which is essential in order to transmit knowledge.

9. An attempt to link the insights of trade theory with those of the 'New Economic Geography' and simulate the effects of globalization was presented by the panel. This showed the complex interplay of comparative advantage and market size effects in determining the location of industry and yielded a number of interesting results, highlighting in particular the decisive role of trade costs in this process.

10. While highlighting the existence of a permanent concentration force prompting industries to concentrate in areas where they have historically developed, the panel pointed to the fact that there were also dispersion forces arising from such sources as a desire on the part of firms to get as close as possible to their clients and the lack of labour mobility. In attempting to anticipate the effects of the decline in transport costs as a result of recent technological developments on the location of industry, the panel noted that the simulations undertaken in the context of studies conducted within the framework of the New Economic Geography allowed many scenarios to be developed. The most popular of these suggests that the dispersion effect of wage differentials between developed and developing countries eventually overcomes the concentration effect and prompts firms to relocate to the low-wage area. This, in turn, leads to the beginning of a new local agglomeration, which

reinforces the comparative attraction of the host region. This leads to a wavy, cascading spread of industrialization, with serious implications for countries not in the vanguard of this process, who might have to wait very long before they are reached by the spread of industrialization.

11. In explaining the development impact of this mechanism of the spread of industry, the panel noted that the first industries to move away from existing agglomerations would be those oriented towards final consumers or those with few industrial inputs. These firms would have little developmental impact on their host countries, which would only begin to increase when the second wave of more input-intensive firms followed the first wave. The stage of self-sustained development in the host economy would not be reached until the third wave of this migration, however, when firms that were both industry-oriented and input-intensive began to arrive.

Support Measures to Promote Industrial Development

12. The panel showed that while industry was a prime source of increasing returns to scale, and was therefore much needed and wanted for growth in developing countries and economies in transition, it needs special efforts to be attracted and promoted. These include measures to help these countries to overcome 'natural' forces of adverse comparative advantage and industrial agglomeration in core countries, and others to support the build-up of agglomerative forces in the developing countries themselves.

13. Measures also have to be taken to address other key factors underlying industrial growth, especially the acquisition of technology, the promotion of foreign capital inflows and the build-up of a domestic skill base. Citing empirical studies, the panel showed that technology spillover effects of foreign direct investment (FDI) play a particularly important role in stimulating productivity growth in developing countries, and that the enhancement of the domestic skill base permits these countries to benefit from these effects more widely.

14. On the basis of empirical work utilizing data from the coastal area of China where the government had an open-door policy, FDI firms were shown to display a much higher level of total factor productivity than local firms. Against this background it was argued that FDI could be an important source of increased productivity because it could benefit the host country in four specific ways: through technology spillovers such as demonstration, imitation and contagion; through competition; through foreign forward and backward linkages; and through training. Of these, technology spillovers and training were seen to be the principal sources of domestic productivity growth in the region covered by the empirical research presented by the panel. The importance of training was a particularly significant feature of these results, since it showed that Chinese firms were successful in absorbing technology because they trained their workers.

15. The significance of skill upgrading was also underlined by the panel, which cited empirical evidence indicating a shift in demand in favour of skilled workers. On the basis of both intra- and inter-country analyses of employment patterns it was argued that it was mainly technological change which had driven the increase in demand for skilled workers; i.e. that skill-biased technological change had been the prime determinant of the observed skill upgrading. This was true not only in the case of developed countries but also in the case of developing countries, as the new technologies were being diffused across national borders. By contrast, these results could be taken as an indication that the competitive effect of low-wage labour in developing countries had had little effect on the weakening position of unskilled labour in developed countries.

Policy Implications

16. The empirical findings presented by the panellists were seen to be clearly policy-relevant. Specifically, they showed that:

    - Country size does play a considerable role in determining the specialization of production, as long as there are trade costs;
    - There is a need for developing countries to develop their capacities to absorb technology spillover from FDI; and
    - Skill-biased technological change rather than the competition of developing countries' products exported to developed countries is the main determinant of the decline in demand for unskilled labour in OECD countries.

17. These findings implied, first, that the international dimension had to be taken into account in formulating policies and, second, that there was a necessity for policy makers to intervene in the market with rational policies in order to enable countries to obtain optimal results from the process of internationalization currently in progress. As an example, it was noted that if the hypothesis of skill-biased technological change was correct, then the development of a proper skill base of workers that could use the new technology coming from the dominant firms in the industrialized world was critical, and that there was therefore a strong need for training to ensure that developing countries and transition economies were not left behind.

Contributions by Distinguished Speakers

18. Contributions to this panel were heard from two distinguished speakers, Professor Fabrizio Onida of the National Institute of Foreign Trade in Rome and His Excellency Mr. Murtaza Rakhimov, President of the Republic of Bashkortostan in the Russian Federation.

19. Professor Onida noted that the re-thinking of international trade theory comes from a profound cross-fertilization of different disciplines - industrial organization, endogenous growth, and the geography approach. He then made the following points related to the central issue of how developing countries learn to implement appropriate policies aimed at developing dynamic gains from trade and thereby capture the benefits of globalization:
    - Developing countries may benefit from the modernization of their own labour-intensive production even if they specialize in the unskilled labour-intensive sector, because it teaches them to add value to their natural or human resources;
    - Specialization and international trade gives developing countries the opportunity of raising standards of living and achieving within-industry skill upgrading;
    - Most empirical studies show that FDI and other non-equity forms of investment make a substantial contribution not only to integration in basic terms but also in providing and improving knowledge, information and managerial skills;
    - With regard to the issue of geography and trade, regional integration may be adopted as an important and successful stepwise strategy to achieve the economies of internationalization through larger markets, including economies of scale of production and distribution, circulation of knowledge, and greater attractiveness for foreign investors.
    - Developing countries must urgently address the need for education and training if they are to take full advantage of the globalization process;
    - With regard to the issue of social dumping, it should be noted that the integration of goods, capital and people is being accompanied by an integration of institutions, which allow the diffusion of certain values such as democracy, human rights, social standards and labour

standards, through trade and investment. In this context the raising of social and labour standards should not be seen as a question of sanctions but of reducing the level of poverty. The ILO protocol on social standards should therefore be widely diffused, multinational corporations should adopt ethical standards, and positive incentives such as trade preferences should be given to developing countries to adopt these standards.

20. President Rakhimov began by introducing the Republic of Bashkortostan, which is located in the centre of Russia, about 1,500 kilometres east of Moscow. The Republic has a highly diversified raw material base, with extensive forests and arable land as well as a well-developed and diversified industrial base. President Rakhimov also pointed out that his republic has good trade relations with other Russian regions and many foreign countries, which have been facilitated by the special status of Bashkortostan as a sovereign republic within the Russian Federation. He noted that the Republic was giving priority to attracting foreign investment, improving the difficult environmental conditions, and establishing a market-based economy while retaining a social dimension.

21. President Rakhimov noted further that on 23 April 1999 the government of Bashkortostan had signed a cooperation agreement with UNIDO under which industrial enterprises in the Republic will be extended assistance. Specialists from UNIDO have already been able to work out the mechanisms for cooperation on the four-year programme, which deals with enhancing the Republic's industrial potential and ensuring its sustainable development. The main components of the programme include the establishment of a system of industrial support, promotion of industrial partnerships and foreign investment, and the improvement of the environmental situation. The programme includes several high priority projects, including the construction of a reservoir, a polycarbonates complex and the airport at the capital city of Ufa. In order to implement these projects and many others, the Republic is seeking to broaden its links with foreign entrepreneurs and improve the business climate. In this regard, and within the framework of its cooperation with UNIDO, the government is beginning to establish the necessary institutional infrastructure, including an agency for industry and partnership promotion.

22. In conclusion, President Rakhimov stressed that his Republic stands ready to broaden its cooperation with UNIDO in such fields as food production, forestry and wood processing, furniture making, light industry, improving the system of quality control, standards and certification, and SME development. He thanked UNIDO and congratulated the Organization for having intensified its cooperation with the Russian Federation and its constituent parts since the election of Director-general Magariños, which has heightened the prestige of the Organization.

Panel 2
Globalization of Production Systems and Implications for Developing Countries and Economies in Transition
The Upgrading of Local Competitiveness

Moderator:	*Frederic Richard*
Panellists:	*Hubert Schmitz* *Didier Lombard* *Claudio Frischtak*
Distinguished speakers:	*Péter Hónig* *Maria Elena Cardero Garcia* *Ombretta Fumagalli Carulli* *Bunrou Shiozawa* *Stefan Salej* *Carlo Filippini*

Introduction

1. The deliberations of this panel followed directly from those of Panel 1, which had explained why industries agglomerate or cluster in specific geographical locations. The driving force of this process was the availability of local competitive advantages, such as skills, knowledge, resources, the size of the local market and the presence of an efficient supplier base. While the analysis presented in Panel 1 had necessarily been theoretical, this Panel was intended to look at the practical questions raised by these issues: What are the strategies of the multinational companies? How do they affect the possibilities of the developing countries to take advantage of the process of globalization?

2. The Panel noted that in developing countries clusters had a tendency to emerge in resource and labour intensive industries. To achieve sustainable growth, developing countries must upgrade the productivity and capabilities of these clusters, and enter into more sophisticated and knowledge-intensive activities. The purpose of this panel was to address these issues and analyse how globalization affects this process of upgrading and innovation. In this context it was noted that on the one hand the globalization of production systems opens great opportunities for developing countries in terms of access to markets, knowledge and resources, while also contributing to an integration in the value chain of global retailers and manufacturers. However, it was also noted that on the other hand competition is becoming increasingly strong, in particular in the labour and resource intensive segments of value chains, and the requirements in terms of quality and speed of delivery are also becoming greater every day.

The Effect of Globalization on the Organization of Systems of Production

3. In assessing the impact of globalization on the organization of systems of production in developing countries and economies in transition, the Panel began by emphasizing that the question of whether to integrate into the world economy was no longer an issue given the rampant trade liberalization that had already taken place throughout the developing world. The question was how to integrate, and the choice was between the low road, involving increased industrial and export activity without reaping the benefits of this activity, and the high road, involving the achievement of higher returns and sustainable income growth. It was noted that the principal means of achieving the high road was through upgrading, either by shifting to manufacturing products which command a higher price, or by acquiring new functions in the global value chain.

4. The Panel noted that the research and policy-making communities, including UNIDO, have placed an increasing emphasis on local sources of competitiveness, involving economies of clustering, synergies, systemic competitiveness, local innovation systems and collective efficiency. This has led to a common message: Upgrading is facilitated by sectoral and geographical agglomeration. Such clustering makes it easier for firms to specialize, to reap the externalities generated by other nearby specialized enterprises, to engage in learning by interaction, to cooperate and to grow in small steps.

5. It was noted in this context that such clusters provide not just favourable growth prospects but also favourable export prospects for the following reasons:
   - Clusters are common in a wide range of countries and sectors;
   - Clustering has helped small enterprises to overcome growth constraints and compete in distant markets;
   - The collective efficiency approach helps to explain the ability to grow;
   - However, collective efficiency only emerges where trust sustains inter-firm relations and where traders connect clusters to sizeable markets;
   - The cluster research has practical relevance, contributing to a policy approach which hooks into enterprise networks and self-help institutions.

6. The Panel noted, however, that the optimistic view on the upgrading potential of developing countries through SME clustering and networking needed to be tempered because there were limits to these local upgrading strategies. These arose largely out of the increasing degree of concentration among the foreign buyers of the goods produced by local SME clusters in developing countries. This concentration feeds into two types of chains - the producer-driven chains and the buyer-driven chains. Producer-driven chains occur where the lead firms driving the chains are themselves producers - e.g. in the car industry. In the buyer-driven chains the lead firms have nothing to do with production but concentrate on such activities as branding, designing and marketing.

7. The concentration of power in the buyer-driven chains has particularly serious implications because it is leading to an increasing number of developing countries engaging in contract manufacturing for a decreasing number of global buyers. These chains are driven by price rather than quality, which mitigates against the emergence of long-term ties between local SMEs and the foreign lead firms, who will often resist attempts by the SMEs to move into the higher value-added realms of the value chain where they could emerge as competitors of the lead firms.

8. Arguing that the strategic responses of local SMEs to global competitive pressures cannot just rely on private joint action but require public agencies as catalysts or mediators, the Panel offered the following policy recommendations:
   - The provision of public support in logistics, including such matters as effective infrastructure and speedy customs clearance.

- The integration of global buyers in technical assistance projects through partnerships with bilateral and multilateral donors, for which there are no tested role models and where it is therefore necessary to have the courage to experiment.
- Facilitating electronic commerce, in order to enable direct sales from local manufacturers and reduce the power of global buyers.

The Role of Foreign Direct Investment (FDI) in Supporting Industrial Development

9. Foreign direct investment plays a particularly important role in producer-driven value chains, and was seen by the Panel as lying at the core of the globalization process. It has risen steadily in the developing countries throughout the 1990s, and by 1997 the list of the most important recipients of FDI included four developing countries. Similarly, the contribution of FDI to GDP and gross fixed capital formation in developing countries has also risen steadily in recent years. Although there was a slight downturn in 1998, this is believed to have been of a temporary cyclical nature, and over the longer term FDI is expected to remain an important force.

10. The role of FDI in promoting industrial development is underlined by the fact that while inflows into developed countries are mainly in services, almost two thirds of investment flowing to developing countries is still in the manufacturing sector.

11. The panel argued that the FDI inflows had a wide range of potential benefits for developing countries and economies in transition: They boosted economic growth, strengthened local industry by exposing it to the international companies investing in the country, and facilitated the transfer of technology.

12. At the same time, however, the Panel acknowledged that there had been considerable variations in the flow of FDI to individual countries and regions, underlining the findings on the location of industry that had emerged from the theoretical discussions of Panel 1. It was noted, for example, that the whole of Africa, including the Arab countries of North Africa, attracted far less investment than Singapore in 1997.

13. From an analysis of the historical trends of FDI the panel concluded that its nature has gradually been changing, with three distinct "generations" of investment being identified.
    - The first generation was driven primarily by an attempt on the part of the investors to access the domestic markets of the host countries, to exploit new sources of raw materials, and/or to establish low-cost supply bases. This generation of investment therefore relies on inherited locational factors such as market size, the availability of raw materials, and the low cost of labour.
    - The second generation was focussed on the achievement of production economies through a complex fragmentation and reintegration of production processes through global sourcing, and a decentralization and regionalization of production. This generation of investment depended on domestically created assets, including a more sophisticated infrastructure (with an emphasis on telecommunications and transportation logistics); an educated labour force to face the growing skill content of production; and systems of national innovation.
    - The third generation of FDI is being undertaken by firms aiming to attain a critical size in the relevant industry and in key markets by setting themselves up as system integrators and problem solvers. This kind of investment is aimed at obtaining critical technologies, specializing around core competences and manufacturing higher-value products. Such investments are being directed mainly towards developed regional blocs and to industrializing countries with sizable economies. Only a trickle has so far gone to the less developed countries.

14. Looking at the reach of industry in developing countries under the increasingly tough world environment, the panel showed that only industries in large economies can have a global reach, while industries in mid-sized economies may have a regional reach and small economies will only be able to maintain a few traditional industries serving national markets. Based on the findings, the panel concluded that:
    - Poor and small economies should aim at the development of a dynamic and vibrant industrial base catering to domestic needs;
    - Mid-sized economies should establish regional production platforms and integrate local suppliers into global production systems;
    - Producers from the larger economies should attempt to project themselves into the global economy.

15. In order to attain these objectives, the panel argued for the need to endogenize the key drivers of industrial development. These were identified as domestic (including non-resident) entrepreneurs in the case of small and poor economies, regional export platforms and supply-chain integration in the case of mid-sized economies, and technology and capital in the case of large economies.

16. Based on these findings, the panel derived a number of both general and specific policy recommendations to promote foreign investment. The general recommendations included good, effective governance and a vision for the future, as well as the "three fundamentals" - education, infrastructure and institutions. The more specific recommendations varied according to the size of the economy in question, and the specific drivers of industrial development that they were aiming to modernize, and involved the creation of appropriate enabling business environments.

17. More generally, and based on the experience of the most successful countries, the panel identified the following proposals for promoting inflows of FDI:
    - National investment promotion agencies should be realistic in presenting their countries' assets to potential investors.
    - Efforts need to be made to retain the confidence of existing foreign investors, which can help to promote the host country's investment prospects both through the demonstration effect of their own presence and because they may have an economic interest to attract suppliers, clients or partners.
    - Measures should be taken to achieve consistency and reliability of public policies, and special attention should be paid to policies dealing with all matters related to freedom of capital transfers.
    - The provision of efficient infrastructure, especially telecommunications, should be given priority, as it is emerging as an increasingly important prerequisite for attracting investment.

Comments and Questions from the Floor

18. Important comments and questions from the floor were offered by the distinguished representatives of Haiti, India, Mali, Mozambique, the Russian Federation and Sudan.

19. The point was made that the scholarly and theoretical presentations of the panellists had largely neglected to take into account political considerations, and the fact that economic change is achieved by deliberate decisions, plans and actions. In this context, the example of Airbus Industrie was cited, which had been created through by the deliberate decision and support of the European Union (EU). It was also noted that the globalization of international trade did not necessarily mean free trade, as indicated by the persistence of the Common Agricultural Policy of the EU, which was described as a device to insulate European agriculture from world agriculture. Against this background it was

argued that the change currently taking place in the world economy was not necessarily spontaneous evolutionary change, and that there may be times when one might have to stand up and oppose the self-momentum of the system.

20. In a related issue arising from the process of globalization, the point was made that while it opened up many new opportunities, it also brought in its wake new risks. In this connection it was noted that the international community had not yet learned how to manage globalization and bring its negative aspects under control. Citing the recent financial and economic crises in Asia, Latin America and Russia, it was argued that these negative aspects were sometimes even greater than the potential benefits of globalization. The example was also given of the continued marginalization of the least developed countries against the background of income growth for wealthy countries. It was therefore argued that efforts needed to be concentrated on trying to make sure that the global processes are controllable. Acknowledging the extremely difficult and complicated nature of this task, it was argued that this would require joint action by national governments as well as the international community and the multilateral institutions. It was proposed that the multinational institutions participate in a comprehensive study of globalization in order to find mechanisms for bringing this difficult process under control. In particular, it was suggested that UNIDO could make a significant contribution towards such a programme through the study of the industrial component of globalization and the formulation of appropriate recommendations on behalf of developing countries on how to overcome the difficulties arising from the adjustments to this process.

21. With regard to the discussion of the role of industry in Panel 1, it was noted that a new definition of industry was needed since manufacturing no longer always meant the making of things. Rather, manufacturing was now increasingly closely coupled with such value-added activities as design, marketing, branding, selling and transport, and that the scope for innovation in such fields as materials, processes, the business structure and international trade relations was beginning to exceed the scope for innovation in manufacturing itself. Thus, the making of things had become a low value-added activity bringing very little profits. It was this feature of the changed nature of industry that explained to some extent the geography of the flow of investment. Based on this argument it was concluded that conglomerates invested in peripheral countries to make things at cheap prices, but retained control over the design, the materials, the marketing, from which they continued to derive monopolistic returns. For this reason it was argued that UNIDO should resist this "old division of labour" and help developing nations to upgrade their industrial capabilities in the new sense of the word.

22. One speaker raised the point that the establishment of the institutional and industrial infrastructure as well as the reliable financial and legal frameworks cited by the panel as prerequisites for attracting FDI might be necessary conditions, but did not appear to be sufficient conditions. It was noted that there were cases where these prerequisites had been met, but had not been very successful in attracting investment. The question was therefore asked whether there might not in fact be a link between FDI and the international division of labour whereby certain countries have been assigned certain roles.

23. In this connection another speaker agreed that the availability of appropriate infrastructure was correctly seen as an absolutely essential prerequisite for attracting investment. It was noted, however, that this gave rise to the important question how the developing countries, where such infrastructure was often sorely lacking, could proceed to set up the required financing systems and build the basic infrastructure when many of these countries faced severe resource constraints.

24. With reference to the view expressed by the panellists that good governance was also an important prerequisite for attracting foreign investment, the point was made that this concept is often taken as

a measurement of a country's ability to implement certain macroeconomic policies. This often implied, however, that on the one hand one had to satisfy potential international investors who want such good governance and policies, while on the other one had to satisfy civil society, which had found that such macroeconomic policies could have an adverse impact on the population on the ground, and in some cases had actually led to the overthrow of governments. The panel was asked how one could satisfy these seemingly contradictory demands of the two different parties. In response, the panel noted that this issue was perhaps a matter of how "governance" was defined. To the extent that governance was defined as the capacity to govern effectively and deliver critical services, including both macroeconomic stability and appropriate social policies, there was no contradiction between good governance and the welfare and development of a country.

25. In a related comment, another speaker made the point that there were cases of countries that had been successful in attracting foreign investment even though their record in governance was not necessarily good, including some that were embroiled in domestic conflict. In response, the panellists argued this phenomenon was usually limited to extremely resource-rich countries, and that the investment in these cases was generally confined to certain enclaves based on the exploitation of natural resources, and hence the appropriation of economic rents. These were exceptional cases, and the benefits of such investment were not normally disseminated through the entire country.

26. Referring to the importance of sound property rights in economic development, one speaker acknowledged that the situation with regard to property rights was not very good or sound in many developing countries. The question was therefore asked whether an analysis on how actually this has helped economic development was available in the English language, and whether there was a model set of codes, laws or regulations for governments wishing to encourage an improvement in these practices. To the extent that such material was not available, it was suggested that it might be worthwhile for UNIDO to prepare it for the assistance of developing countries.

27. The question was raised about the cultural dimension as a key factor in attracting and sustaining FDI. In this connection the view was expressed that technology also had to be assimilated also in a cultural dimension in order to ensure a sense of ownership among the people. This view was supported by the panel, which noted that while culture used to be regarded as a blockage to modernization, it is now recognized that socio-cultural ties, even in traditional society, can be a vehicle for overcoming distrust and can become a vehicle for learning. The critical new issue related to the manner in which such local and global cultures interacted with each other, but this was too big topic to be dealt with in the time available.

28. Finally, the point was made that although FDI was undeniably very important indeed, domestic investment was even more important because it showed the ability of a country to save and to fund its own development. Saving was not just related to what one earned, but also to how one perceived oneself, and one's present and the future.

Contributions by Distinguished Speakers

29. Contributions to this panel were heard from six distinguished speakers in the following order of presentation:
    - H.E. Mr. Péter Hónig, Under Secretary of State of the Ministry of Economic Affairs of the Republic of Hungary.
    - Ms. Maria Elena Cardero Garcia, Director-General, Office for the Coordination of Economic Affairs, Ministry of Foreign Affairs, Mexico.

- H.E. Senator Ombretta Fumagalli Carulli, Senate of the Republic of Italy and President of the Intergroup "Parliamentarians for the Jubilee".
- Mr. Bunrou Shiozawa, Director, Technical Cooperation Division, Ministry of Trade and Industry, Japan.
- Mr. Stefan Salej, Vice President, National Confederation of Industry, Brazil, and President, Federation of Industries of the State of Minas Gerais, Brazil.
- Professor Carlo Filippini, Bocconi University, Milan.

30. In his presentation, Mr. Hónig recalled that Hungary, as a beneficiary of UNIDO Funds as well as a country making efforts to strengthen its donor activity, had always been a staunch supporter of the reform process of UNIDO. Referring to the rapidly accelerating process of globalization and the resulting increase in cross-border linkages, he stressed that the formulation and implementation of successful economic and industrial policies require the continuous co-operation of all the players involved, including government, organizations representing economic interests, chambers of commerce and economy, technical associations, organizations representing the interests of employees and regional groups. In this context, Mr. Hónig noted that a Board for Investments has been established in Hungary to provide a permanent framework for continuous dialogue between major foreign investors and the Hungarian Government, and pointed out that the principal objective of the Hungarian policy was to prepare the country for its accession to the European Union.

31. Returning to the issue of globalization, Mr. Hónig pointed out that it presented both opportunities and risks for national economies. In this context he proposed that UNIDO should place special emphasis to investigating and analysing the most effective measures that developing countries could take to meet the challenges of globalization by:
    - Upgrading local competitiveness and promoting the transfer of technology;
    - Developing local quality systems with the necessary technical support services; and
    - Developing human resources.

    In this context Mr. Hónig cited several technical assistance programmes implemented by Hungary to meet these objectives.

32. Ms. Cardero Garcia sought to answer the fundamental question whether export-oriented industrialization was a key source of economic growth or not. Reviewing global statistics for the 1961-97 period, she found that rising exports did not support accelerating growth in major developing countries, with the exception of the Asian "tigers". These results were surprising, she concluded, and perhaps deserved further study by UNIDO.

33. Turning to the experience of Mexico, Ms Cardero Garcia pointed out that as the protectionist policies of the previous decades gave way to trade liberalization in the mid-1980s, the access gained by domestic producers to international suppliers resulted in a rapid increase in imports of intermediate goods. The result was a decline in the domestic content of production and a persistent deficit in the manufacturing balance of trade in spite of the spectacular growth of the maquiladoras, or firms assembling imported inputs for export. In particular, she noted that productive chains in local industrial centres were disrupted by the trade liberalization and that small and medium domestic firms faced the greatest difficulties in adjusting to an open environment.

34. While acknowledging that manufactured exports have risen much faster than GDP, and that the maquiladoras have had a dramatic impact on employment creation, Ms. Cardero Garcia pointed out that the benefits of trade liberalization have been concentrated in a small number of sectors and firms, and that the maquiladora-based activity contributes very little to total output in Mexico. Although it is very important in a few industrial sectors such as electronics, electrical and automotive

equipment, and textiles and clothing, it generates only 2.8% of gross domestic product and 13.8% of manufacturing output. Other than labour, domestic content is almost nil.

35. Against this background, Ms. Cardero Garcia pointed out that the foremost challenge for Mexico's industrial policy is to create productive chains within an open economy. She noted that regional industrial clusters, whether maquiladoras or not, have formed around a few dominant industrial activities in Mexico, but that small and medium enterprises need to be successfully integrated into these clusters, through productive efficiency, better organization and higher use of technology, in order to strengthen domestic productive chains. In this context, she explained that measures were already being undertaken to improve infrastructure, promote technological modernization, create labour and management training programs, provide incentives for higher quality, deregulate and ensure better access to credit. These measures are supported by other sectoral and regional coordination programmes, which have proved successful elsewhere in creating productive chains.

36. In conclusion, Ms. Cardero Garcia suggested that the following elements of Mexico's industrial policy needed to be reinforced:
    - Development of domestic markets, to be achieved without resorting to protectionism but through the active promotion of an integrated market, by fostering information flows and promoting rapid growth.
    - Higher expenditure on R&D, to be achieved by a combination of public and private efforts, including fiscal incentives to encourage innovation by private firms.
    - Better credit facilities for industrial activities including R&D, training, and promotion of small and medium enterprises.
    - Acceleration and deepening of efforts to promote cooperation among small and medium enterprises, as well as to create partnerships and networks.

37. Senator Ombretta Fumagalli Carulli reiterated the deep commitment of the Republic of Italy to cooperation with all of the specialized agencies of the United Nations system, and particularly with UNIDO, noting that the commitment to poverty eradication, increasing material and cultural growth, and the improvement of living conditions in the least developed countries was a moral as much as a political priority for Italy. In this connection Senator Carulli referred to the Italian participation in the UNIDO integrated programmes for a number of developing countries, as well as Italy's support for UNIDO's programmes to promote investment and assist the development of small and medium sized enterprises, and to projects in the area of industry and environment. In particular, Senator Carulli also mentioned Italy's active participation in partnership agreement between UNIDO, FIAT and the Indian government in the field of automobile components in India. Finally, Senator Carulli referred to two institutions based in Italy as examples of other vehicles for Italy's cooperation with UNIDO: The International Centre for Science and High Technology (ICSHT) in Trieste and the UNIDO Investment and Technology Promotion Office (ITPO) in Milan/Bologna.

38. Turning to the Intergroup "Parliamentarians for the Jubilee", of which she is the President, Senator Carulli explained that it is an association of parliamentarians established in 1997 representing all the parties in the Italian parliament. It has the goal of promoting social, economic and civil progress, as well as dialogue amongst peoples through the moral appeal represented by the grand jubilee of the year 2000, and is trying to promote the establishment of similar groupings in parliaments throughout the world. The Intergroup has chosen three topics in particular for action and analysis: The external debt of developing countries, religious freedom and human dignity. At present the group is concentrating on the crucially important issue of the foreign debt of least developed countries, and more specifically the 41 countries which were classified by the World Bank as the Highly Indebted Poor Countries, HIPCs, and is working for a substantial reduction, if not a complete cancellation, of this debt. It is doing this in close cooperation with the government of Italy and seeking to

introduce the issue into the appropriate financial fora, beginning with the G-7. In addition, the Intergroup plans to organize five conventions, one per continent, in order to promote dialogue in this area during the course of the year 2000. The final ceremony of the jubilee will take place in the presence of the Pope John Paul II on 5 November 2000 in Rome, where parliamentarians and heads of states and governments will come together from five continents to reaffirm the dignity of the human being and strengthen the solidarity within the great family of humankind on the dawn of the third millennium.

39. Mr. Bunro Shiozawa addressed the issue of the relationships between large enterprises and SMEs, and their implications for the transfer of technology, with special reference to the Japanese experience in the development of SMEs. He showed that there are a number of factors affecting relations between large enterprises and SMEs, which include the desire of the large enterprise to obtain cheap labour; miscellaneous services such as the maintenance of machines; additional production facilities to save capital resources in an environment of fluctuating demand and high-cost capital equipment; special or unique skills; and special parts from SMEs. In return, the large enterprises give assistance to SMEs in terms of technical guidance, training and similar services.

40. In this context, Mr. Shiozawa showed, with reference to specific examples from various parts of Japan, that three specific kinds of relationship between large enterprises and SMEs can be distinguished in Japan. In one, local natural or human resources are the main drivers of development of the SMEs. In the second, SMEs develop as sub-contractors of large enterprises. Two patterns can be identified in this category. The first is where large enterprises try to establish a knock-down operation, i.e. only assemble the completed parts into the final product. The other case is where the large enterprise tries to purchase the specialized parts from the SMEs. This type of relationship between large enterprises and SMEs can be seen as a kind of division of labour between them. The last pattern would be where the market forces drive the development of SMEs. This refers particularly SMEs that develop near major market where large demand exists and allows SMEs to develop by themselves as long as they have the necessary entrepreneurship, technology and human resources.

41. From his analysis of these examples, Mr. Shiozawa concluded that the degree of technology transfer between large enterprises and SMEs will vary both according to the specific kind of relationship between these categories of enterprises, as well as such determinants as the type of industry concerned, its natural resource base, the costs and skills of the labour employed, the type of production processes employed, the proximity to the market and the size and quality of the market. This led him to derive the following policy implications:
    - The creation of a domestic market within a stable domestic economy and a sound economic policy framework is very important, because SMEs located near the market will need to produce goods suited to that market and employ new technologies to do so.
    - Human resource development is very important.
    - The appropriate policy-making and capacity building function of the government is very important, especially with regard to the government's need to alleviate market failures, which make it difficult for SMEs to develop by themselves.

42. Mr Stefan Salej began by addressing the issue of global sourcing and showed, with reference to the example of four foreign investors in Brazil, how their sourcing policies from national suppliers varied significantly from company to company, with some foreign investors failing to establish any meaningful linkages with local SMEs. He therefore noted that global sourcing could be a double-edged sword and a serious threat for existing SMEs in developing countries.

43. Mr. Salej continued that while local SMEs had to upgrade their capabilities in order to be able to compete in global markets, they needed assistance with knowledge, education, and technology to achieve such an upgrading. He noted that this was a very important task for UNIDO, which he felt should in the future be called UNISDO, the United Nations Industrial and Services Development Organization, since services were rapidly assuming an increasingly important role in manufacturing. In this connection he argued that the development of increased capabilities in such service-based activities as logistics, marketing and design was a particularly important feature of such upgrading.

44. Finally, Mr. Salej gave a brief summary of his experience in the development of SME clusters in the state of Minas Gerais in Brazil. He explained that as part of the Brazilian national development programme called Avança Brasil, the decision had been taken to promote the development of five clusters producing cattle, poultry, fruit, biotechnology and information technology. By developing these five clusters the state hopes to create 62,000 new jobs, and to raise gross output by US$5.4 billion per year and GNP by US$3.2 billion per year. The programme is being undertaken in partnership between the government and the private sector, and involved a heavy investment in terms of human and financial resources. The successful development of these clusters is expected to take at least ten to fifteen years. Mr Salej concluded by pointing out that success in this endeavour required a partnership between government and the private sector, a focus, a long-term system, knowledge, international relationships and hard work.

45. Professor Carlo Filippini began his presentation by pointing out that recent studies show an increasing inequality in developed countries during the 1980s and 1990s with regard to wage and income, and noted that these trends appear similar to past events in 1850-1914 and in the inter-war period. He noted that many explanations have been put forward for this development, including:
- Increasing trade with emerging economies;
- Skill-biased technological change;
- Weakening of labour market institutions; and
- Organisational change in firms.

46. According to Professor Filippini, the basic dilemma was between trade and technological progress since the last two explanations are dependent on technological progress. Against this background, he noted a growing opposition to increased free trade, as exemplified by the protests at the WTO meeting in Seattle. He pointed out that a more constructive approach had been adopted by the East Asian and European countries, who had placed high emphasis on education and research on the one hand, and small firms on the other.

47. With regard to education, Professor Filippini noted that the granting of increased and better education would lead to a less pronounced polarisation between skilled and unskilled workers in both developed and developing countries. In this connection, he argued that the existence of market imperfections like externalities, public goods or asymmetric and imperfect information make public-private cooperation not simply useful but necessary.

48. With regard to the importance of small firms, Professor Filippini argued that they have played a significant role in Europe. In this connection, he pointed specifically to Italy's experience with industrial districts, where flexibility in adapting to changing situations and special labour relations have made an important contribution to the success of the small firms, and to East Asia, where small firms have been more dependent on large ones in a hierarchical relationship. He concluded by pointing out that East Asian and European institutions could contribute to the development of many economies by joining forces in presenting their own experiences in a synergetic way.

Panel 3
Industrialization facing environmental challenges
Specific contributions to solving large problems

Moderator:	*Zoltan Csizer*
Panellists:	*Jacquie M. McGlade* *Edward C. Yeh* *Cahit Gürkök* *Edwin P. D. Barnes*
Distinguished speaker:	*Yuri Spiridonov*

Introduction

1. This Panel was intended to complement the general analyses of the first two panels with specific responses to particular problems. It centred around the relationship between the development of industry on a global scale on the one hand, and crucial environmental concerns, ranging from depletion of natural resources to risks to human health, on the other. It looked, in particular, at the "environmental constraints" to industrialization and the role of "cleaner production" in mitigating adverse environmental effects, especially where those effects are seen to be aggravated by spatial agglomeration. In addition, it advocated the adoption of environmental management methods as a response to the environmental impact of the globalization of production systems. Lastly, in connection with the case of energy in industry, it discussed strategies to combine cost reduction and environmental benefits.

2. The panel noted that the rapid growth of industrial output and trade during the past 50 years has been accompanied by a decline in biodiversity, an increase in pollution, and a serious depletion of the world's natural resources. Its response to these issues was based on the premise that the mere promulgation of environmental laws would not necessarily provide the expected relief since they cannot be effectively enforced in the absence of a strong financial incentive. The panel noted that such an incentive could be given by a new type of industrial paradigm geared towards the prevention of pollution and the utilization of waste as a raw material, and sought to assess both the degree to which it could be made commercially viable and the role that UNIDO could play in this regard.

Opportunities and Problems of Environmental Management and Governance

3. While recognizing that the environment represents both a burden and an opportunity for industry, the Panel suggested that the burden could be minimized in a number of ways. It argued against the adoption of an excessively tight regulatory regime, however, on the grounds that this would be unrealistic. On the contrary, the panel proposed that there should be more flexibility and innovation in the way the current regulatory regime is implemented rather than looking always to add new regulations. One should focus on the so-called "Regulatory Ladder" that gives priority to mitigation and prevention at source as well as hypothecation (the uses of instruments such carbon taxes). One should use campaigns of social awareness, recognising that these make the difference in the long-run.

4. The Panel also put forward the interesting concept that the world seems to be moving towards a situation of governing without governments. This is particularly significant in the environmental field where traditionally government has been seen as the most important actor in protecting the environment. New ways of governing (corporate governance, new public management, self-organizing networks, and so on) have also to be explored in the environmental field.

5. In this connection, it was suggested that there were two ways in which organizations such as UNIDO could assist future efforts in the environmental protection field. First, they could act as a connecting mechanism between the world of industry and the world of environmental protection: UNIDO, as one panellist put it, could be the "and" between "industry" and "environment". In the second place, UNIDO and other international organizations could help small businesses in particular to obtain the information they need but cannot obtain on their own. Development, the Panel reminded the audience, is about linking people, resources and energy in order to go in a preferred direction.

6. The panel also presented concrete examples of how the environment could be used as an opportunity for business. One panellist, Mr. Edward Yeh, described a case study of an enzyme manufacturing company in Wuxi, China. Through international co-operation (in this case between America and China brokered by UNIDO) and international transfer of cleaner and environmentally sound technology as well as know-how, the company made significant improvements in a whole series of spheres. Environmentally, it significantly reduced its pollution loads and energy consumption. Economically, it greatly increased its productivity and sales, and was able to start competing in the international market place. It created a significant knock-on effect, by pushing all enzyme manufacturers in China to adopt its new technologies as well as by encouraging major international players to enter the Chinese market.

7. In much the same vein, another panellist, Mr. Edwin Barnes, showed how the government in Ghana is trying to tackle the increasingly serious environmental problem of post-consumer plastic wastes by turning it into an opportunity for industry rather than a burden. Mr. Barnes discussed the mechanisms, in particular the Waste Stock Exchange Management System, and the strategies that the government is working on to encourage the growth of an industry for the collection, recycling and reuse of these wastes. He stressed that Ghana sees the government's role here as creating the necessary enabling environment, while it is industry's role to take advantage of that environment to actually recycle these plastic wastes.

Energy Efficiency

8. The Panel highlighted the importance of energy for development by pointing out that "no energy means no industry, no industry means no development". It therefore noted that access to energy is a key to industrial development. The panel showed, however, that the world is marked by a very

unequal distribution of energy use, with the developed countries enjoying an overly preponderant advantage, even taking into account their higher levels of development.

9. At the same time, the Panel pointed to the uneven distribution of energy efficiency, with developing countries being overly inefficient. If this fact is linked to the problems of global warming, and to the fact that the developing countries are showing the highest growth rates in industrial development, then it suggests strongly that solutions are urgently required to remove barriers to increased energy efficiency in developing countries, and that technologies that have low carbon dioxide emissions must be encouraged.

10. The panel consequently concluded that energy might be one of the most important sectors to save dollars and cents in the long term while at the same time decreasing harmful emissions.

Contributions by Distinguished Speakers

11. A contribution to this panel was heard from one distinguished speaker, His Excellency Mr. Yuri Spiridonov, Head of the Republic of Komi in the Russian Federation, who presented an overview of the environmental challenges faced by his region and the help provided by UNIDO.

12. Mr. Spridonov explained that the Republic of Komi, located in the extreme north-east of the European part of Russia, is rich in a variety of natural and mineral resources, including energy, various metals, gold and diamonds and timber. He noted that the availability of these resources has helped to promote a high degree of industrial development. At the same time, he pointed out that the variety of adverse climatic conditions in the region has led to a high vulnerability of nature and a slow recovery of its processes. For this reason, the issue of linkage of industry and the environment, and the establishment of efficient mechanisms for the use of natural resources are an urgent priority.

13. In this context Mr. Spiridonov pointed out that as an independent constituent entity of the Russian Federation, the Republic of Komi is entitled to conclude economic and commercial agreements with Russian and foreign business partners, and has cooperated actively with international agencies. Since 1997, the Republic has been engaged in a programme of cooperation with UNIDO through a project to promote sustainable industrial development and competitiveness. A UNIDO integrated programme for the Republic of Komi is also being developed, with the environmental issue as one of its most important components.

14. Noting that this move towards a more environmentally sustainable form of industrial development was taking place concurrently with the Republic's transition to a market economy, Mr. Spiridonov explained that the managers and owners of local enterprises in the timber and oil and gas industries, as well as those in the other sectors, had gradually realized that the use of less environmentally hazardous technologies, even if they are more expensive, does result in higher profits. He pointed out that for two years Komi had been successfully implementing a Russian-Norwegian Cleaner Production Programme, and that the UNIDO Integrated Programme for Komi provided for the establishment of a Cleaner Production Centre as well as the efficient use of industrial energy.

Comments and Questions from the Floor

15. Important comments and questions from the floor were offered by the distinguished representatives of Austria, China, and Turkey.

16. With regard to the experience of Mr. Yeh in China, the question was asked whether the membrane technology employed by his company in the Wuxi project could also be used to clean up polluted freshwater lakes, such as Lake Tai, and whether the use of this technology would be more economical than that of alternative technologies.

17. The response given by the panel was that in principle the technology would be suitable, although simply using it to clean up polluted lakes would be insufficient since it would cure the symptoms rather than the causes of the problem. Instead, the panel recommended that such technology should be installed in the enterprises near the lakes, whose untreated discharge was causing the pollution, and the possibility of investigating appropriate regulatory requirements was proposed. With regard to the costs, it was pointed out that this issue would need further study. In his concluding statement, the moderator of the panel also noted that UNIDO was actively involved in projects to clean up freshwater lakes and had acquired considerable experience in the field of reducing industrial effluent discharges into such lakes. In this context, he cited UNIDO's participation in the Caspian Environmental Programme funded by GEF and EU-TACIS to address industrial pollution.

18. The points raised by the other speakers concerned the issue of industrial energy. With regard to the generally accepted projections of the rapid rise in energy in developing countries in the coming decades, the question was asked to what extent this increased demand could be met from renewable sources of energy. Other related questions referred to the nature of the obstacles inhibiting the use of such energy and how could they be overcome, and to the role that international organizations, and UNIDO in particular, could play in this regard. In this context the point was also made that in some countries, such as Turkey, the use of renewable energies such as wind, solar and hydrogen energy was constrained by high marketing costs and deficiencies in infrastructure. The specific question was therefore raised whether UNIDO could assist in bringing down the costs of marketing renewable sources of energy.

19. In response, the panel noted that awareness creation about such simple things as switching off the lights when they are not needed could already lead to a staggering degree of energy savings, and that such savings were comparatively easy to achieve both in our own lives and in industry. Nevertheless, it was argued that energy savings alone would not be able to address the magnitude of the energy problem, and that it was an issue of political will. Given that 13% of all development aid flows, amounting to some US$ 5-6 billion, was directed to the field of energy, and that additional private flows took the total size of the investment into the industry to about US$ 1 trillion, it was also argued that UNIDO's limited resources would inevitably confine its role to increasing energy efficiency in industry and to act as an honest broker between parties looking for viable projects. With regard to UNIDO's potential role in reducing the costs of renewable energy, the panel noted that the Organization had had several success stories in this area in the past, when it had established special centres for the development of such alternative energy sources in cooperation with both developed and developing countries, including centres for solar energy in Australia and mini-hydro plants in China. It was acknowledged that similar efforts could also be made with regard to other sources of energy.

Panel 4
The UNIDO Partnership Programme
A New Approach to Promoting Small and Medium Enterprises

Moderator:	*Wilfried Lütkenhorst*
Keynote Speakers:	*Ajit Kumar* *Mauro Pasquero*
Panellists:	*Shantanu Bhattacharya* *Jean-Pierre Brouquil* *Robert Davies* *Yasuo Konishi* *Dinesh Munot* *M. S. Ogale*

Introduction

1. Following on from the discussions of Panels 1 and 2, which highlighted the important need to provide support services to local SMEs in developing countries and economies in transition in order to enable them to maximize the benefit they derive from their integration into global value chains, this Panel was intended to provide a case study of a particular UNIDO programme offering such support. This programme, referred to as the UNIDO Partnership Programme, translates some of the concepts discussed in earlier panels, and in Panel 2 in particular, into practical application. It also represents the nexus between UNIDO's globally oriented research role and its crystallization in terms of concrete technical cooperation programmes.

2. Unlike the previous panels, this panel referred to only a single topic, the UNIDO Partnership Programme as applied to India, and was structured accordingly. Its principal components were an introductory statement about the origins, purpose and prospects of the programme by the moderator; keynote addresses by representatives of the two principal partners in the programme, the Government of India and FIAT S.p.A.; and statements by the panellists representing the other partners (Magneti Marelli, the Automotive Component Manufacturers Association of India - ACMA, the Automotive Research Association of India - ARAI, the European Institute for Management - INSEAD, and the Prince of Wales Business Leaders Forum), who were present as panellists to explain their reasons for joining in the Partnership and present their experiences as members.

The UNIDO Partnership Programme - Salient Features

3. The UNIDO Partnership Programme brings together partners from different domains that used to be regarded as irreconcilably distinct in the past: government, international and domestic industry, civil society, and research and development. This Programme thus epitomizes the emergence of non-governmental actors and the ensuing phenomenon of hybrid governance structures (combining domestic and international, public and private entities), which is one of the most debated trends in the theory of international organization and development.

4. The establishment of this Partnership Programme reflects the growing perception of a mutuality of interests. The private sector has been discovered as a partner by the UN system just as many private companies have come to recognize the value of working with the UN. Their roles are different, of course, and so is their contribution. In a somewhat simplified and stylized perspective, it may be said that in international economic development the UN is more geared towards providing the soft infrastructure of analyses, policy advice, norms and standards as well as important technical cooperation services, while business contributes primarily wealth-generating technologies, innovation, resources, markets, capital and above all productive employment. In this context it is only natural that UNIDO, as the specialized agency of United Nations with the mandate to promote industrial development, is taking the lead in this process through concrete activities on the ground with carefully selected partners.

5. The specific case presented in this Panel is one of the first joint UN/business partnership activities to have yielded tangible results. It is both sector-specific and country-specific, and relates to the automotive component industry in India - an industry that represents a producer-driven global supply chain.

6. The panel discussed the challenges facing this sector, and what the Programme had done to upgrade the capabilities of small and medium enterprises within it for them to become competitive suppliers to transnational corporations and thereby to create productive employment and reduce poverty. It demonstrated the tangible impact achieved by this Partnership Programme which was born only a year ago, and showed how deliberate efforts had been made from the outset to collect appropriate impact indicators, at the level of each participating enterprise, as a basis for future evaluations and lessons to be learned.

The UNIDO Partnership Programme - A Preliminary Assessment

7. The UNIDO Partnership Programme is based on three defining characteristics and seeks to meet three preconditions for its effective functioning.
   The defining elements are:
   - To agree on joint objectives;
   - To engage in a collaborative relationship towards achieving these objectives with clearly delineated roles for each Partner; and
   - To share responsibility and accountability for the outcome.

   The further preconditions for a partnership to succeed are:
   - To consider it as an instrument, a modality - often time-bound - and not as an end in itself;
   - To ensure that clear-cut benefits are generated by the Partnership which exceed its costs; and
   - To share the resulting value-added in a manner perceived as being fair by all partners.

8. The Panel discussion presented an opportunity for the Partners of the Programme to offer their own assessments as to whether it actually met these criteria, since the Panel comprised representatives of

all of the Partners. The statements issued by these panellists with regard to their experience of the Programme were overwhelmingly positive, indicating that all of the Partners felt that they had gained from it as well as contributing to it. In addition, the panel was able to show that within the short period of its existence the Programme had already achieved a number of tangible results in terms of improved management practices and performance indicators for the firms covered by the programme, and in terms of their demonstration effect on other firms.

9. With regard to the benefits offered by the Partnership Programme to the various individual participants in the Programme, the panel concluded the following:
   - The government of India regarded the transfer of needs-based technology and gaining access to global markets as the most significant benefit for India.
   - The business partners from FIAT and Magneti Marelli underlined the benefits of learning more about the entire automotive sector in India and having access to key institutions and policy makers, which would have been difficult within a captive strategy.
   - The Prince of Wales Business Leaders Forum stressed the "strategic significance" of the Programme in creating awareness and changing mind-sets by demonstrating that business can operate in an economically sustainable way to satisfy its own shareholders while at the same time delivering development support to the countries concerned in a manner that goes beyond philanthropy into mainstream business practice.
   - The Automotive Component Manufacturers Association of India placed particular emphasis on the fact that the impact of the Programme has gone beyond company-level productivity improvements, but that the Programme has set in motion a dynamic process of interaction between the participating companies and others, where the participating companies are seen as shining examples of what can be achieved in a relatively short time.
   - The Automotive Research Association of India stressed the opportunity given by the Programme to establish important links and information exchange between the association and participating companies on the one hand, and the emerging opportunities to explore contacts with specialized European institutions in the second phase of the programme, on the other.
   - The European Institute of Management pointed to the benefits it had derived from the Programme through the valuable insights it has gained in terms of developing best practices, preparing in-depth case studies, and developing teaching materials.

10. By reference to a concrete technical cooperation programme devised by UNIDO to bring together actors from government and civil society, from international and domestic industry, and from research institutions in an innovative and pioneering multi-dimensional partnership, it has thus been shown that this approach is an effective mechanism to leverage resources: Complementary expertise and strengths are brought to bear on jointly defined and agreed objectives by the various partners to the mutual benefit of all.

11. In particular, the panel found that the UNIDO Partnership Programme represented a valid new approach, if not a logical conclusion, to the growing complexity and interdependence of industrial development resulting from the process of globalization as indicated in Panels 1 and 2 of the Forum. It was argued that while the forward march of globalization is causing global business players to become ever more powerful, the state continues to exercise a key role in providing public goods. By bringing these dimensions together, the Partnership Programme acts as a platform for a reciprocal learning process. The public sector can learn from the private sector in terms of real world business challenges and how to best meet them. At the same time, the private sector can acquire a certain developmental perspective, a sense for sector- and country-level requirements, which the Programme tries to instill.

12. Equally importantly, the Partnership Programme was found to have been extremely cost-effective. The resources that have gone into its first phase have been very modest, although the impact has been high. While the need for additional resources will inevitably grow as the Programme moves into the second phase with a stronger emphasis on institutional capacity-building, the cost-effectiveness is almost certain to remain very high, not least because the Programme also provides for a high degree of cost-sharing between the various partners.

New Approaches to Promoting SMEs

13. While focussing primarily on the Partnership Programme, the Panel also touched on the matter raised in the sub-title of the theme of Panel 4, i.e. "A New Approach to Promoting Small and Medium Enterprises". The Panel noted that an intense debate was in progress within the development community on best practices and lessons learned in promoting SMEs. In particular, it was pointed out that a new sobriety was gaining ground in assessing the widespread failures of the past resulting from attempts to protect SMEs rather than exposing them to competition, and to build up huge and centralized state capacities to support SMEs rather than creating a decentralized network of service providers.

14. In this context, the Panel referred to some of the best practice principles identified by the Donor Committee for Small Enterprise Development (of which UNIDO is an active member):
    - First, to work with groups of SMEs to ensure a joint learning process and experience-sharing for the targeted industry as a whole, as well as greater cost-effectiveness for development agencies;
    - Second, to insist on at least partial cost recovery for services provided;
    - Third, to directly involve the private sector as provider of services; and
    - Fourth, to design a framework for performance and impact measurement.

15. The Panel also stressed that UNIDO shared the view of the Secretary-General of the International Chamber of Commerce that "Creation of small and medium-sized businesses will be the most effective way to spread genuine wealth, as opposed to handouts." Together with its partners, UNIDO is responding to the needs of SMEs in a quickly globalizing market with a Programme that is technically sound, economically viable, institutionally sustainable and – as a model – replicable in different country and sector contexts.

Comments and Questions from the Floor

16. Important comments and questions from the floor were offered by the distinguished representatives of Bosnia and Herzegovina, India, the Russian Federation, and the United Kingdom.

17. In the context of the issues discussed in Panel 4, the point was made that while the importance of supporting SMEs as a source of economic and industrial development was generally understood and acknowledged in most developing countries and economies in transition, SMEs continued to face a variety of obstacles, including:
    - The lack of a stable legislative framework for competitive business;
    - Continuing administrative barriers;
    - Difficulty in ensuring financing and resources; and
    - The weak infrastructure for supporting investment.

The hope was therefore expressed that cooperation with international organizations like UNIDO would enable these countries to develop new approaches to supporting SMEs and achieve the desired results.

18. A point was raised about the need to ensure the most extensive "impact chain" possible for the Partnership Programme, to ensure that the benefits of the Programme reached enterprises of progressively smaller scale. This proposal was strongly supported by the panel, which pointed out that the companies participating in the Programme ranged in size from 17 employees to 360 employees, and had been specifically selected to ensure such a diversity of scale. In this context it was argued by one panellist that a concept of how the large, medium-sized and small beneficiaries of the programme could support micro level enterprises should be consciously built into the second phase of the Programme. By way of example, it was suggested that the firms participating in the Programme could subcontract activities such as the cleaning and repair of overalls, food and canteen production, gardening, painting and child-care to micro-level businesses. At the same time, it was also argued that the small and medium sized enterprises involved in the Programme could also share some of their facilities such as IT skills, telecommunications links, and training facilities with smaller firms, including start-up enterprises.

19. A further question was raised about the broader impact of the Programme on the productivity and competitiveness of the firms included in the partnership programme, and specifically whether the Programme had succeeded in generating commercial orders for these firms. In response, the point made earlier was reiterated that the firms involved in the Programme had become mentors or showcases within their industry and were acting as catalysts for other firms. With regard to orders, two examples were cited. One achieved an increase in turnover of 69%, equivalent to approximately US$1.1 million, within a six-month period without any capital investment. The other, a smaller company of 36 employees, had increased its product line from four to twelve. In addition, it was noted that seven of the companies involved in the Programme had been given the opportunity to participate in the Equip Auto trade fair in Paris with the support of the UNIDO Investment and Technology Promotion Office in Paris. At this fair they were able to meet with a wide range of foreign companies, which has resulted in at least four of them being engaged in supply sourcing negotiations, and three having initiated joint-venture discussions with foreign partners.

20. Finally, the point was made that although the Programme has been working with automotive component companies, foreign companies from outside the sector have also expressed an interest in sourcing from the Indian SMEs involved in the Programme. In this connection a specific example was cited of a major international furniture manufacturer, who had entered into negotiations with one of the Programme participants which makes plastic components.

Concluding Session
Integration, Agglomeration and Interaction in World Industry
Drawing Some Lessons

Speaker: Carlos Magariños

Introduction

1. This panel was intended to highlight major points of the foregoing discussions, identify additional links between the various issues, and draw the lessons and conclusions from the discussions of the previous panels to guide UNIDO in its future efforts to promote sustainable industrial development. These conclusions were presented in a final wrap-up speech by HE Mr. Carlos Magariños, Director-General of UNIDO.

Major Issues Addressed and Lessons Learned

2. The exercise of the Forum on Sustainable Industrial Development was ambitious but worthwhile. In the last 25 years there have been many changes in the way the productive systems have adapted themselves to the possibilities and challenges of the process of international economic integration. This rendered it necessary to reintroduce substantive matters about industry and industrial development in UNIDO's discussions with its Member States.

3. Panel 1 was very useful in setting the scene to assess the question that is on the mind of many people - academicians, businesspeople, actors in our societies - about the fact that the role or relevance of industry in some countries appears to be fading away, and that it no longer performs its traditional role as the engine of locomotive of growth in these countries.

4. By using two different approaches, the New Economic Geography and the New Growth Theory, and also by drawing lessons from classical theory, Panel 1 was able to clarify the role and potential of industry in the framework of the new international economic system. It was made clear that new forces such as spatial agglomeration were driving the way in which industry is being developed between and within countries, and it was also made clear that the process of agglomeration poses a problem that one may be able to solve if one looks more closely for solutions like the mobilization of information.

5. The deliberations of Panel 1 highlighted the need to mobilize information, knowledge, technology and skills in order to reconnect the population of the world with the process of globalization. Faced with the process of agglomeration, industrial development around the world is proceeding in waves rather than in a smooth flow, even though the share of developing countries in total MVA is increasing.

6. Some countries are entering the process of industrial production, however, and are generating possibilities for their neighbouring countries and their regions. This situation has very much to do with the need to mobilize information to bring developing countries closer to their potential supplier network. While it is not possible to change geography in order to link SMEs in developing countries with supplier networks in Europe or the USA, it is possible to change the way in which they are connected through the flow of information in the process of production.

7. Panel 1 was also very clear in establishing that it is no longer possible to think in terms of industrial policies confined within national boundaries. To be effective nowadays, policy-makers have to be conscious, willing and brave enough in political terms to acknowledge that new mechanisms to promote industry need to be developed in today's inter-connected world. The mobilization of information, skills, technology and knowledge requires more modern tools than the ones that were developed before. It will not be possible to proceed simply by using the traditional interventionist systems of the past. New tools need to be developed, including possibly the development of a foresight mechanism. Such a mechanism is, in fact, being launched at a meeting in Trieste in early December, taking the Latin American region as a test case.

8. Panel 1 also provided an empirical answer to the question about what foreign direct investment (FDI) really means for the transfer of technology, and this answer was both encouraging and policy-relevant. It showed that there is a spill-over of technology to domestic firms through FDI, and that domestic skill-formation and upgrading appear to be a sure way of making the best of FDI as a carrier of new technology. Formation of skills in the industrial labour force works indirectly to increase productivity, and this is precisely the way in which living standards can be improved.

9. At the more general level, Panel 1 showed that technological change and a rising demand for skilled labour go hand in hand. This complementarity between technological change and higher skill requirements is an empirical fact. It stems from the overwhelming dominance of the developed countries, and it is the technology-intensive nature of the new technology produced there that lowers the demand for unskilled labour in industrial production throughout the world. The policy consequences of this development are striking, both for the developing and the developed countries. First, given that developed countries are the main source of new technology, which happens to be skill-based, there is an added need for developing countries to upgrade skills to improve conditions for technology absorption. Second, the problem faced by the unskilled portion of the labour force in the developed countries must be regarded as mainly home-grown. It occurs because of the nature of technological change, and cannot be blamed on import competition from the developing countries. This needs to be taken into account when conclusions are drawn that affect policy proposals.

10. In summary, Panel 1 hinted at least at some major results of evidence-based economic analysis of industrial development, and one can safely say that industry is by nature the best reservoir of increasing returns to scale. It is much needed, and therefore wanted, for growth. However, it needs some special support measures to be attracted and promoted. These must include some that help countries to overcome the forces of adverse comparative advantage and of industrial agglomeration in core countries. This could include the promotion and establishment of "soft infrastructure", an infrastructure that can help countries to cope with the information flows necessary to get involved in the development of international suppliers networks and with some of the measures that support the build-up of agglomerative forces in the developing countries themselves. Other such measures have

to address the key factors underlying industrial growth - technology and its transfer, foreign capital flows and the build-up of a domestic skill base - and in doing so to heed the interaction between these factors.

11. It may also be concluded that because agglomeration derives in part from the immobility of information, anything that promotes information not only counteracts agglomeration but also supports the spread of industry. Logically, therefore, UNIDO must work for the dissemination of information or the establishment of a new type of infrastructure that could be called "soft infrastructure".

12. With the ground laid by the theoretical analysis undertaken by Panel 1, it was possible to move on to Panel 2. This was focussed on how globalization affects the process of upgrading and innovation that developing and transition economies need to master in order to achieve sustainable growth. It showed that the globalization of production systems brings both opportunities and dangers - opportunities in the form of expanded markets and hence potential access to information, capital and knowledge, and an increased scope for networking. Dangers in the form of a variety of risks and costs arising from market volatility, and from a possible marginalization due to the agglomerative nature of industry discussed in Panel 1.

13. Panel 2 argued that the important issue for developing countries and transition economies is whether to take a low growth path or a high sustainable growth path involving an upgrading of their activities. Clearly, the latter is the preferable option.

14. Panel 2 found that entrepreneurship development was the key to technological and skill upgrading in countries at all stages of development, but in particular for those at the earliest stages. As entrepreneurial skills and capabilities develop, proactive FDI promotion policies can be expected to gain in effectiveness with a view to establishing export platforms and supply-chain integration, especially in the case of mid-size, mid-income countries. In this context good governance may not be sufficient to attract investment, but lack of good governance, including transparency, the rule of law and adequate framework conditions will certainly lead to failure in attracting FDI.

15. From a policy perspective it maybe said that the conceptual framework considered by Panel 2 raised many interesting questions complementing the conclusions of Panel 1, in the sense that the framework linked the reach of developing country industrialization to the size of the economy. It suggested that only large economies have a chance for global reach; that mid-size, mid-income economies can establish regional production platforms and integrate local suppliers into global production systems; and that poor and small economies should aim at an industrial base catering to domestic needs. Countries of all sizes would have to develop policies to endogenize the key exogenous drivers appropriate to their objectives and framework conditions.

16. The Director-General noted that he would like to stress the importance of the analysis undertaken by Panel 2, and link it to his initial remarks on 29 November. He expressed his belief that the key issue was to see how international organizations and national institutions could help, through the provision of global public goods, to build up a stronger private sector able to develop new entrepreneurs and new enterprises that would help developing economies to cope with the challenges posed by globalization.

17. The deliberations of Panel 2 suggested a number of points relevant for UNIDO's research and technical cooperation agenda, and for adapting its mandate to the challenges currently faced by developing countries and economies in transition. These include the advantages to be gained from a clustering of SMEs at the local level; the opportunities, risks and trade-offs involved in linking with global production and global producer-driven and buyer-driven value chains; and policy options and

degrees of policy freedom entailed in pursuing the high road as opposed to a low road of integration with global networks by shifting to higher value-added products and new functions in the global value-chain. Other policy-suggestions included strategies to couple integration into global markets with local and regional development, and the identification of best practices, strategies and approaches to reap synergies between private-sector driven responses to the pressure of global competition, and government-led catalytic and enabling actions.

18. Having concluded his review of Panel 2, the Director-General of UNIDO proposed moving directly to a discussion of Panel 4 because of its obvious links to the conclusions of Panel 2.

19. Panel 4 presented a concrete new approach to technical cooperation. This UNIDO Partnership Programme is a pioneering effort. It is entering into unchartered waters, and testing the validity of a new approach for providing technical cooperation. Its defining element is a multi-dimensional Partnership bringing together actors from government and civil society, from international and domestic industry, and from research institutions.

20. The opportunity the Partnership Programme provides for UNIDO to work with representatives of private sector institutions and civil society organizations is very gratifying and serves to break new ground. It is very difficult to think how UNIDO could continue to offer technical cooperation in the long run if it could not link the technical cooperation activities from the multilateral system with the actions taken by the private sector, non-profit organizations, civil society organizations and multinational companies all around the world. UNIDO needs to link its efforts with the sustained processes of private sector investments in order to be sure that the things it is teaching, the knowledge it is transferring, and the information it is mobilizing to SMEs in developing countries will be able to stay there. Unless the SMEs in India are able to supply auto parts to a multinational company like FIAT, which is producing cars there, it is not certain that all the information UNIDO is are trying to mobilize there will remain.

21. Turning to Panel 3, the Director-General described it as very useful. It was included in the Forum as a demonstration of the importance UNIDO assigns to environmental issues in its daily work. The Director-General also noted that from his perspective it was extremely important to assess the situation of the environment and its role in the promotion of industrial development.

22. Panel 3 addressed the question whether the environment is a burden or an opportunity. The answer is that it is both, and that one will have to see how to deal with it. Panel 3 suggested the regulatory ladder approach to minimize the burden rather than impose still more regulations. This is extremely valid. The panel also suggested that the world is moving towards a situation of governing without governments, and a hollowing-out of the state. This was a very valid observation and will require further exploration as a basis of effective environmental protection. This could easily be seen in the negotiations that are taking place permanently on the different protocols and the agreements to reduce environmental pollution and to control emissions. Those are treaties negotiated by governments that should be implemented by private enterprise. The implementation of those agreements will need changes in the behaviour of the consumers. It is therefore clear that one is facing a completely new challenge, and that the traditional ways to assess the international agreements and protocols will not be useful because one is trying to address a more complex problem including more dimensions and mores actors.

23. The potential role for UNIDO as a connecting mechanism between the world of industry and the world of environmental protection could include the identification of the business opportunities offered by an environmental clean-up. The case studies showed UNIDO as a broker for international cooperation between the USA and China, and for the international transfer of environmentally cleaner

and sound technology and know-how in the area of enzyme manufacturing and membrane filters. One of the distinguished speakers, Mr Edwin Barnes of Ghana, described how his government is creating the economic environment that will encourage industry to collect and recycle consumer-generated plastic wastes. This underpins UNIDO's view that there is a whole environmental industry that needs to be developed in many parts of the world to turn waste and pollution into a resource.

24. Panel 3 also posed a very interesting question. Given that environmental deterioration does not respect political boundaries, what new types of international cooperation or partnerships should be developed as the environmental scenario becomes more threatening? Or what types of incentives and enabling legislation would promote the kind of international cooperation in which foreign investment would address both environmental and industrial growth issues?

25. Another important question refers to the relationship between the value of environmental public goods in developed countries and the private costs of pollution control and reduction. Are they different to the relationships in developing countries having both high pollution levels and high compliance costs? Many of these questions need to be included into UNIDO's research programme. This does not imply any change in UNIDO's priorities; the Organization should strengthen its contacts with research institutions, as shown during the presentations during the past two days.

26. Looking back at the Forum as a whole, it was shown that the forces of industrial agglomeration tend to increase – at least up to a certain point – inequalities in economic development, both between and within countries. It was also learned that competition is more and more driven by non-price factors such as product quality, delivery speed, design factors, product-related services etc. The integration of developing countries, and in particular their small and medium enterprises, into global production networks and value chains requires continuous skill upgrading on the one hand and the build up of national innovation systems on the other. Supporting SMEs in improving their performance and competitiveness may indeed be the best long-run investment into poverty alleviation, especially if one accepts the assumption that the integration of the developing countries into the world economy is no longer a matter of debate as such. What can be influenced however, are the actual terms under which this integration will continue to take place.

27. These conclusions of the Forum are expected to be well received by the international community to the extent that they provide a positive message of the continuing need for developing countries to pursue economic reforms. Referring again to his speech of 29 November, the Director-General of UNIDO emphasized that both the first generation of economic reforms, those related to the need to introduce sound macroeconomic systems, and the second generation of reforms, known by their accent on institutional reforms, are extremely necessary for developing countries to cope with the challenges of globalization. He stressed that the time had now come, after 50 years of discussion whether to finance or adjust an economy to let it grow, to think of how one is going to help to connect the population of developing countries and the world at large with the process of globalization. This new challenge will remain for the coming years, and new challenges cannot be confronted with old instruments or old methodologies or old tools. One is not going to solve the problems of the future with the tools of the past.

28. The Director-General noted that this was precisely the purpose of the Forum during the last two days, and had been precisely what UNIDO had been doing through its transformation of the past two years. This was not a transformation just to cut the budget or adjust the number of staff; this was a transformation to try to direct the organization's services to produce public goods able to help to reconnect the population of the developing countries with the process of globalization. The process is potentially beneficial, but we need to assess the difficulties and the problems that the developing countries are facing in moving towards it.

29. The Director-General concluded with a proposal regarding the future of the Forum. He suggested that it had been a good exercise in increasing the interaction between the members states and the Organization, and between the member states themselves. He therefore proposed the institutionalization of this sort of debate in UNIDO's policy-making organs, possibly organized on an annual basis; and certainly on a regional basis. This had already been done in three regions this year - Asia, Sub-Saharan Africa and the Arab World. He also conveyed a proposal by President Bédié to include more representatives of the private sector, and suggested that the Forums could address particular issues of interest to one or other regions or for UNIDO's constituency at large. To increase UNIDO's relevance and practical involvement in the economic agenda, however, these Forums would need to address substantive matters.

B. PAPERS AND PRESENTATIONS

Aide Mémoire

Aide Mémoire

UNIDO Secretariat

Probably the most striking aspect of the present phase of economic change of global dimensions is that dynamics are shifting from the national economy to the world economy. Of course, national boundaries do still matter in the organization of economic activity, but more and more, opportunities and challenges stem from the world economy. Economic activities that up to now were partitioned by national boundaries are reorganized at the international level. As a consequence - and invisible on maps - a new economic geography is taking shape and starts to weigh on the political economy of the world. Decision makers cannot ignore this reality, since any country - except, perhaps, the United States - is small with regard to the world and, hence, must take into consideration what other countries do before making its own decisions.

For an international organization with the mandate of UNIDO, three features of today's global picture are of particular interest. First and foremost, the role of industry - tacitly recognized or expressly rediscovered - as an important driving force behind economic growth and improvement of material standards of living; second, an uninterrupted tendency - concomitant with rapid international integration - towards spatial agglomeration of industrial activities; and third, related to the observed uneven spreading of such activities, good chances for a coupling of less developed economies with more developed ones. Examples illustrating the last feature abound, including groupings like the United States, Canada and Mexico; Japan and South East Asia; the European Union, North Africa and Eastern European countries; Singapore and Malaysia; Hong Kong and other parts of China; and Finland and the Baltic countries.

Whereas progressive international or even global integration - in brief: "globalization" - makes the symbiosis of poor and rich areas ever more feasible, it is not so sure that it makes it automatically more desirable. Albeit coupling of spaces of different levels of economic development looks like a key to success, it is not clear how such success is shared. Globalization is a process that generates winners and losers, both between and within nation states. In an unpublished paper of the Institute of Development Studies of Sussex University, for example, figures are presented that show the failure of the world's economies to converge. In 1820, the gap between per capita incomes of the richest and poorest countries was 3:1; in 1960, it was 30:1; in 1990, it was 60:1; in 1997, 74:1. And at country level, measures of the degree of inequality of income distribution are on the increase almost everywhere. Such developments, by necessity, call forth intense interaction between groups of presumably advantaged and disadvantaged, both at national and international levels.

In view of the above, the eighth session of UNIDO's General Conference will give the international community an opportunity to consider global industrialization. When all parts of the world meet, a natural issue for discussion is what happens to manufacturing industry as the economic spaces of developed and developing countries as well as those in transition are becoming increasingly integrated, tendencies towards spatial agglomeration of activities are continuing and interaction between different groups of actors is

intensifying. This broadly stated theme is what UNIDO proposes to examine and discuss in its Forum on Sustainable Industrial Development which will take place during the General Conference. The Forum will be organized around five panels which will be held from 29 November (afternoon) to 1 December 1999.

The Issues

Within the Forum each of the panels has the function of helping to outline the scope of a broader discussion and suggest a number of issues on which it might focus. These issues will be stated and succinctly analysed by a few experts in each panel. Following this, statements of the participants in the Forum will be invited to form the core of the discussion. It is hoped that in this way analyses and experience of the Organization can most effectively be confronted and implemented with the expertise as well as the views of decision-makers at national level.

In this framework, the first and the second panels are intended to present the audience with insights into world-wide industrial development derived from recent results of economic analysis on the one hand, and gathered from case studies as well as anecdotal evidence on the other. By contrast, the third and the fourth panels will substantiate as well as complement the more general analyses and descriptions through distinct references to some of UNIDO's programmes and activities. The final panel will wrap up what has gone before and attempt to draw some more general conclusions. The grouping of issues among the panels is briefly described below.

The title of the first panel is *The New Geography of Industry - Insights from Economic Analysis*. It will focus in its first half on the different mechanisms of adjustment in the globalization context and on their effects. Topics include the interplay between traditional forces of comparative advantage on the one hand and non-traditional "geographic" factors on the other, and processes of agglomeration viewed in an international perspective. Among the questions posed are the following: How will closer integration affect the highly industrialized and the less industrialized countries? If integration is a zero-sum game, will it hurt the industry of developed countries as the rapid growth of South East Asia and the sluggishness of Europe and the United States suggested until a couple of years ago? Or will it hurt the developing countries and economies in transition that may be overwhelmed by manufactures produced in the developed countries? If, however, integration is a positive-sum game with possible gains for all parties involved, how will these gains be shared? And which factors are likely to determine their distribution between the developing and the developed economies? The second part of the panel will discuss integration and interaction in the perspective of the broad categories of "factors" underlying industrial production, namely, labour and skills, capital, and technology. Empirical evidence will be presented on interactions between factors as well as between different (groups of) countries in the globalization context. In this vein, pairs of factors, for example, capital and technology or technology and skills, will be singled out for an examination of crucial relationships. Examples of questions typically raised in this context are: How are production methods transmitted from home to host country when industrial relocation takes place? Which kinds of jobs are de-skilled, which kinds are destroyed or created? What are the impacts of technological innovation and of foreign competition on employment and wages in the different groups of countries? How does technology spill over from one space to the other as well as diffuse within spaces?

The second panel will be devoted to the theme of *Globalization of Production Systems and Implications for Developing Countries and Economies in Transition - The Upgrading of Local Competitiveness*. It will examine whether and how the globalization of value chains in an increasing number of industries - including textiles, clothing, automobiles and electronics - and the strategies and organization of global firms in those industries can enhance the dynamics of industrialization of developing countries and economies in transition. On the one hand, globalization of production systems provides new opportunities for developing countries and economies in transition in accessing markets and resources, in upgrading skills

and knowledge and in stimulating the development of local supplier networks. On the other hand, the increasing competition between developing countries to attract activities of global firms is often based on the availability of cheap labour and on tax incentives. This type of competition can drive developing countries and economies in transition into a trap of increased industrial activities without accompanying income growth. The panel will examine some of the issues related to this problem and look into how partnerships and joint upgrading programmes between global players and local governments and institutions can help to get out of the above trap and to initiate a sustainable process of industrial growth beneficial to both parties.

The third panel is entitled *Industrialization Facing Environmental Challenges - Specific Contributions to Solving Large Problems*. It will centre around the relationship between the development of industry on a global scale on the one hand, and crucial environmental concerns on the other. The latter range from depletion of natural resources to human health, where in the present context the manufacturing industry aspect will be highlighted and "environmental constraints" to industrialization critically examined. Central to the debate will be the role of "cleaner production" in mitigating adverse environmental effects, in particular, when those effects are seen to be aggravated by spatial agglomeration. In addition, the growing importance of environmental management, also in view of a globalization of production systems, will be advocated. Furthermore, for the case of energy in industry, strategies to combine cost reduction and environmental benefits will be discussed. Among the questions which the panel will raise and at least attempt to answer are the following: Given that investment in environmentally sound technologies is relatively high, can developing countries and economies in transition avoid repeating crucial mistakes made by the developed countries over the past fifty years? In which way can technologies of the aforementioned type be made available to developing countries and economies in transition at affordable cost? How serious are the challenges to local environments posed by agglomerative tendencies in the location of industry? What is the significance of the contribution of increased energy efficiency to productivity enhancement and environmental improvement?

The title of the fourth panel is *The UNIDO Partnership Programme - A New Approach to Promoting Small and Medium Enterprises*. This panel will debate the growing cooperation and concrete partnerships between the United Nations system, the corporate world and civil society organizations (including research institutions) in order to meet more effectively the challenges of globalization. What are the key ingredients for successful partnerships? What could be the main risks involved in bringing together, in particular, the two worlds of intergovernmental organizations and global corporate players? What can they do jointly to improve the performance and, ultimately, the competitiveness of local supplier networks in developing countries and economies in transition? Which role can UNIDO play in the field of industry to forge relevant partnerships? In this panel UNIDO will present its new concept of multi-sector partnership programmes for industrial development and will illustrate its benefits through the impact achieved so far in the case of the automotive component industry in India.

The fifth panel is entitled *Integration, Agglomeration and Interaction in World Industry - Drawing Some Lessons*. It is expected to highlight major points of the foregoing discussions, identify additional links between the various issues, and achieve, at least in part, what the second half of its title suggests. If the architecture of the Forum was to be described in a compact form, this may be done in the following way: Analysis and discussion are based on a *general* foundation of economic theory and empirical evidence (panel one). Built on this are a second level of *partial* analysis from a business viewpoint (panel two), a third level of *specific* discussion from the angle of the environment (panel three) and a fourth level of *individual* illustration at a particular case, taken from one of UNIDO's programmes (panel four). The fifth level, topping the architecture, is a *synopsis* of issues which is expected to "house" a number of conclusions.

It is clear that most of the questions raised in this prospective outline of the panels will not be answered during the Forum - many of them are probably not answerable at the present and foreseeable states of knowledge. Nonetheless, the many fears and the many hopes entertained at a time when economies get less national, demand - on the part of the international community - a joint effort at least to clarify on what these fears and hopes are based. More specifically, decision makers, confronted with sets and sequences of possible actions, need to assess the utility that attaches to a certain consequence of a given action. They also need to assess the probability of each consequence obtaining subsequent to a selected course of action. Bringing to light the perceptions of all parties dealing - from different angles - with the topics presently proposed for discussion, is a precondition for any progress. More than that, it can be seen as a significant step towards mutual comprehension and, hopefully, cooperation. And it is towards this goal that the UNIDO Forum on Sustainable Industrial Development intends to contribute.

Panel 1

The New Geography of Industry - Insights From Economic Analysis

Theme Paper for Panel 1

UNIDO Secretariat

The term 'industrial development', when applied in a global setting, circumscribes two related phenomena: the spread of industry across countries and the growth of industry within countries. The panel outlined here deals with the economics - theoretical and empirical - of the development of manufacturing industry worldwide, viewed from this angle.

1. Background

The term 'Geography' used in the title of the panel refers to the location of industrial activity around the globe. Economic geography is already an ancient discipline but in the last ten years the field has been revolutionized. Theoretical and methodological progress plus the building of stylized facts, labelled the 'New Economic Geography', have provided novel insights that significantly further our understanding of the dynamics of industrial development.

Given that globalization basically acts on location forces - the deployment of a new space where commerce and communications are speedier and cheaper invites firms to choose new profit-maximization locations - the panel will address the contributions of the New Economic Geography to gain a better understanding of contemporaneous opportunities and challenges of industrialization in the various parts of the world. The 'New Economic Geography' provides explanations for the forces of change in the international location of industry and predictions of the directions of such change. But there is more to the discipline than a discussion of where and why industries locate across economies in interaction. The much more interesting contribution of the New Economic Geography is that it links location to growth. Where industries will be located both depends on the economic growth of the economies in interaction and influences the growth of these economies.

The study of the role of one particular sector in overall economic growth has some specific methodological requirements. The reason to single out a sector is that that sector differs from the rest of the economy in a significant manner. The method used will then need to recognize interactions between parts of the economy rather than to treat the whole economy as an undifferentiated entity. Furthermore, within each part of the economy there will be specific dynamics resulting from interactions among agents that produce with the help of various technologies, earn income, consume goods and services, save and invest. Accordingly, an account of growth, and in particular of its link to the location of industries, can only come from a general equilibrium approach which explains the behaviour of the total economy as the result of rational decisions made by its contributing parts.

Obviously, a detailed account of such interactions is not manageable - and, anyway, would probably be useless insofar as it would reproduce the complexity of the real world. Instead, the New Economic Geography offers very simplified accounts that focus on issues deemed to be of particular importance.

Notwithstanding their deliberate simplicity, these accounts retain the hallmark of breadth and generality that attaches to general equilibrium approaches because interaction lies at their methodological roots. Thanks to this feature, the available models, albeit very sketchy, have much to tell us about growth and industrialization.

The panel intends to provide the gist of what can be learned from today's state of the New Geography of Industry - the writing of which, of course, is ongoing - by means of an introduction by the moderator of the panel followed by three paper presentations by practitioners of the field. These four presentations will be organized in two groups of two. The first group will focus on the spread of industry across countries; the second, on industry and growth within countries.

2. Issues

The first half of the panel is devoted to a very brief, yet as complete as possible, outline of the new approach to the international location of industry. This approach examines the interaction of economies that globalization has brought closer to each other. It involves three main elements: First, the endowments of countries with the major factors of (industrial) production and the international distribution of activities that result from the comparative advantages dictated by factor proportions; second, the existence of increasing returns to scale in industrial production, the particular forms of (imperfect) competition among firms associated with this technological trait, and the attendant role of market size for the location of industry; third, the input-output linkages between firms and the resulting location forces which produce spatial agglomeration of industrial activity. The presentations on international location, outlined below, deal with all three of the above elements, however, in reverse order.

The title of the opening presentation is *Agglomeration and Industrial Development - Lessons from the 'New Economic Geography'*. It sets out a model of the international development of industry which focuses as sharply as possible on forces that prevent industrial activity from spreading internationally as factor endowments would suggest. Paramount among these forces are industrial linkages of the input-output type which create a special kind of dynamics when technologies exhibit increasing returns to scale. In a first round, after transport costs or other barriers to trade have begun to vary, industrial linkages cause manufacturing industry to agglomerate in space - in our setting: in certain advantaged countries - and, as a result of this, cause the emergence of substantial differences in wage levels among countries. As long as the benefits of industrial linkages are larger than those expected from low wages, industry remains concentrated in 'industrial' countries. Only when the wage gap will have widened considerably, will industry spread to other locations.

Admittedly, while achieved from an unconventional angle, this result retains a conventional flavour. In some scenarios, however, less intuitive results obtain. There is the possibility, for instance, that the spread will not take place in a process of smooth convergence of industrial and non-industrial countries, but in a series of steps in which new centres of industrial agglomeration will emerge and grow. Policies have a role in attracting industries, with different types of policies having different implications for industrial structure and for levels of welfare.

However 'new', the above theories of international location stand on the shoulders of the 'old' comparative-advantage paradigm which emphasizes differences among countries in factor endowments. This is true for 'new geography' models as well as for the 'new trade theory' which - among other things - takes seriously the fact that countries differ drastically with respect to their economic size. The second presentation, entitled *How Strong is Comparative Advantage? - Simulating the Location of Industry*, gives substance to the view that 'old' and 'new' theories of international specialization are complements rather than rivals. It shows, by way of numerical simulation, that a shift in the balance between the forces of

comparative advantage, on the one hand, and those of market size, on the other, must be expected as barriers to trade are lowered.

By and large, factor endowments determine patterns of specialization when trade is nearly or completely free. However, in a situation where countries differ significantly both in size and in factor proportions, market size does matter for the location of industry, as long as there are sizeable costs to trading goods. Under these circumstances, a large country overindustrializes with respect to its comparative advantages, due to the boost of a large domestic market on goods produced with 'industrial', i.e. increasing-returns, technology.

The second half of the panel no longer deals with the spread of industry, but with industry and growth by focussing on the interplay between underlying (production) factors such as labour, capital or technology. Owing to its pivotal role for the increase of productivity and hence for industrial growth, technological innovation is given priority over other factors in this discussion. Since technology, in the starting phase of industrialization, comes from abroad, technological developments are first examined in relation to capital flows. Then technological change is presented and analysed as a major source of changes in the skill structure of industrial employment. Both these analyses shed additional light on technology in its role as the 'hub' of the fast turning 'wheel' of productivity increase and the expansion of industrial production.

The third presentation, *Capital Flows and Technology - Some Country-specific Evidence*, is of an empirical nature and studies the effects of receiving foreign direct investment (FDI) on a host country's industrial productivity. In investigating the different channels through which technology is likely to 'spill over' to host-country firms, an attempt is made to assess the relative importance of these channels for an explanation of productivity growth at firm level. It underlines the fact that among various avenues of international technology transfer, FDI plays a unique role because it also involves the transfer of technology embodied in human capital such as management know-how.

The data used for the empirical study of technology spillovers pertain to more than 400 manufacturing firms in eight Chinese cities, referring to performance at the beginning 1990s. Among the most interesting results obtained on the basis of these data are the following: (i) The most important sources of firms' productivity growth are spillovers from existing foreign technological knowledge and skill improvements arising from training efforts; (ii) skill improvements through training significantly enhance technology spillovers from foreign to local firms; and (iii) such training is more likely to be undertaken by local firms than by their foreign counterparts, who tend to maintain product quality by importing intermediate goods from home countries and by transferring managers from headquarters to the host country.

The relationship between technological change and workers' skills - touched upon in the previous presentation - is subjected to a comprehensive empirical examination in the last one, entitled *Technology and Skills in Industry - the International Evidence*. The central question posed is simple to formulate, an empirical answer not easy to give, and the policy conclusion, to be drawn from the latter, far-reaching. The question is about what technological change implies for the demand of skilled labour and, as a consequence, for the difference between 'skilled' and 'unskilled' wages and employment. Part of the empirical answer is strong evidence for pervasive so-called skill-biased technological change, i.e. change that increases the demand for skilled labour relative to that for unskilled labour, in the developed countries. Likewise, many developing countries show clear signs of the same type of technological change. These findings give empirical substance to the suggestion that there exist important skill-technology complementarities across all countries, where demand shifts in favour of skilled labour have occurred within rather than between industries.

These results underline once more the crucial importance of labour skills for the adoption of new technology, which is vital to the industrial expansion of developing countries. With respect to the

developed countries and their concerns about trends in their own labour markets, the evidence points to technological change as the prime cause for damages done to wages and employment of less skilled workers; the much-feared competition from developing countries is shown to be far less important.

When looking back on the economic analysis of the development of industry outlined here, it becomes clear that some of the questions raised in the discussion will be answered (at least partly) in the panel, that others will not, and that - most importantly - the answers given will raise new questions. The section below deals with a few of these questions in an anticipatory manner and tries to raise some points for discussion.

3. A Few Points for Discussion

From the above discussion there emerge a certain number of questions; if only one per presentation had to be formulated, the following could perhaps be retained:

(i) As a consequence of spatial agglomeration, the spread of industry across countries can be represented as proceeding in waves rather than as a smooth and continuous expansion. Such waves imply the coupling of certain more developed and less developed economies. Examples include Finland and the Baltic countries or Japan and South-East Asia.

Which policy interventions can be suggested to get developing or transition economies to 'ride' on such waves towards (advanced) industrial development. Can some of the findings be taken as an argument in favour of a 'regionalist' component in industrialization strategies - suggesting the 'teaming-up' of more industrially developed and less industrially developed economies within a geographic region? If so, what would be the implications for policies addressing different industry-related areas?

(ii) Comparative advantage still seems to have a role in industrialization: It is thought to help attracting a certain kind of industries in the first place and to act as one of the determinants of industrial specialization as globalization progresses.

What policy lessons are to be drawn from these observations? For policy design, which are the weights to be assigned to comparative-advantage factors on the one hand and to technological advance on the other, at different stages of industrial development? In which way would policy prescriptions differ depending on whether a country's domestic market is 'large' or 'small'?

(iii) Foreign direct investment is of considerable importance as a source of productivity increase, and this importance can be enhanced by the upgrading of local industrial skills.

Which means, in addition to skill upgrading, can be deployed to make the most of the potential positive impact of foreign direct investment on the productivity of local firms? More specifically, which channels can be opened in the host country to intensify the spilling over of technological knowledge to the domestic industry?

(iv) Much of technological change in industry seems to be of a nature that raises skill requirements; for both developed and developing countries this so-called skill-biased technological change has strong implications for the situation in labour markets and for the need to improve the human-capital base of industrial production.

Given that technology appears to be more important than foreign competition as a source of unskilled-labour problems in developed economies, what is a good policy response to these problems? In

transition economies and developing countries, which human-resource policies should be pursued in order to meet global industrial-technology requirements best?

Paper 1
Agglomeration and Industrial Development
Lessons from the New Economic Geography
Ghislain Robyn[1]

1. Introduction

This presentation is structured into three parts. The first part will deal with the question of the role of industry in growth. It will be asserted and demonstrated that industry is a decisive factor in long-term economic growth, by which I mean a long-term improvement in our material living conditions. This is an essential phenomenon if we are to satisfy political and social values of the highest kind, including the attainment of equity, which implies a reduction, and ultimately hopefully the eradication, of poverty. Long-term growth is the sort of growth which means that today most of the people sitting in this room have doubtless had an opportunity to visit Latin America. By contrast, Philip II, when he was the omnipotent king of a kingdom where the sun never set, never had the chance to visit Latin America and it would have taken far too long to do so. It is growth which drastically changes our living conditions, and industry plays an extremely important role in achieving this growth. Not an essential or an exclusive role, because growth is an extraordinarily complicated phenomenon, but nonetheless a very important role in so far as industry is its driving force, its engine. The focus of the first part of my statement will thus be productivity and growth.

The second part of my statement will address the fact that the very characteristics which make industry so dynamic also mean that industry is compelled to concentrate itself geographically. Industry does not spread across the globe in a uniform manner. This is the dual face of industrial dynamism. That is my second point.

The third point is intended to draw some lessons from the first two parts in the context of globalization. Globalization is nothing new. It is not a novel phenomenon. It has been under way ever since the start of the industrial revolution. It is also not a phenomenon which is becoming especially swift today. It is simply proceeding along its natural course, which it has followed for a long time. But this is an especially interesting occasion to talk about globalization because we speak here just as the Seattle conference is opening. That is a conference whose ultimate aim is to reduce trade obstacles and to liberalize international trade relations. That will have the knock-on effect of bringing nations together economically, which will bring Côte d'Ivoire closer to Europe, it will bring China closer to the United States, it will bring Argentina and Brazil closer. All countries of the world are now very soon going to be much closer to each other than before. As the economic space shrinks, the players in that space who want to improve their profits will be taking up new positions in that space, so it is especially appropriate today to study the technologies and techniques available to us in order to analyse the possible consequences of this shrinkage of the economic space.

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[1] Director, Industrial Statistics and Networks Branch, UNIDO. No formal paper was prepared for this topic. The text presented here is based on a transcript of the lecture.

2. The Role of Industry in Growth

Now I come to my first point, which I will approach in two ways. Firstly in a purely empirical way, and then in a theoretical way to try to provide the basic reasons for what we are observing.

It is, ladies and gentlemen, an empirical fact that industry is an absolutely essential phenomenon; absolutely a source of dynamism, as our Director-General mentioned a few seconds ago. This is shown by the history of the industrial revolution; the reconstruction of Europe after the Second World War; the catching up by Japan after the 1950s with the countries that were then industrially developed; the record breaking growth of the Republic of Korea after 1965; and the well-named Asian miracle in the 1980s. All the developments that have transformed our lives so deeply come from the success of industry in these countries. There is no need to insist on this over-conspicuous evidence.

It is true too, that people now say that the time of de-industrialization has come; that the de-industrialization of today will be followed tomorrow by a mode of production dominated by info-based services, where industry will recede into secondary place. Well, we in UNIDO are among those who think otherwise. We think that it is true that de-industrialization is taking place in developed countries. However, industry remains the future of developing countries. Wherever you see a developing country leading the race towards economic growth, you see that the share of industrial production in their GDP is increasing at an increasing pace.

We also think that it is true that in the future the success of industrialization, once universal, will certainly push forward an info-based service kind of an economy. There is no doubt about that. But that will be in the context of the coupling of services and industry in systems where both parts will play a role. If today there is no industry left in Hong Kong, it is because Hong Kong is more closely coupled to its industrial hinterland in the rest of China. If you see Helsinki in Finland focussing on the development of Information and Communication Technologies (ICT), it is because it is taking advantage of the industrial bases that it has created in the Baltic countries. If you see the success of Singapore, it cannot be explained without the collaboration that exists between Singapore and Malaysia. Japan de-industrializes, but only because it installs industrial bases in South East Asia. So, we need to think in terms of these systems.

Furthermore, the third reason why we disagree with those who speak of de-industrialization without qualifying their statements is that de-industrialization in developed countries is taking the form of production increasing at a slower pace than productivity, and that the industrial sector is therefore releasing jobs. It is true that jobs in industry in developed countries are on the decrease, and this for a long while already, and there is no reason to suppose that this will stop. We may imagine a future in three or four decades where the share of labour used in manufacturing in developed countries will resemble that of the agricultural sector. There is no question about that.

However, a distinction needs in to be drawn between production and productivity. Productivity, the key to growth, is still something that is derived mainly from industry, as is shown in Table 1. These figures are the most recent figures available, from November 1999. While it is true that they do not cover all OECD countries, they have not been selected merely to support my point but because they are the only ones for which these data are available. To calculate the contribution of one sector to productivity you need to use input-output tables, which are not available everywhere. From these data it appears that the contribution of industry was 19% of all incremental productivity achieved between 1990 and 1997 in Australia. In West Germany,[2] it was 61%, in the USA it was 40%, in the Netherlands 79%, in France 60%, and so forth. These are huge contributions to the total gains in productivity made during 1990-97.

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[2] Only West Germany is mentioned here because the data provided here are only available for the West German part of the country.

Table 1:
Manufacturing and Productivity Growth in the Non-farm Business Sectors, 1990-1997

	Contribution of Industry in %	Comparative Impact of Industry		Contribution of Industry in %	Comparative Impact of Industry
Australia	19	1.12	**Netherlands**	79	3.16
Canada	31	1.35	**Norway**	3	0.18
Finland	48	1.37	**Sweden**	49	1.63
France	60	2.14	**USA**	40	1.74
Italy	16	0.67	**W. Germany**	61	1.49
Japan	75	2.34			

Source: OECD and UNIDO

But I would also like to attract your attention to something else. The second vector, the column to the right, has been calculated by UNIDO and entitled "Comparative Impact of Industry". It shows the impact of industry once the figures for the contribution to productivity have been normalized for the share of manufacturing in all the business taken together. That share is now very low in the OECD. It is around one-quarter, more or less, of the total GDP of the business sector. And due to this small share we can see that the corresponding impact of industry is much more than what one might predict based simply on the share of that sector. Actually, the impact in the Netherlands for instance is 3.2 times higher than one would predict based on the share of industry in the GDP of this sector. In the case of Japan, where 75 of the productivity was generated in the manufacturing sector between 1990 and 1997, the contribution of manufacturing was 2.3 times larger than one would have predicted given the share of industry in these businesses.

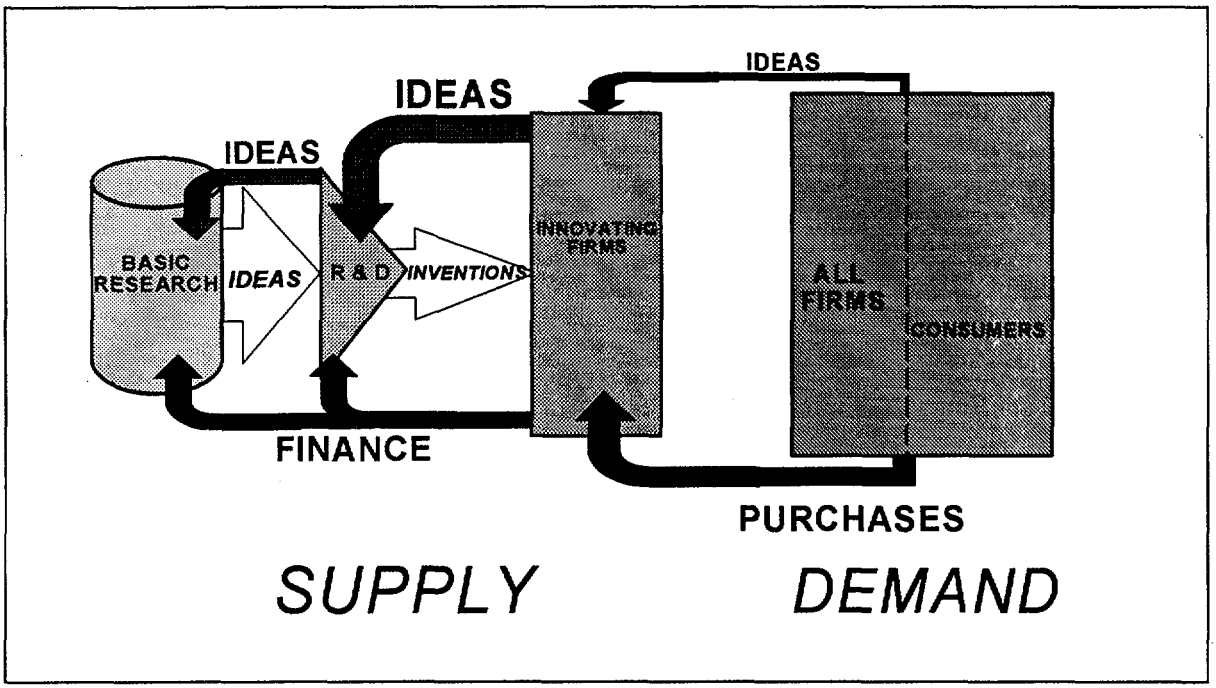
This is as far as empirical evidence is concerned. I think that Table 1 in itself is an abundantly eloquent demonstration that industry does matter. In particular, when it comes to productivity in the OECD countries.

Now I would like to present the theoretical argument that explains why industry is so particularly dynamic. However, before getting to that demonstration, I have to place the industry in the world in which it exerts its role. It is like in mathematics. If you want to produce and analyse a mathematical object, you have to install it in a certain domain. Well, industry also can only be apprehended and understood if it is placed in the domain in which it operates.

Ladies and gentlemen, our Director-General already has evoked some of the characteristics of that domain. It is a domain of innovation. It is a domain where productivity derives from changes - changes in the function of production; changes, rather, in the boundaries of the set of production possibilities that shift continuously under the impulse of innovation. We are in a Neo-Schumpeterian world when we talk of industry, no doubt about it. Neo-Schumpeterian in the sense that it is not only a world that works through creative destruction as Schumpeter had it, but also a world that is capable of welcoming almost any addition to what it already has. New products and new processes can come and add themselves to old products and old processes. That is what generates productivity.

What is it that brings about these changes. In order to understand that, let us have a look at what is called the knowledge-based economy. This is an economy where a very important group of activities produces knowledge and where a very important group of activities uses knowledge. A model of this world is presented in Figure 1. On the supply side, which is the determining side because in the world of innovation supply takes the lead, there are three main actors. There is one cylinder in Figure 1 that contains the basic research. This is the research conducted in the basic natural sciences - chemistry, physics and biology. Then one has the sector of research and development (R&D). In this sector one has engineers, technicians and scientists, whose job consists of transforming the returns from basic research into inventions that can be incorporated into the industrial cycle, such as new processes and new products. Later on, innovating industries take these inventions, which are technically new, and convert them into innovations, which are new things that are made commercializable, marketable, and economically successful.

Figure 1.
The Knowledge-based Economy



In the OECD countries both basic research and R&D constitute an important group of activities, representing 2.2% of the combined GDP of all OECD countries. This corresponds to US$500 billion per year. This is an investment in knowledge, which represents 8% of total investment, whereas investment in physical capabilities amounts to 20%. It absorbs 2.7 million members of the labour force. We are thus talking of an important supply activity. We also have huge users. The sectors recognized by the OECD to be intensive users of technology represent 50% of the GDP of all OECD countries combined.

The importance of these sectors can also be seen by looking at them in terms of financial flows. First it should be noted, however, that there is a flow of financial resources from the innovating enterprises to those conducting basic research and R&D research. In basic research, financing mostly comes from the public sector, but this sector absorbs only one-fifth of total resources spent on R&D. Four-fifths are absorbed by R&D, by the triangle and not by the cylinder in Figure 1, but in the cylinder one finds two-thirds of the labour force. Since the labour force there is very qualified but very distant from the market it is less remunerated. Most of the resources are spent on the labour force in the R&D sector.

The role of manufacturing firms in the funding of research is illustrated in Table 2. This shows that basic research absorbs about US$100 billion per year. US$6 billion of this amount come from the business sector. This is not much, only 6%. When it comes to R&D, the business sector finances US$350 billion out of the US$400 billion. This reflects the interest of the business sector in R&D to commercialize the good ideas and inventions arising from basic research and R&D. Out of these US$400 billion, US$300 billion come from the manufacturing sector. Thus, approximately 85% of the expenditure by business on R&D comes from the manufacturing sector.

Table 2
Expenditure Inputs into the Knowledge-based Economy
(US$ billion, 1995)

	Domain of Expenditure			
	Basic Research	**R&D**	**Innovation**	**Total**
Business	6	350	420	776
Manufacturing	...	300	300	600
Services	...	50	120	170
Govt. & Pte. Non-Profit Orgs.	94	50	-	144
Total	100	400	420	920

Source: OECD and UNIDO

After R&D there is innovation. Innovation is an activity that involves acquiring the basic equipment, machinery, and training, and developing the marketing necessary to transform an invention into an innovation. Here we do not invest or create anything, but we put a good on the market and we convince the consumer to acquire it. US$420 billion are spent on this function, entirely by the business sector. Of these US$420 billion, manufacturing accounts for US$300 billion and the service sector for US$120 billion. Out of a total outlay of US$920 million, the share of manufacturing thus amounts to US$600 billion, and the total share of the business sector is $770 billion. That is one of the reasons, ladies and gentlemen, why industry is so important, because industry moves research and development and transforms that into new ways of living for us.

After having explained the world in which we are, let us now go to the theoretical explanations why industry is so important, and there are three points that I want to mention in that respect. The first point is the domain of industry itself. The second point is the technology of industry, which is characterized by increasing returns. The third point, finally, is the organization of industry, deriving from its particular input-output linkages.

Let us go to the first point. Why is industry so important in theory? It is not due to chance. Industry is important for the following reason: It involves taking manufactures, i.e. intermediate products, and transforming them through manufactures, i.e. capital goods, into manufactures, i.e. final products. In the case of industry, ladies and gentlemen, the process involves manufactures all the way down, from input to output and to the means of transformation. In other sectors it is not exactly like that. In the case of agriculture, natural products are transformed by manufactures into manufactures. In the case of services, immaterial products are transformed through manufactures into immaterial products. It is very different. The fact that industry deals all the way down with manufactures has the consequence that industry is more

able than any other sector to use R&D, which is itself based on the natural sciences - chemistry, physics, biology, and which obtains results that allow us to produce things in the way that we do. That is the point of industry. It involves manufactures all the way down. It recoils, it loops on itself, it is a self-referential mechanism.

That is the first point that I wanted to make. Some people will tell us that today manufacturing is no longer as important as it used be in the past because the production of manufacturing has itself become intangible. And it is true that it has become intangible. I was reading an article this last Friday in the journal *Le Monde* explaining that a new object is being born in the world. These are nano-tubes; carbon-made nano-tubes. These objects have the particularity, the nice particularity in my view, to have one dimension, plunging in the world of quantum physics - i.e., you take one millimetre; you divide that millimetre in one million parts and that is the diameter of a nano-tube. Whereas the two other dimensions still belong to the world of macro-physics. So production is indeed becoming something intangible, but it is still something material. It is something still that interests industry. These nano-tubes have been born by serendipity about eight or nine years ago in some laboratory. Now the baby is still in its cradle, but around that cradle you can already see - and I am quoting from *Le Monde* - a large number of firms: in Japan NEC, Kobe, Mitsubishi; in Korea Samsung; in Germany Mannesmann, Daimler-Chrysler, Bosch, Opel, Volkswagen; in the USA we have Exxon, Motorola, Lucent, Bell, IBM, Lockheed, Northrop; in France we have Aire liquide, Alcatel, etc. I won't mention Great Britain. There are so many firms looking at this baby, and preparing their R&D departments to invest millions of dollars in order to find industrially acceptable ways of making these nano-tubes into one of the basic building materials of electronics. Notwithstanding the intangibility of production today, it remains still a major industrial operation.

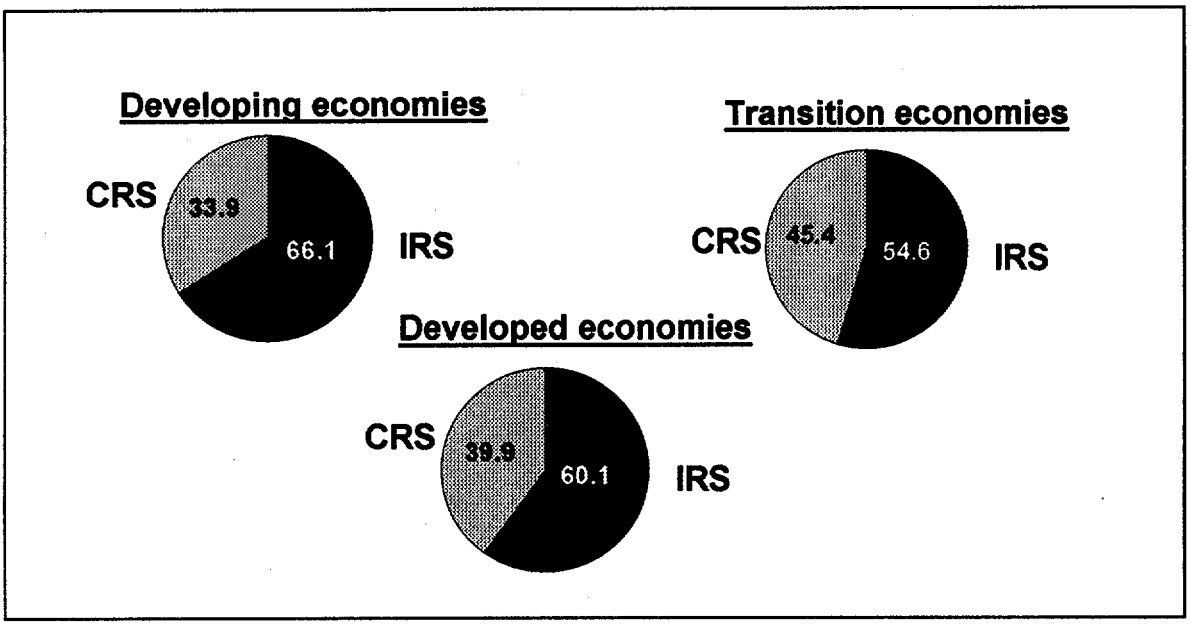
That was the first reason why industry is dynamic. Because of the domain in which it operates, which is manufacturing. The second reason is its technology. The technology of industry is an increasing-returns technology. We know of increasing returns since Adam Smith wrote his *Wealth of Nations* and described how one could specialize the operations of a pin factory as the market scale increased. Well, that is the prodigious attribute of industry. It is an activity that reduces its costs as its scale increases. If you are in a boat and you are in the sea and you increase your speed the sea is going to impose an increasing resistance to your movement. In industry it is not like that. When you push industry it creates better conditions for its own development. And that is why industry has this intense principle of dynamism coiled within itself.

Note please how important this second aspect of industry is when it comes to mobilizing R&D. R&D consists of taking knowledge and transforming it into an investment on which to earn one's living. However, R&D, being knowledge-based, poses an appropriability problem. It produces designs, ideas, things that are easy to copy and hence easily fall into the public domain. They are extremely risky to develop on the one hand, and do not allow one to secure full property rights on the other. One would therefore be reluctant to undertake an activity like this unless one had the means of undertaking it. And this is precisely what increasing returns provide. Increasing returns are a system whereby a firm can select the scale, the quantity it is going to produce, in order to maximize its profits. So it can create a profit. Increasing returns is a solution to the incentive failure that prevails in the domain of R&D. Only firms that have these increasing returns can envisage investing in R&D.

And it is the case that industrial activities are basically of an increasing returns nature. As shown in Figure 2, the proportion of increasing returns (IRS) versus constant returns (CRS) activities in industry ranges around 60%. This means, it is true, that not all industrial activities offer increasing returns. It is also true that increasing returns may be found in non-industrial activities, for instance in services. However, manufacturing is the domain *par excellence*, the locus, where increasing returns flower more willingly. Figure 2 also shows that the proportion of increasing returns activity is larger in developing countries than

elsewhere. We have not yet made any analysis of this phenomenon, and do not know if it is due to a random or if its has some systematic reason, but at least the facts are as they are displayed in Figure 2.

Figure 2
'New Geography' Industries
Share in Manufacturing Value Added, 1997 (%)



Source: UNIDO
Notes: CRS = constant-returns-to-scale industries; IRS = increasing-returns-to-scale-industries

We can therefore make the following statement about industry: That it is a tremendous machine capable of converting knowledge into profit, and then profit into knowledge in a spiral. Because they can enlist R&D due to the domain in which they operate, manufacturing firms can then bring about product differentiation. They can come up with products or processes that others do not have, thereby creating for themselves a transient monopoly, on which they can charge a price that cannot be matched by the competition. For a while the incumbent keeps competition at bay, making a margin of profit that allows it to cover the sunk costs of investment. Having made this profit thanks to its knowledge that allowed it to differentiate its product, the firm can use this profit to bring about further product differentiation and maintain the difference through time and against the competition. This is a major characteristic of industry.

The third characteristic of industry arises from its input-output linkages. These input-output linkages also have to do with the domain of industry. It is manufacturing all the way down. That means that the major clients of industry are industrial firms - firms buy from firms and sell to firms. Thus, every industrial firm is connected with other industrial firms that have increasing-return characteristics, that have the monopolistic competition market structure that we have mentioned earlier. It is a system, and that system can be conceived of as a turbine that, once attached to the motor of increasing returns, boosts performance and maintains the self-sustained growth cycle of the economy.

The input-output linkages of industry maintain productivity on an ever-ascending spiral. An expansion of demand at the downstream stage following some sort of random shock generates more demand for inputs. This will lead to an expansion in the quantity produced at the upstream, where the inputs are produced, but thanks to increasing returns this expansion of quantity produced also implies a decrease in the cost of

production, and increased diversity. It thus allows the production of more diverse and cheaper inputs at the upstream level. That, in turn, allows downstream producers to become more input-intensive; to acquire more adequate, more precisely-specified inputs at a decreasing cost. This gives another boost to the downstream stage, which loops back and forth and generates the ascending spiral of productivity.

3. The Dynamics of Industrial Location

With this I have finished the first part of my presentation. Let me now move to the second part, in which I would like to explain that the same factors which give rise to the dynamism of industry also compel it to operate within concentrated locations. These dynamics ensure that industry cannot distribute itself evenly on the face of the earth, but must be concentrated in some places. For instance, the dynamics of input-output linkages ensure that firms wanting to minimize transport costs will want to be located in the vicinity of other firms, which are their clients. That is where these firms will find their suppliers and their buyers. Firms thus want to go where other firms go.

Furthermore, we know from information theory that the process of acquiring inputs and incorporating innovation in one's processes and products demands a face-to-face interaction between buyer and seller. Such face-to-face interaction is essential in order to transmit knowledge. Even though one would think that knowledge, being entirely a formal characteristic, would travel without needing face-to-face interaction, this is not the case in practice. It is very difficult to understand what the new knowledge means until one can have direct access to those who have generated it. Therefore there is a need for these input-output linkages to take place locally. When they take place locally, there is a dynamism that is again boosted by the local effect; everything being internalized within the agglomeration reinforces the dynamisn that otherwise would be wasted through distance.

4. Lessons Learnt

We thus know that industry will agglomerate. Now let us turn to the third part of my statement, in which I will try to answer the question what will happen when distance is reduced considerably through the transport cost reductions now taking place as a result of globalization. Well, we know that there is a permanent concentration force in existence, which historically has resulted in a concentration of industries in the OECD countries. But this is not the only force that plays a role in the geography of industry, i.e. in the location of firms. There are other forces. For instance, other things being equal, firms would like to get as close as possible to their clients. Actually, there are studies showing that in a situation of constant returns, firms could become arbitrarily small without a negative impact on their costs. They could be divided as small as possible, and the result of that would then be that industry would be extremely close to the consumer. There would be miriads of industries in the immediate proximity of any kind of consumer nest identifiable on the face of this earth. However, this process is prevented by the availability of increasing returns, which gives rise to the agglomeration force.

The agglomeration force is nevertheless opposed by a dispersion force. Firms want to go close to their clients, but they do not go because of increasing returns. If, however, the dispersion force is neutralized by globalization, i.e. if we eliminate transport costs, the role of the concentration force would increase significantly and provoke a maximum degree of concentration. Is this going to be the result of globalization - an increase in concentration?

Well, it is not going to be like that, because there is one factor of immobility, the labour factor. The labour factor does not move. Is not allowed to move if it wanted to and generally does not want to move. For that reason firms may be attracted by low salaries to the extent that salaries are an important aspect in the cost

of a firm, and would like to go where the salaries are low. There are thus at least two opposing forces in operation - the force of dispersion and the force of concentration.

The New Economic Geography allows us to simulate the effects of these opposing forces, and we will see a number of these simulations when the other panellists take the floor. It is quite a complex exercise that we are going to present here in a simplified fashion, and an exercise that can come up with a large variety of scenarios. However, the most popular scenarios today are scenarios in which one begins with an historical situation with a concentration of industry in a certain place. In these areas of concentration salaries tend to increase because there is a demand for factors connected to industry. Elsewhere, however, salaries for industrial work are lower, giving rise to a temptation for industry to move from the high salary areas to the low salary areas. At first they don't move, and are retained in high salary areas because of the agglomeration effect. After a while, however, when the gap between local salaries and salaries in non-industrialized regions grows too wide, for instance to the current levels of 1:60, 1:70, or 1:80, the temptation becomes irresistible, prompting the first firm to move from high-salary areas to low-salary places.

At that moment we witness a catastrophic evolution in the sense of the theory of chaos. Indeed, the first firm that moves into the low salary area creates there the beginning of an agglomeration; the growth of which will progress exponentially. There will thus be a catastrophic transfer of industry from high to low salary regions. But how will the process continue? Will the firms that are leaving the developed countries distribute themselves equally, geographically speaking, and cover the earth more or less in an even fashion? The models derived from the new geography of industry suggest that this will not be the case. Rather, they suggest that because the first movers into the new countries are themselves creating agglomerations, these agglomerations will reinforce the comparative attraction of a certain number of countries. That is why, for instance, the Republic of Korea will develop to a maximum whereas the Philippines, which are not very far from the Republic of Korea, will develop more slowly. The idea is that there is cascading movement - one first has to fill fully the level of one vessel, and can only begin to fill the second one when the first one overflows, and so forth.

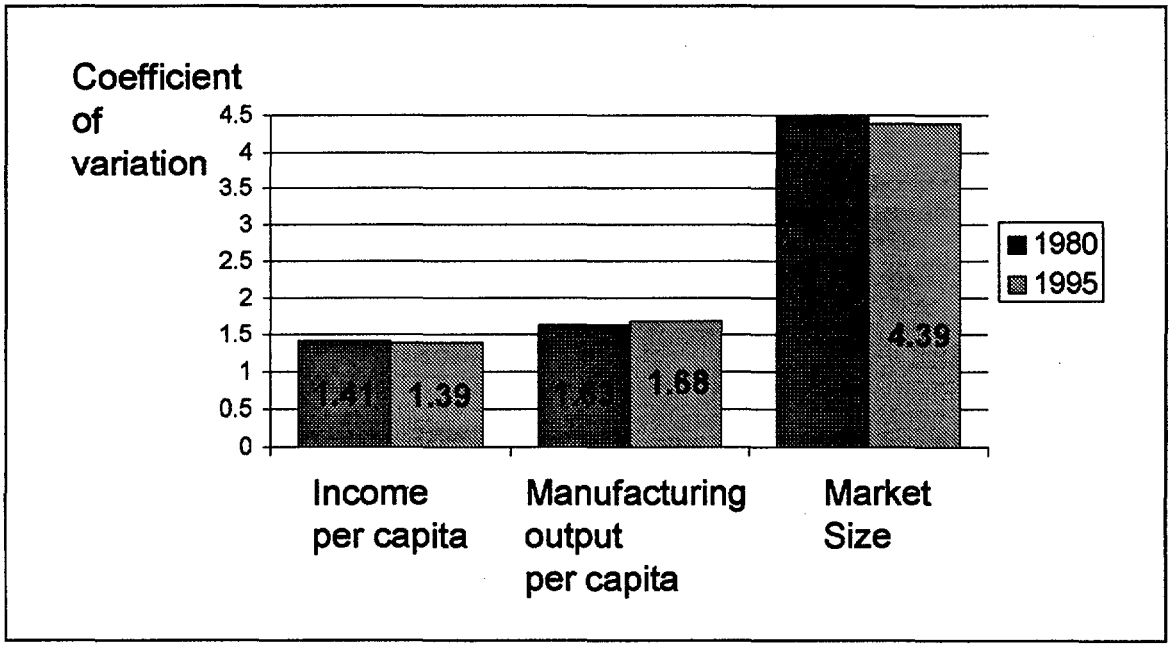
The movement is therefore not one of a general industrialization, but of a wavy industrialization. As a result, the countries that are at the end of the waiting list may have to wait for a very long while. In fact, it may well be that the countries that are not in the immediate path of these cascading waters may find themselves imprisoned in a quicksand of industrialization. If one is not yet affected by industrialization because one's turn has not yet come, any move one takes to integrate oneself into the global economy will simply reduce the access costs to one's own economy. This, in turn, will delay the moment when industry will come, because instead of relocating there, industry will only send its products and remain where it is agglomerated. If such was the case, then we could not have confidence in the workings of the invisible hand of the market to satisfy the objectives that have brought us together at this meeting - the objective to accelerate industrialization in developing countries and implement equity. That will not be achieved by the characteristics that we can observe in the dynamics of industry and the agglomeration force.

Another question pertains to which industries will be the first to move, and what the impact of these industries will be on the receiving economies. We saw that one cause for agglomeration was the input-output linkages. We can therefore assume that the first industries to move will be consumption-oriented industries whose clients are not other industries but households or government, and who do not depend on potential beneficial backward effects from downstream industry. These firms can move, and forego less when they abandon their initial agglomeration sites. Firms that are relatively free from inputs can also move more easily. Such input-loose firms include not only firms that do not use many inputs from other firms, but also firms that can import their inputs without losing too much by not being in face-to-face contact with the producers of these inputs. If one can import one's inputs without too great a loss, then one can certainly transport oneself where wages and salaries are low.

The first wave of firms to move will therefore consist of firms that have very little input-output linkages. These industries will also have a very slow development effect in the host countries where they land. The second wave will be a wave of industry that will be consumption oriented but will have a more intensive input content. These industries will accelerate development in the host countries, for instance by engaging in import substitution. The automobile industries, for instance the automobile industry in Argentina, is an example of this second generation of firms. The third generation of firms, finally, will be those that have a normal intensity of input-output linkages, and it is only these that will be capable of inaugurating self-sustained industrial development.

This completes my own presentation. I will now pass the floor to one of our panellists, Ms. Delgado from the University of Sussex, who will examine the influence that the size of a country has on the agglomeration of industries. As is shown in Figure 3, countries differ much more in terms of size than in terms of income or manufacturing output per capita. Ms Delgado will examine the impact of this in the environment of globalization.

Figure 3
How Countries Differ



Source: UNIDO

Paper 2
How Strong is Comparative Advantage? Simulating the Location of Industry

Sylvia Delgado[1]

1. Introduction

The post-WWII increasing internationalization and globalization of the world economy has been associated with global structural changes in the manufacturing sector. Although world production of manufactures is still dominated by the United States, Europe and Japan, new centres of production have emerged in what had been, historically, the periphery of the world economy. For instance, data from UNIDO show that between 1953 and 1995 the industrialised economies' share of the world manufacturing output declined from 95% to 80% whereas that of the developing economies increased from 5% to 20%.

This intense process of globalization has benefited many of the world's population. Yet, observers in developed and developing countries have expressed concern that globalization may not translate into higher standards of living in their respective countries. Whereas the general view in less industrialized countries is that integration of world markets produces a rise of living standards in rich nations at the expense of the poor, industrialized nations fear that their industry will be badly hurt by low-cost Third World manufactures. According to the UNDP, in 1960 the richest 20% of the world's population had incomes 30 times greater than the poorest 20%. By 1990 the richest 20% were getting 60 times more. On the other hand, the number of unemployed in the seven leading industrialized economies virtually doubled between 1979 and 1995, from 13 million to 24 million.

Economic theory casts some light on distinct aspects of globalization. It will be seen below that international trade theorists have analysed many the determinants of industrial location. However, as the whole Panel of this Forum demonstrates, the various theories single out determinants of industrial location one by one. Recent research - including this paper - attempts to fill the gaps by developing models which focus on the interplay of two or more determinants of manufacturing location.

The paper is organized as follows: Section 2 outlines the contribution of international trade theory to the analysis of industrial location. Section 3 describes briefly and in a non-technical way the model that will be simulated in this paper. Section 4 presents the results of the simulations. Finally, we present policy issues and conclusions in Section 5.

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This work is based on the paper "*Can market size outweigh adverse comparative advantage?*" presented at the 54th European Meeting of the Econometric Society.

2. Location of Industry in Trade Theory

Classical international trade theory as developed by David Ricardo in the beginning of the 19th century and in the Heckscher-Ohlin framework in the 1950s is seldom viewed as a theory of industrial location, having more to do with patterns of trade and welfare gains from trade. However, the geographical location of economic activity is - implicitly - at the core of their theoretical framework. The location of industry and hence patterns of trade can be predicted by comparative advantage based on technology (Ricardo) or on relative factor abundance (Heckscher-Ohlin). For instance, in Ricardo's famous model of trade liberalization, England can increase its welfare by specializing in the production of cloth and import its consumption of wine from Portugal. The reason being that England's technological advantage allows it to produce cloth more efficiently, i.e. more cheaply, than wine. Clearly, though, between autarky and free trade a complete relocation of manufacturing activity has occurred. While in autarky both countries produce both goods, at free trade the cloth industry is concentrated in England and wine production in Portugal.

In the Heckscher-Ohlin model manufacturing as well as agricultural production are characterized by product homogeneity, perfect competition and constant returns to scale (CRS). Manufactures use capital intensively in production while food uses labour. Factors of production, capital and labour, are *unevenly* distributed among countries. When countries are sufficiently dissimilar in terms of relative factor proportions, labour-abundant countries specialize exclusively and export labour-intensive goods at free trade. Capital-abundant countries produce and export capital abundant goods. Since countries produce and trade goods belonging to different industries, free trade is said to be characterized by inter-industry trade. When relative factor endowments are sufficiently similar, both countries may produce both goods. However, the capital-abundant country exports the capital-intensive good, while the labour-abundant country exports agricultural goods.

Neither Heckscher-Ohlin theory nor the Ricardian model can account for the fact that most trade takes place between countries that are identical in terms of relative factor endowments and technological levels. In addition, some of the assumptions of neoclassical trade theory - e.g. perfect competition and product homogeneity - cannot be maintained. The 'new trade theory', as developed by Dixit and Norman (1980) and Helpman and Krugman (1985), generalized Heckscher-Ohlin results to a trading world with imperfect competition: Manufacturing production of differentiated goods takes place with increasing returns to scale (IRS) and under conditions of monopolistic competition. Agriculture is described as in the Heckscher-Ohlin model. When countries are dissimilar in their relative factor endowments, specialisation of production still results. When factor proportions are similar, both countries do produce and export both goods. However, capital-abundant countries are net exporters of capital-intensive goods whereas labour-abundant countries are net importers of such goods. Because both countries produce - and trade in - food and manufactures, there is intra-industry trade.

At free trade, the international location of industries is then fully explained by comparative advantage based on the uneven distribution of factors or on technological differences.

The focus of new trade theory is on free-trade equilibria. This is a shortcoming, since trade costs add a new dimension to locational decisions of firms, namely market size and market access. Firms belonging to IRS industries depend on large markets to break even. Either on large domestic markets - in which case no trade costs are involved - or, if domestic markets are small, on access to large foreign markets at positive

trade costs. Clearly, at free trade market size and market access issues are absent, since firms may locate in any country and export from there. When trade is costly, market size becomes a crucial determinant of the international location of IRS industries. As trade costs restrict access to foreign markets, if countries are identical in every aspect except size, larger markets tend to concentrate a larger number of firms. Large countries then become manufacturing cores and small countries manufacturing peripheries. As a result, wages decline (increase) in peripheral (core) countries. However, as trade is becoming more liberalized, the wage differential attracts firms back to peripheral countries, which at free trade become manufacturing cores. Comparative advantage arising from differences in factor proportions is not the driving force, since countries have identical factor proportions.

The 'new trade theory' and the 'new economic geography' analyse important determinants of the international location of industries. Firms are effectively attracted to a location by its larger market and/or its lower wages, as both reduce production costs. While trade theory overlooks market size effects, new economic geography does not incorporate the basic insight of trade theory, namely, comparative advantage.

Recent research offers some insight on the interaction of market size and comparative advantage. Ricci (1997) considers Ricardian comparative advantage and monopolistic competition to show that full geographical specialization may result in large productivity gaps if trade costs and the elasticity of demand are low. Both market size and comparative advantage determine the location of production. In Gasiorek (1996) it is shown that a small country with favourable factor proportions may specialize in manufactures at positive trade costs, although both countries produce manufactures at free trade. Finally, Markusen and Venables (1996) build on Helpman and Krugman (1985) by explicitly assuming that countries may differ in terms of factor proportions and market size. One of their results is that the international location of industries is determined by the factor market at free trade whereas market size is the main determinant at an arbitrary positive level of trade costs.

3. Description of the Model

Manufactures and a non-manufactured good, food, are produced in a world consisting of two countries. The world endowment of factors of production is unevenly divided among the two countries, one being labour-abundant and the other land-abundant. Factors are perfectly mobile between sectors but not between countries. Both goods are produced exclusively with labour and land, i.e. excluding intermediate inputs. Production adjusts instantly to variations of demand caused by the reduction of trade barriers. In addition, factor rewards adjust instantly to variations in the demand for factors, which rules out unemployment of factors. Profits and wages are spent locally, since there is no international factor mobility. We assume that many varieties of manufactures are produced in each country, but that food is a homogenous good. Product differentiation is modeled following Dixit and Stiglitz (1977) and the general equilibrium structure follows Helpman and Krugman (1985).

The manufacturing sector operates under increasing returns to scale (internal economies of scale), monopolistic competition and is labour-intensive. Each firm produces a unique variety of manufactures under monopolistic competition. This implies that each firm practices mark-up pricing, i.e., producer price equals factor costs plus a margin. There is free entry and exit of firms in the manufacturing industry which implies zero-profit in the long run. Finally, labour skills, the quality of land and production technologies are identical in both countries.

For the sake of simplicity we assume that firms are not multinationals. They may operate a single plant in their country of origin. As will be seen below, this restriction, the assumptions of perfect adjustment of factor supply and quantities produced and firms' increasing returns to scale are the underlying forces of the agglomeration process in this model. Agriculture is a land-intensive sector producing under constant returns to scale and perfect competition.

In each country, consumers are aggregated into a unique representative agent, whose utility function is the measure of social welfare in the country. More precisely, we consider that social welfare has increased as a result of trade liberalization if the utility of the representative consumer has increased. The consumer utility is a positive function of the number of firms, a negative function of the price of manufactures and a negative function of trade costs, which are borne by consumers. Consumers have a bias towards the consumption of manufactures. Other things being equal, the consumption of a unit of manufactures increases their utility more than the consumption of a unit of food.

Manufactures incur trade costs when exported, but not when consumed domestically. Food is always costlessly traded. Trade costs include transport costs and other barriers to trade and are of the *iceberg* type, i.e. a fraction of the goods "melts away" due to trading. Here various levels of trade costs are considered, from autarky to free trade.

4 Core-periphery processes

The model described above has been simulated for different parameters, reflecting different assumptions. Throughout this paper, Country 1 is assumed to be land-abundant, while Country 2 is labour-abundant and thus has a comparative advantage in the production of manufactures. The following three cases are simulated:

Case 1: Country 2 is labour-abundant and larger than country 1.
Case 2: Country 2 is labour-abundant and smaller than country 1.

Economic-Geography Case: No country has a comparative advantage in the production of manufactures.[2] However, Country 2's domestic market is 1 to 9 times larger than Country 1's market. This case represents the basic model of the economic geography literature.

In the present context we define one country as being larger than the other country if it is more richly endowed with at least one factor of production. Accordingly, in the Economic Geography Case Country 2's supply of both factors is assumed to be 1 to 9 times larger than Country 1's supply. The three cases outlined above allow us to examine:

1. The effects of relative factor endowments on wages and the location of production, irrespective of market size effects, and
2. Market size effects irrespective of factor proportions.

All figures presented in this paper show the behaviour of the relative number of firms in the land-abundant country (Country 1) for trade costs declining from 50% to 0%. Trade costs are represented in the Figures as the fraction of the manufactures lost in transit.

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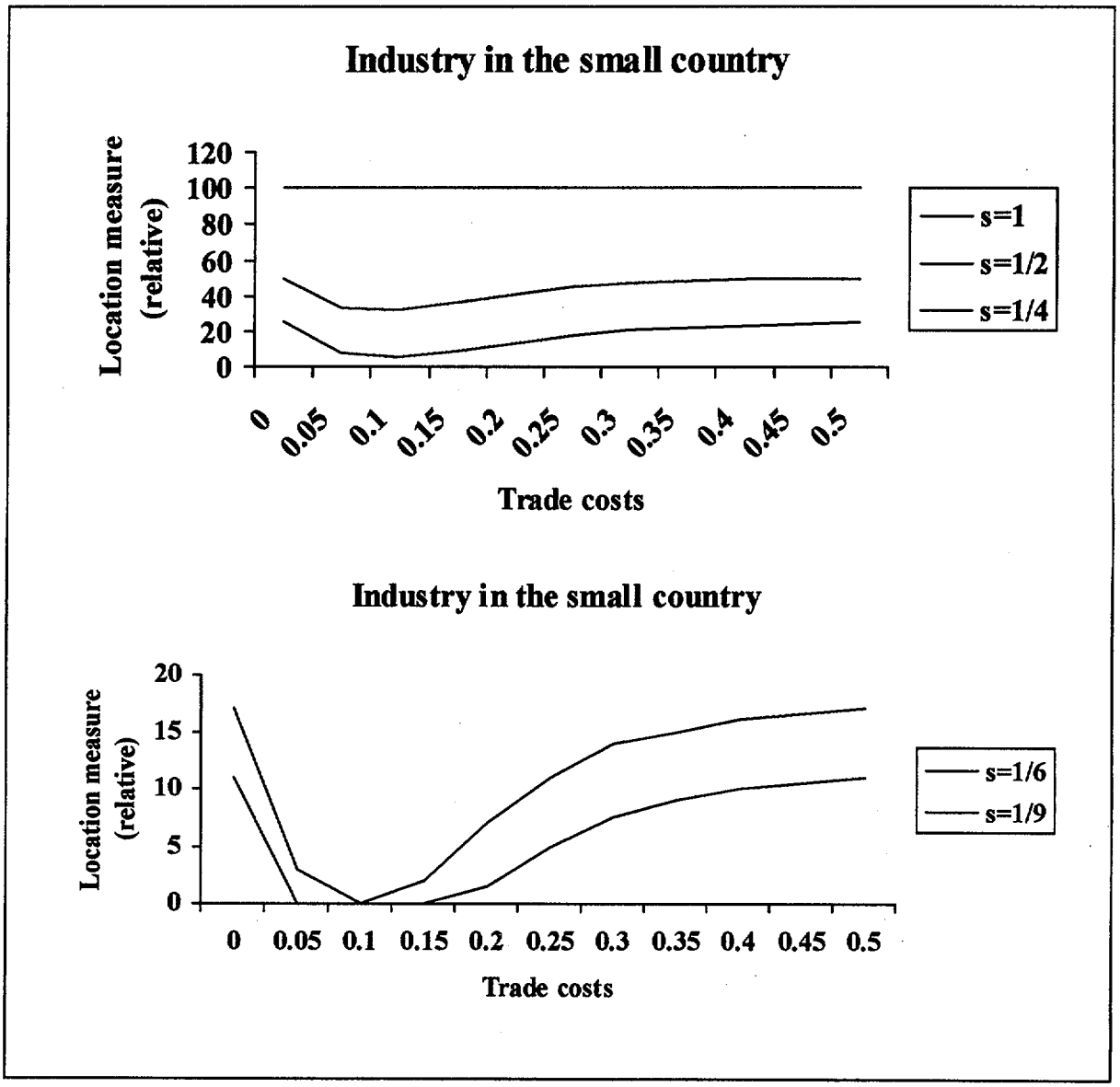
[2] In this case the land-labour ratio equals 1.

4.1 Pure market size effects and domestic market bias

Figure 1 shows the core-periphery processes as established in the 'new economic geography' literature. At high trade costs, industry is spread among countries, since at this level of trade costs consumers have a strong domestic bias. Trade-cost free local manufactures are preferable to imports. As trade becomes more globalized, consumers in the small country increase their consumption of foreign manufactures. Foreign consumers, however, do not import varieties from the small country to the same extent, as will be seen below. Firms in the small country then incur unsustainable losses and cease to produce. This decreases the demand for local labour and consequently, wages decline. The small country has become a manufacturing periphery.

Figure 1
Market-size Effects on the Location of Industry



The level of trade costs at which peripheralization occurs depends on the relative size of the two countries, as can be seen in Figure 1. When Country 2 is twice as big as Country 1 (s = 1/2), manufacturing

production in the small country is reduced to less than two-fifth of the large country's production if trade costs amount to about 10 percent. When Country 2 is 9 times larger (s = 1/9), the small country fully specializes in agricultural goods if trade costs lie between 20% and 5%.

Trade liberalization does not affect firms in the large country as it does in the small, although consumers in the former also reduce their demand for local manufactures in order to buy foreign varieties. First, since Country 2's market is larger, reductions of local demand will have a smaller impact on firms' profits, allowing a greater number of firms to break even. Second, due to its larger supply of factors, production costs in Country 2 are lower. Unless trade costs are prohibitive, manufactures produced in the large country are internationally more competitive.

However, during the process of peripheralization, demand for factors rises (declines) in the large (small) country, and hence, the rewards to factors increase (decrease) in the large (small) country. When the latter is fully specialized the wage differential between the two countries is at its highest and is larger the larger is Country 2.

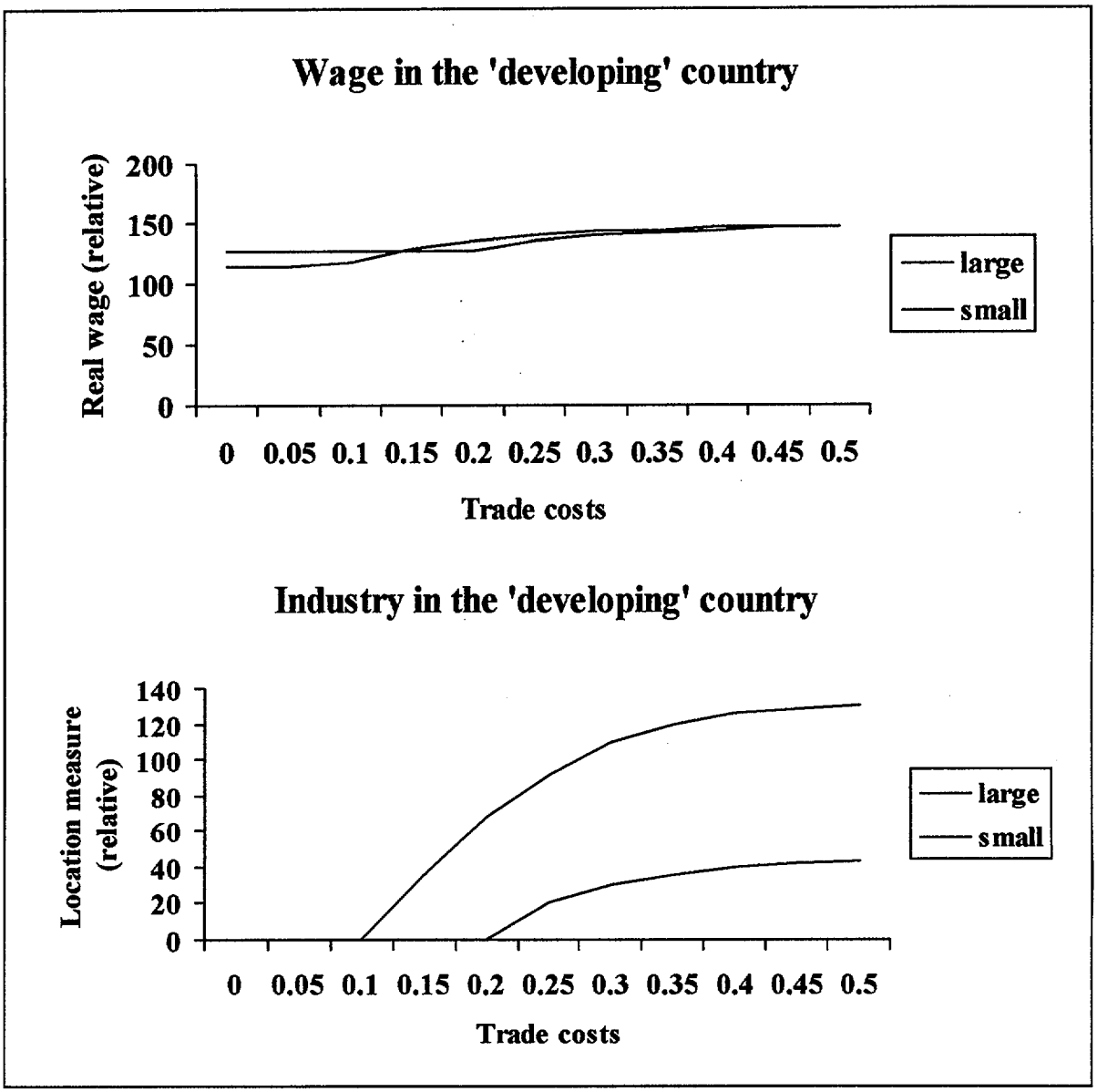
Trade costs are then low when compared with production costs, implying that firms may produce in any location and export at a minimum trade cost. At this point, factor costs become a more relevant aspect of their decisions. The small country is then able to attract manufacturing production due to its lower wages, and consumption of its varieties increases due to its lower consumer price. Figure 1 shows that the relative number of firms in the smaller country then rises steadily until trade is completely free. Wages follow the same pattern due to increased demand for factors. Clearly, at free trade, both countries are manufacturing cores.

What are the effects of globalization on small countries' manufacturing production? On the one hand, globalization limits smaller countries, when there is some level of protection (low trade costs in the model), i.e. tariffs or transport costs. On the other hand, total openness is beneficial to small countries. Low factor costs attract manufacturing production while the absence of barriers to trade allows their manufactures to be competitively exported. However, these results depend crucially on the assumption that a country has a comparative advantage in the production of manufactures. Although market size may be considered as a form of comparative advantage, it becomes less crucial the lower the trade costs. In the following section we shall see how differences in factor proportions affect the location of firms.

4.2 Comparative advantage and market size

Figure 2 presents the results of the simulations of Case 1 and Case 2. In the former, the large country has a comparative advantage in the production of manufactures, whereas in the latter the large country has a comparative *dis*advantage in manufactures. At high trade costs the curves are similar to Figure 1. Although Country 2 has lower costs of production, trade costs are sufficiently high to prevent its manufactures from being internationally competitive. Firms cater mainly to local demand. The curves clearly show that market size determines the number of firms even in the case of adverse relative factor proportions. More firms can profitably operate in the large country in Case 2 than in Case 1. In addition, the ratio of the number of firms in the country with adverse comparative advantage and the number of firms in the country with favourable comparative advantage (n_1 / n_2) is above 1 for trade costs above 27%. At all levels of trade costs above 5%, the relative number of firms in the large land-rich country (Case 2) is consistently greater than the relative number of firms in the small land-rich country (Case 1). This indicates that a larger market allows more firms to produce against the country's comparative advantage.

Figure 2
Comparative Advantage and Market Size



As was seen above, in both cases diminishing trade costs cause the consumer price of varieties exported from Country 2 to become more competitive in Country 1 since their producer price is lower due to favourable factor proportions. Consumers in Country 1 buy more quantities of foreign varieties and decrease their demand for domestic varieties. Firms in Country 2 produce more manufactures and hence demand more labour. As a result, wages in Country 2 increase. The opposite movement occurs in Country 1. Less manufactures are produced for export, implying less demand for labour in manufacturing and lower wages. Although consumers in Country 1 still demand domestic varieties, the quantities demanded are not sufficient to maintain the same number of firms. As more and more firms cease to produce in Country 1, wages decline until no manufacturing production takes place. This occurs at 17% trade costs in Case 1 and 5% in Case 2.

The core-periphery process in Case 1 and Case 2 is similar to the Economic Geography Case, however, for different reasons. In the latter case, the larger supply of factors reduces the production costs of the larger country. Here, the larger relative supply of labour reduces the production costs of the labour-abundant country, which becomes the manufacturing core. In all cases peripheralization is accompanied by declining wages in the periphery. However, when the factor used intensively in manufacturing is scarce in peripheral countries, the wage differential never increases sufficiently to attract manufacturing production back to the periphery. As a consequence, while peripheralization is a temporary process in the Economic Geography Case, it is permanent once countries have adverse comparative advantages.

How does globalization affect the manufacturing industry of peripheral countries? Given adverse comparative advantage and low levels of trade costs, globalization intensifies peripheralization. With few trade barriers, any market can be accessed at low cost and domestic market size is a less important determinant than factor costs. Market size does matter, though, in allowing peripheral countries to maintain their manufacturing industries, provided there is a minimum of trade costs. Since trade is never free - e.g., there may be transport costs - we may conclude that expanding domestic markets could help countries with adverse comparative advantage to diversify their production structure and not fully specialize in agricultural goods.

5. Conclusion and Further Issues

This paper has investigated the role of comparative advantage and that of market size in the international specialization of production. Building upon the conventional 2x2x2 general equilibrium framework, our analysis extends the present literature by incorporating both effects in the same model.

The model yields several interesting results. Firstly, if no country has a comparative advantage in the IRS sector, but instead countries differ in size, the small country specializes in the CRS sector at positive trade costs. Secondly, if a country has a comparative advantage in the production of the IRS good and a small market, it will concentrate on the production of this good. Furthermore, complete specialization in production depends solely on factor proportions, irrespective of market size. On the one hand, land-abundant countries specialize in the production of food if manufacturing is labour intensive. On the other hand, labour rich countries of any size are manufacturing cores.

Land-abundant countries with large markets can sustain a domestic manufacturing industry until trade costs are very low, and in some cases only specialize at zero trade costs. By contrast, in small land-abundant countries IRS industries are unprofitable even at high trade costs so that these countries specialize according to their 'adverse' comparative advantage.

The model developed and simulated here relies on particular assumptions regarding technology, factors and externalities. For instance, we have supposed a unique type of labour. Wood (1994) distinguishes skilled labour from unskilled labour with results similar to ours. Industries intensive in the use of skilled labour will agglomerate in countries rich in skilled labour. Such distinction in the model between different types of labour represents a new approach to analyzing certain trends in globalization as they were pointed out in the Introduction.

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Paper 3
Capital Flows and Technology
Some Country-Specific Evidence

Yuko Kinoshita[1]

1. Introduction

Technological change plays an important role in the process of economic development. New technology is generated through innovative efforts of certain firms and spills over to other firms through imitation or learning processes. The generation of new technology typically takes place in developed countries, where human capital is more abundant. Developing countries on the other hand, may be able to advance the level of technology simply by adapting existing technology. How fast and successfully developing countries can access and absorb new technology is therefore a key determinant of economic growth of these countries.

Among various avenues of international technology transfer,[2] foreign direct investment (FDI) plays a unique role because it involves the transfer of technology embodied in human capital such as management know-how.

More specifically, there are four channels through which technology is transferred via FDI. First, the demonstration or imitation effect arises from differences in the level of technology between foreign and local firms. Foreign firms with more advanced technology enter the local market and introduce or demonstrate newer technology in the industry. Through direct contact with foreign affiliates, local firms can watch and imitate the way foreigners operate and eventually advance their productivity. This may occur also through labour turnover from foreign to local firms.

Second, a competition effect can often be observed. The entry of foreign firms leads to more intense competition in the local industry, and local firms are forced to be more efficient in using existing technology and resources. Thus, local firms themselves may have to introduce new technologies in order to maintain

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2 Technology can be transmitted internationally also via international trade (Keller,1995; Ben-David and Loewy,1995), licensing agreements or scientific journals, for example.

market shares. As a consequence, increased competition may help to eliminate monopolistic profits and enhance the welfare of the host country.

Third, backward and forward linkages may occur when foreign affiliates establish a direct relationship with local suppliers and customers, respectively. Through backward linkages, local suppliers may benefit from their foreign customers in several ways. Foreign customers may provide technical assistance or training to raise the quality of local suppliers' products. They may also assist local suppliers in the purchasing of raw materials. Even without these direct contributions, local suppliers may be forced to meet the higher standards of quality and speed of delivery of multinational corporations (MNCs) and innovate more. Local content requirements can encourage more foreign affiliates to establish backward linkages. As technical complexity increases in many industries, producers in developing countries may seek to purchase intermediate inputs from foreign suppliers (forward linkages) for which higher levels of R&D are typical.

Finally, technology can be transferred to local firms through costly efforts of MNCs to increase productivity of their local partners/suppliers. In addition, own training of employees by local firms, as it is induced by increased competition or by the demand of MNC customers for higher quality of goods, can also help to absorb new technology. Irrespective of who provides the training - foreign joint venture partners or local firms themselves - formal education or on-the-job training will help to accumulate human capital and enhance productivity.

The present study examines the relative importance of each of the four effects in accounting for productivity growth of a firm in the host country. The data background is that of 1992 survey data on 468 manufacturing firms in eight cities of China. Using these data, the following questions are examined:

1. What is the quantitative importance of technology spillover from FDI for productivity growth of the host developing country?;
2. Which channels are most important for such spillover to become effective?;
3. What can a host country do to maximize the degree of technology spillover from FDI?

2. Empirical Framework

Previous studies at industry or firm level presented mixed evidence of technology spillover from FDI. Caves (1974), Globerman (1979), and Blomstrom and Persson(1983) found spillover effects from foreign presence on productivity growth of local firms in Australia, Canada and Mexico, respectively. In contrast, Haddad and Harrison (1993), Kokko (1994) and Aitken and Harrison (1999) found no such evidence for Morocco, Mexico and Venezuela, respectively.

These contradictory results suggest that technology spillover from FDI to domestic firms does not take place automatically. And this becomes all the more evident when countries with similar FDI policy are compared. For instance, both the Moroccan and Chinese governments have promoted foreign investment, yet economic growth rates subsequent to the inflow of FDI were quite different in the two countries. In other words, the degree of technology spillover from FDI is largely determined by host country

characteristics, as e.g. its capacity for absorbing new technology. In cross-country studies, Coe, Helpman, and Hoffmeister (1997), and Borensztein, DeGregorio and Jong-Wha Lee (1998) have pointed out the importance of human-capital based absorption capacities for the effect of FDI on economic growth.

With the arrival of new technology, productivity would not grow unless workers in the host country know how to adapt this technology to the production process. In the absence of such ability, policies in favour of FDI would be unlikely to succeed in bringing about an improvement in productive efficiency and thus enhancing growth.

The theoretical basis for the present analysis draws on an equation proposed by Parente and Prescott (1994). This equation effectively states that both spillover effects and a firm's own investment in technology account for productivity growth. After a transformation of this equation and inclusion of additional variables, the following regression model of productivity growth at firm level obtains:

Rate of productivity growth
$= \beta_0 + \beta_1 *$ spillover $+ \beta_2 *$ training $+ \beta_3 *$ linkages $+ \beta_4 *$ foreign joint venture

The above equation represents a decomposition of a firm's productivity growth into the demonstration effect, the training effect, the foreign linkages effect and the foreign joint venture effect.

In the present context productivity growth is measured as the rate of growth of total factor productivity or the 'Solow residual' for the time period 1990 to 1992. The explanatory variables are intended to represent the channels through which FDI can raise productivity.

The spillover variable is expressed as the difference between productivity levels of the firm studied and of the foreign firm 'leading' in a given industry group as measured in the initial year (1990). This variable is interpreted as capturing demonstration and the competition effects. More precisely, it indicates productivity gains that arise from being close to efficient foreign firms, either because local firms learn and imitate better technology used by foreign firms or because local firms are forced to upgrade their technology due to increased competition. The training effect is measured by the incidence of training workers between 1990 and 1992. It is a proxy for the firm's investment in human capital. The linkages effect is meant to capture technology spillover from forward/backward linkages with foreign firms, i.e. inter-industry spillover. Finally, the foreign joint venture variable indicates whether or not the firm participates in a foreign joint venture.

3. Data

The data used here are based on a special survey conducted by the World Bank in 1992 in eight cities[3] in China. Six of these cities are located in coastal provinces that were chosen as "Special Economic Zones",

[3] The eight cities are Chengdu, Chongquing, Dongguan. Fuzhou, Quangzhou, Quanzhou, Shenzhen, and Xiamen.

while the other two are inland cities that received relatively little foreign investment due to fewer incentives. The survey questionnaire was distributed to 468 firms[4] in November 1992. All firms returned the questionnaire with some missing information. The response rate is, therefore, 100%. There is a great foreign presence of foreign-owned firms in the sample since most of the sample firms are located in the coastal region. The industrial classification that was used in the analysis is 2-digit ISIC.

The questionnaire was designed to assess factors that explain rapid growth in coastal provinces. Specifically, the purpose of the survey is to study a firm's effort to imitate or innovate in response to changing competitive conditions by investing in human capital (e.g. training) and to assess the relative importance of different sources of foreign knowledge. Also, the benefits received through different sources are identified.

The original data contains a detailed classification of ownership. According to ownership of shares, the firms can be divided into three types: state-owned, collectively-owned, and foreign-owned firms.[5] Furthermore, the first two groups are redefined as domestic or non-FDI firms and the last group as foreign or FDI firms.

A comparison between foreign and domestic firms with respect to productivity levels in the initial year is reported in Table 1. This table confirms that in almost all industry groups foreign firms exhibit higher productivity levels than domestic firms and that technology is likely to spill over from foreign to domestic firms. It is also notable that on average local Chinese firms are more likely to train workers than foreign firms. This may imply that foreign firms are simply importing skilled workers as well as intermediate goods from the home country and therefore do not have to train workers locally.

4. Summary of Results and Discussion

The main results from the regression analysis outlined above are presented in Table 2.

These results may be summarized as follows:

1. The most important sources of firms' productivity growth are spillover from foreign technological knowledge and training efforts that raise skill levels;
2. Local Chinese firms are more likely to train workers with the result that technology spillover from foreign firms is enhanced and accelerated;
3. Foreign joint ventures do not significantly raise local firms' productivity;
4. In China foreign firms are unlikely to train local workers; instead, they bring skilled workers and import intermediate goods from their home countries.

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[4] The questionnaires were distributed to 60 firms randomly chosen in six cities in coastal provinces. Two inland cities, Chengdu and Chongquing, have only 55 and 53 sample firms, respectively.

[5] If more than 50% of shares are state-owned, then the firm is defined as state-owned. If more than 10% of shares are owned by foreigners, then the firm is foreign-owned. The rest are collectively owned or private firms.

Among the four channels through which technology is transferred via FDI, this study points to both the spillover and the training effects as being crucial for productivity growth of local firms. At the same time it is shown that the degree of spillover is likely to be limited without simultaneous efforts to enhance workers'.skills. The policy implication drawn from this result is that favourable FDI policy alone is not sufficient to induce the benefits of technology spillover from FDI. Host country governments need to also implement policies - such as subsidies or tax breaks for training programmes - in order to help local firms to build up their skill base.

Table 1
Relative Performance (TFP Levels) of Domestic and Foreign Firms

Industry	Domestic	Foreign
Food	0.23	1.24
Textiles	-0.12	0.39
Wood & pulp	-0.12	-1.13
Chemicals	0.08	0.22
Non-metallic minerals	-0.03	0.61
Machinery	-0.21	0.54
Other industries	0.15	0.04
All industries	-0.06	0.33

Table 2
What Explains the Growth of TFP (Regression Results)

Variable	Sign of effect	Coefficient	Significance
Technology spillover	+	0.382	Very high (99%)
Training	+	0.063	High (90%)
Foreign linkages	(+)	0.015	Insignificant
Foreign joint venture	(+)	0.013	Insignificant

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Paper 4
Technology and Skills in Industry
The International Evidence

Stephen Machin[1]

1. Introduction

Across the industrialised world employers' demand for skilled workers has been rising over time. This has resulted in them being prepared to pay higher wages to workers with relevant skills, particularly to those with the aptitude and knowledge to utilize the new forms of technologies that are permeating into workplaces throughout the world. There has been much debate about what underpins this increased demand for skilled workers. As such, a large (and growing) academic literature has emerged which both documents trends in skill demand, and considers what are the key driving forces that lie behind the observed change.

In this short paper I review the main findings from this literature, drawing on the empirical evidence presented therein. The paper is structured as follows. Section 2 describes the nature of shifts in skill demand that have occurred in recent years. Section 3 considers what lies behind the observed shifts. Section 4 focuses upon what is happening in the developing world. Finally, Section 5 concludes by briefly discussing some of the policy implications of the key findings of the research.

2. Shifts in Skill Demand

The US literature on demand for skills[2] begins with a stark finding: Since the late 1970s real wages of young men with twelve or fewer years of education *have fallen* by one quarter. However, even though these less educated workers are cheaper to employ, their share in total employment has fallen massively. Put alternatively, they have lost out to their more skilled and educated counterparts in terms of wages and

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[1] Professor of Economics, University College London, and Director of the Skills Programme of the Centre for Economic Performance at the London School of Economics.

[2] In this work 'skill' is measured in a variety of ways. All measures used are rather coarse and as such have their limitations. But the measures used do seem to display similar trends. For example, the two most commonly used measures (forced upon researchers by data availability constraints) are to define non-production workers and workers with a college degree as relatively skilled and production workers and non-graduates as relatively unskilled. Trends in the wage and employment rates of non-production vis-à-vis production workers and graduates vis-à-vis non-graduates show very similar trends in the countries where they have been compared (see Berman, Bound and Griliches, 1994, for US comparisons and Machin and Van Reenen, 1998, for UK comparisons.

employment. Demand has shifted against the less skilled and moved in favour of the more skilled who have gained in terms of labour market returns.

The international picture is also clear. In the developed world, less skilled workers have fared worse in at least one of the dimensions of relative wages, employment or unemployment. Table 1 shows the nature of skill demand shifts for a number of countries based on the relative employment and wages of non-production vis-à-vis production workers (the only comparison possible for a reasonably large number of countries). Employment shares of the relatively skilled group of workers rose in all countries in the 1970s and 1980s. The pattern of wage shifts is more variable but seems to show increases in the 1980s at the same time as relative employment increases. It is possible to combine the employment and wage changes into a single index of skill demand by looking at the wage bill share of non-production workers: This rises everywhere suggesting that employers want more skilled workers and that their demand for them has increased as they are prepared to pay them relatively more.

Table 1
Patterns of International Skill Upgrading

	1970-80			1980-90			
Country	Change in % non production (annualized	% within	Change in wage ratio (%)	Change in % non production (annualized)	% within	Change in wage ratio (%)	Note
US	0.20	81	-2	0.30	73	7	
Norway	0.34	81	-3	.	.	.	1970,80,n/a
Luxembourg	0.57	90	6	0.30	144	12	
Sweden	0.26	70	3	0.12	60	-3	
Australia	0.40	89	-17	0.36	92	2	1970,80,87
Japan	.	.	.	0.06	123	3	n/a,81,90
Denmark	0.44	86	-11	0.41	87	7	1973,80,89
Finland	0.42	83	-11	0.64	79	-2	
W.Germany	0.48	93	5	.	.	.	1970,79,n/a
Austria	0.46	89	7	0.16	68	7	1970,81,90
UK	0.41	91	-3	0.29	93	14	
Belgium	0.45	74	6	0.16	96	-5	1973,80,85
Average	0.40	84.3	-1.8	0.28	91.5	4.2	

Notes: From Berman, Bound and Machin (1998). The percent within column is based on comparing changes over time in the same 28 industries in each country (except for Belgium [24], W. Germany [22], Japan [27], Luxembourg [9 in 1970-80, 6 in 1980-90] and Norway [26]).

Table 1 also reveals an important feature of the nature of shifts in skill demand. The table shows what happens if one breaks down the overall shifts into components that measure the extent of skill upgrading going on *within* industries as compared to *between* industries. This is an important distinction as the extent to which the shifts are concentrated within specific industries is likely to reveal something about the importance of different explanations about what underpins the observed shifts in skill demand (this is discussed in Section 3 below).

The table makes it very clear that the bulk of the observed upgrading has occurred within, rather than between, industries. Put another way, some industries have experienced faster skill upgrading than others. Identification of which industries have had faster rates of upgrading, and their characteristics, can therefore shed light on what may underpin the improvements in labour market conditions for the more skilled.

Even more relevant is the fact that faster skill upgrading is observed in the same industries in different countries. Table 2 shows cross-country correlations of changes in non-production wage bill shares in the 1980-90 time period. There is indeed a cross-country correspondence: 31 out of 36 pairwise comparisons are positive and a sizeable number of the correlations are statistically significant (13 of them). This suggests that skill upgrading has a strong tendency to be clustered in the same industries across different countries.

Table 2:
Cross-Country Correlations Changes in Nonproduction Wage Bill Shares, 1980-90

	US	Swe	Aus	Jap	Den	Fin	Aus	UK
Sweden	.15							
Australia	.35	.16						
Japan	.09	.14	.08					
Denmark	.66*	.06	.11	.14				
Finland	.70*	.12	.37*	.33	.52*			
Austria	.27	-.44*	.14	-.11	.31	.29		
UK	.64*	.06	.38*	.01	.53*	.39*	.47*	
Belgium	.45*	-.19	-.28	-.12	.41	.45*	.51*	.47*

Notes: Calculations based on the 28 industry data used in Berman, Bound and Machin (1998). A star denotes statistical significance at the 5 percent level or better.

3. What Lies Behind the Demand Shifts?

The basic facts outlined in Section 1 can be drawn upon to try to offer an explanation of what lies behind the declining demand for unskilled labour. The literature has identified several possible explanations of this decline, with the two main arguments being increased exposure to trade from the developing world and skill biased (or unskilled labour saving) technological change (SBTC). As it stands, the profession seems to be near a consensus, as the combination of a number of research findings generate compelling evidence that increased demand for skill in the OECD is primarily due to SBTC:

1. Despite the increase in the relative cost of skilled labour, the majority of industries in developed countries have had within-sector shifts in the composition of employment toward skilled labor (see Table 1 above).

2. Employment shifts to skill-intensive sectors (the between-industry component of skill upgrading) seem too small to be consistent with explanations based on product demand shifts, such as those induced by increased international trade.

3. Shifts in skill demand were concentrated in the same industries in different countries (see Table 2 above). Furthermore, there is a strong concentration of technological change in the same kinds of industries in different countries. Table 3 (reproduced from Machin and Van Reenen, 1998) shows that more R&D intensive industries are very much the same across countries. The same is true of UK-US comparisons of industry computer usage.[3]

Table 3
Cross-Country Correlations in Industry R&D Intensity

	Cross-Country Correlations of Industry (R&D/Y)					
	Denmark	France	Germany	Japan	Sweden	UK
France	.68*					
Germany	.79*	.97*				
Japan	.66*	.95*	.97*			
Sweden	.73*	.97*	.97*	.96*		
UK	.73*	.98*	.95*	.92*	.98*	
US	.68*	.90*	.85*	.91*	.93*	.94*

Notes: Taken from Machin and Van Reenen (1998) The Table reports pairwise correlation coefficients based on 15 manufacturing industries (except for correlations for Denmark which are based on 14 industries due to missing data on the petroleum industry). They are weighted by the pairwise cross-country mean industry value added share in total value added. A * denotes statistical significance at the 5 percent level or better.

4. There appear to be strong, within-sector correlations between indicators of technological change (like computer usage and R&D intensity) and increased demand for skills.

[3] Correlation coefficent for UK-US industry computer usage = .79 (from Machin and Van Reenen, 1998).

5. Case studies (conducted by the US Bureau of Labor Statistics Office of Productivity and Technology) that indicate the nature of innovations often mention innovations that lowered or are expected to lower production labour requirements.[4]

All this points to an important SBTC effect that has shaped the observed relative demand shifts. The fact that technology seems to have diffused across international borders, and affected industries in different countries in similar ways, points to a global SBTC effect that has influenced the wage and employment structure to the detriment of the less skilled in the advanced world. The next section goes on to consider the case of developing countries.

4. Skill Demand Shifts in the Developing World

Data to compute industry demand shifts is much more sparse in the developing world. But what evidence exists also points to an increased demand for skilled workers that is consistent with a long trend of SBTC. This is very hard to reconcile with the story that says the demise of the labour market position of less skilled workers in advanced countries is due to the increased trade with low wage, usually Southern hemisphere, countries.

First of all, several studies have found *increased* relative wages of skilled labour in several developing countries despite widespread trade liberalization in the 1980s which, if trade based arguments were correct, would predict the opposite (see Feliciano, 1995, Hanson and Harrison, 1995 and Robbins, 1995).

Second, one can carry out exercises like those in Section 2 for developing countries. Table 4 reports changes in the non-production wage bill share for three sets of countries: Low, middle and high income countries (based on GDP per capita in 1985). The pattern is interesting and shows skill upgrading going on across the globe.

Table 4
Change in Wagebill Shares by Income Groups (Weighted by wagebills)

	Low	Middle	High
1980s Mean Change	0.05	0.45	0.42

Note: Taken from Berman and Machin (1999). The countries in each group are as follows. Low income: Ethiopia, Tanzania, India, Bangladesh, Pakistan, Egypt and the Philippines. Middle income: Guatemala, Turkey, Peru, Colombia, Korea, Malaysia, Czechoslovakia, Chile, Poland, Malta, Portugal, Hungary, Uruguay, Cyprus, Greece, Ireland, Spain, Venezuala. High income (as for Table I above): Japan, UK, Austria, Finland, Belgium, Denmark, Luxembourg, West Germany, Norway, Sweden, Australia, USA.

[4] These studies are cited in more detail in Berman, Bound and Machin (1998).

Furthermore, the extent of skill upgrading in the developing world is positively correlated with what is going on in the developed world (see Berman and Machin, 1999, and Desjonqueres, Machin and Van Reenen, 1999). Table 5 reports correlations between skill upgrading across countries and US skill upgrading. The mapping is strong: in many low and middle income countries it seems that it is the same industries that have experienced faster skill upgrading. This rests well with the SBTC hypothesis but is very much contrary to the trade based arguments of shifting skill demand.

Table 5
Correlations with US Skill Upgrading

	Correlations	Correlations
High Income Group		
Countries	9	11
Positive	9	10
Significant Positive	5	1
Significant Negative	0	0
Middle Income Group		
Countries	12	8
Positives	11	7
Significant Positives	2	0
Significant Negatives	0	0
Low Income Group		
Countries	6	5
Positives	5	3
Significant Positives	0	1
Significant Negatives	0	0

Note: Taken from Berman and Machin (1999).

5. Concluding Remarks

What these research findings suggest for policy is important at the national and international level. The fact that SBTC has had pervasive effects on labour market structures across the globe makes it clear that governments need to support education properly and to train workers to use the new technologies that are becoming central to the nature of work. The rapid pace of technological change, and its rapid diffusion across international borders, makes this a policy issue that will be central to the organization of work in the 21st century.

Regarding policy approaches, many observations can be made but it is clear that differentiation among country groups is of the essence. Industrialized countries need to be alerted to the fact that their unskilled-labour problems are mainly due to SBTC. Consequently, their policy response would not have to be concentrated against trade with developing countries but it seems more pressing to devote resources towards increased and improved industrial skill formation. The latter also seems important for policies in the transition economies who start from a good general knowledge base already and may need to emphasize training activities. Unsurprisingly, the situation in the developing countries currently appears as the most difficult one: In many of these countries general education needs significant improvement and at the same time industrial training has to be promoted, if only for the sake of improved adoption possibilities for the new technology that is diffusing in from the advanced world.

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Distinguished Speaker

Fabrizio Onida[1]

Mr. Chairman,
Excellencies,
Distinguished Guests,
Ladies and gentlemen,

1. Introduction

Let me first congratulate the panellists for the strongly academic and scholarly approach to this debate, which I was expecting to be more policy-oriented. As an academic myself, let me try to shift the focus from the interesting discussion about the theoretical mainstream and the empirical outcomes of the papers, and to try to focus on four main questions or points. The only point that I ask you to allow me to make as Professor of International Economics is to emphasize how this rethinking of international trade theory comes from a very profound cross-fertilization of different disciplines or sub-disciplines. The main one is industrial organization, if you think of all the contributions of the so-called new trade theories with regard to product differentiation, oligopolistic games, product cycles, etc. The second is the discipline centred on endogenous growth, i.e. the link between innovation, technical change and growth. The third is the more recent geography approach that brings the spatial dimension into economic analysis. This is not a new thing, of course, because economic geography was a very old-fashioned discipline; but it is interesting how we economists have rediscovered all these elements as ingredients for a fully integrated theory that tries to explain globalization and integration, through trade and investment.

Having said this, I will dwell on four main points:

1. The central question of how developing countries can learn to implement appropriate policies aimed at developing dynamic gains from trade and dynamic specialization, and thereby to capture, the benefits from globalization;
2. The issue of geography and trade, which is the main topic of this panel;
3. The implications of the knowledge-based economy; and
4. The issue of social standards.

[1] Professor of economics at Bocconi University, Milan (currently on leave of absence). President of the Italian Trade Commission attached to the Ministry of Foreign Trade. No formal paper was submitted. The text presented here is based on a transcript of the lecture.

2. Policy Implications of Globalization for Developing Countries

This point is to some extent the other side of the coin that Professor Machin presented. If one asks oneself whether developing countries are gaining from specializing in the traditional labour-intensive sector, the answer is that even when they specialize in the unskilled labour-intensive sector according to the traditional classification, they may still greatly benefit from a modernization of their own labour-intensive production processes. This enables them to learn how to add value to their domestic resources, both their natural resources and their resources of unskilled labour. Through specialization and international trade a developing country is granted the opportunity of raising the standard of living, and even raising that skilled labour premium that Professor Machin discovered as the main result of a within-industry process, rather than across industries.

One may consider the textile industries in Indonesia or Tunisia, for example, and how they have already been modernized and gained from entering a worldwide market by raising the level of quality and the level of technical skills. Similarly, one may consider the Chinese specialization in chemicals or in car components. This process is supported, let me add, by the international mobility of capital and technology. To this extent I find myself slightly in disagreement with the Professor Kinoshita's findings. I respect the results of a specific small sample of Chinese companies in 1992. But if I read throughout the literature, from say Helpman-Krugman to Dunning, Sanjaya Lall, Raymond Vernon, and so on, and I look at the results that the OECD, UNCTAD and WTO have gathered in the past few years concerning the impact of FDI and trade, I only find evidence that direct investments ultimately make a substantial contribution not only to integration in basic terms but also to improving the mobility of knowledge, information and managerial skills.

As a matter of fact, FDI and other non-equity forms of cooperation, such as licencing, turnkey plants, managerial plants, subcontracting, co-production and various kinds of collaborative industrial agreements are very important means for promoting the dissemination of technology. The non-equity forms of cooperation that, incidentally, my institute and many trade promotion institutes are trying to cultivate, are particularly suitable for small and medium enterprises, which are often reluctant to take up the difficult task of making direct investments with all the managerial and financial implications. The research that we have conducted - including research carried out a few years ago with the OECD Development Centre and Charles Oman, who you may remember is one of the people who have studied this argument - has always yielded the same conclusion: That trade and investment are complementary. Although the investment effect is somewhat unmeasurable in the short term, it contributes greatly to a broadening of business opportunities and knowledge opportunities for the recipient countries.

3. Geography and Trade

Let me turn then to the issue of geography and trade, which is the main topic of this panel. In this connection I want to stress the importance of regional aggregation and integration as a successful stepwise strategy to achieve economies of internationalization through larger markets, economies of scale of production and economies of scale of distribution. In other words, if one looks at the post-war experience not only of Europe but also of ASEAN or NAFTA, or even of Mexico before NAFTA, or if one takes the central and eastern European experience today, one finds that a larger integration within a broad regional

area is definitely not in contradiction to worldwide multilateral integration. It is a stepwise process to a multilateral integration.

There is no ideal model that brings a small isolated country into full global integration, unless it grows through some process of intermediate regional integration because regional markets mean a lot of things - economies of scale of production and distribution, as well as a greater circulation of knowledge. Even from the viewpoint of multinational investors it makes a lot of difference whether they are investing in a small protected domestic market or if they are investing in a broader, regionally integrated, market.

A corollary of this point could be a reflection on the clusterization of industries within larger markets, of clusters and industrial districts. This is a very popular argument in Italy. Unfortunately the limited time at my disposal does not allow me to dwell on the virtues and limits of clusters as a way of projecting small and medium enterprise towards the global markets. There may be other occasions for this.

4. The Knowledge-based Economy

The point that we live in a knowledge-based economy, as Mr. Robyn has reminded us, may almost be discounted. Of course, a developing country trying to benefit from globalization must not forget that no gains will be available without some significant effort to improve basic education, technical education, and investment in both blue-collar and white-collar training. Such investment in training is not only necessary in the private sector, I should add, but also in public administration. Incidentally, I must tell you that some of the training efforts that our institute is undertaking are aimed at raising the knowledge and skill of the people that provide the administrative background behind the growth of the market, such as public administrators. These efforts are definitely important. And to this extent I can agree with Professor Kinoshita - she is correct if she points out that inward investments are not sufficient conditions for diffusing technology. One also needs this complementary effort.

5. Social Standards

For my final point, let me spend a few minutes on the very controversial debate concerning the social dumping. As you know, this is a very popular topic which pops up every once in a while in the debate concerning the benefits of globalization for the developing countries, and is one of the issues on the table of the WTO meeting starting tomorrow. I want to stress that as Professor Danny Roderick wrote a few years ago in an interesting book whose title was, if I am correct, "Has Globalization Gone Too Far?", that the answer is that it has not gone too far. The question is how to manage globalization. One observation of Professor Roderick was interesting. That is that we are not only witnessing an integration of goods, of services, of capital, but ultimately we are going to integrate institutions. There is a sort of an arbitrage of institutions and culture through international trade and investment. This does not mean that we are converging in one ideal worldwide democracy sharing the same values of course, but simply that we can promote through trade and investment some convergence even of those basic values that refer to democracy, human rights, social standards and labour standards.

The point that I want to make is that raising labour standards is not a question of trade sanctions. As a matter of fact, we know from all the evidence that the direction of causation goes from poverty to social standards; i.e., if I manage to lower the level of absolute poverty, then I manage to raise social and labour standards. There is no inverse causation that if I try to force labour standards, I reduce poverty. This point means that we have to be convinced that through globalization and greater integration we are putting into action a strong and powerful engine of benchmarking among countries and peoples, and are helping some developing countries to increase their capability to add value to their resources, as I said at the beginning. This means carrying towards a market economy a labour force that is strongly under-utilized in the informal economy or in the urban ghetto of despair, that may otherwise be headed towards criminality, prostitution or other undesirable outcomes. This allows people to learn how to measure their productivity and how to add value to their fundamental natural or human resources.

If we are convinced that trade is a mechanism for improving this outcome and raising per capita incomes, then we must conclude that the correct approach is not the easy protectionist approach of introducing sanctions or barriers against those who do not respect a given social standard. On the contrary, the better approach would be the following:

1. The standards of the International Labour Organization have to be diffused, promoted, pushed through. I am surprised that some of the relevant developed countries have not yet signed the ILO protocol on social standards. Before protesting against child labour, they should think about why they have not subscribed to such a fundamental commitment.
2. Multinational enterprises should set high ethical standards. I believe that the reputation of a multinational enterprise also depends on whether it follows an ethical or unethical standard. To a large extent, a multinational enterprise is much more likely to be judged, valued and observed, and therefore can set benchmarks for ethical standards and ultimately social standards.
3. Finally, if we have to think of incentives for governments of developing countries to invest more to improve their social standards, we should think in terms of positive incentives. For example, by introducing some conditionality in public aid that ultimately goes to reinforce investment in human capital and investment in anti-poverty programmes. I would even add something more. We could even think about trade measures, but not in terms of trade barriers raised against the so-called bad-behaviour countries. Why don't we think of greater openness, of granting stronger preferences to countries that demonstrate their honest and pragmatic effort to improve their social standards. This is a very different approach than the threat of sanctions or trade barriers.

6. Conclusion

In conclusion, let me reiterate the main point of all these arguments that import competition and export orientation, together with international investment, are the most powerful source of domestic industrial modernization, providing an exit from poverty and from underdevelopment. They therefore represent the most powerful engine for raising total factor productivity, real wages and the welfare of citizens and workers.

Thank you.

Distinguished Speaker

Murtaza Rakhimov[1]

Mr. Chairman,
Ladies and gentlemen,

At the outset I would like to thank the Director-General for the wonderful idea of convening a forum on industrial development. I represent the Republic of Bashkortostan. My region is located in the centre of Russia, at the crossroads between Europe and Asia, about 1,500 kilometres east of Moscow. The territory of the republic is over 143,000 square kilometres. The population is in excess of 4 million people. Within the republic we have 54 regions, 21 towns, and more than 4,500 settlements. The capital is the city of Ufa, where approximately 1.1 million people live.

The Republic has major raw material deposits - basically the entire periodic table can be found there. I will list some: Oil; gas; iron ore; ores with contents of copper, zinc, gold, and manganese; sulphur, mica and others. We also have many forests. They cover 5.7 million hectares, which amounts to approximately 40% of the territory of the Republic. The arable land amounts to approximately 7 million hectares, on which various kinds of agricultural commodities are produced. We produce about 25% of all of the oil industry equipment throughout Russia, one-fifth of its caustic soda, synthetic resins, plastics and various rubbers, 20% of metal cutting equipment, and about a quarter of all of the lighting fixtures.

The geographic location of the Republic is very advantageous, as I have already mentioned, and we are linked to many regions in Russia and to foreign countries. We also have major oil and gas pipelines going through the territory of my Republic. We have a stable economic and social situation. Various indicators for individual sectors of the economy are improving. This can be illustrated by various economic indicators over the past ten months. The overall rate of profit for the past ten months is in excess of what we had last year. We are the number one region in oil refining in Russia. Yearly we process about one-fifth of all of the oil produced in Russia. The investment activity in construction is also on the increase. In the past ten months more than 11 billion rubles were earmarked for that activity, which is 111% when compared with last year. The republic is fully self-sufficient in food. We had a very good harvest this year and our animal husbandry is doing well.

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[1] President of the Republic of Bahkortostan, Russian Federation. The original paper was submitted in Russian. The English text presented here is based on a transcript of the lecture.

In 1990 the highest decision-making body of Bashkortostan passed a declaration on the state sovereignty of this Republic within the Russian Federation. The special status of the Republic was also enshrined in the Annex to the Treaty of the Federation. In 1993 the Russian Federation and the Republic of Bashkortostan also signed an agreement on the division of authority and the mutual delegation of powers. Under this document, Bashkortostan is free to regulate all legal relationships except for those which have been voluntarily given over to the Russian Federation.

This broadens the possibilities for my Republic, including in the area of international cooperation. Recently, therefore, we have been very actively developing our international links. By now we have about 30 agreements signed with 18 countries. Attracting investment into the economy is one of the areas of our external economic activity. We think this is a major tool to help us modernize our industry, help us lower costs, and to ensure economic growth. Amongst the foreign investors I would like to list the major ones: They include Germany, Italy and the UK.

The most preferable form of investing into the republic for us is the setting up of enterprises in the Republic which are partially or 100% foreign-owned. We have at present about 400 joint enterprises with companies from 50 countries. We also have about 30 subsidiaries and seven representations of foreign companies. There are joint ventures with capital from western Europe, the United States, Canada, Turkey and southeast Asia. The greatest level of foreign investment is in the petrochemicals sector, in agriculture, machine-tool building and in the light and food industry. The overall level of foreign investment in the economy of my Republic is in excess of $300m. In 1999 the level of foreign investment was over $32m.

The environmental situation in my country is difficult. Bearing this in mind we are carrying out a consistent environmental policy aimed at making sure that we protect the environment as well as the health and safety of our population. We have worked out the legal basis necessary for the protection of the environment for the present and future generations. My Republic is continuing to pursue an environmental policy that is similar to that carried out by the Russian Federation. Some of the Republican programmes are part and parcel of the programmes at the federal level, such as for example the forests of Russia programme. At the same time we are trying to attract investment from various sources so as to build new waste management facilities and improve the existing ones.

We are trying to make sure that our economy is market-based and that at the same time the social dimension is not forgotten. In order to do that we are building on the general experience of how to integrate ourselves into the world community. On 23 April of this year the government of my Republic and UNIDO signed a cooperation agreement under which industrial enterprises in my region will be extended assistance. We are trying to ensure sustainable industrial growth in the region, and this is something that we think will continue in future. UNIDO's experience in coordinating industrial development is well known, which means that specialists from UNIDO have been able to work out very quickly the mechanisms for cooperation between UNIDO and my Republic on the programme which deals with enhancing our industrial potential. This programme is intended to cover a period of four years.

With the aim of ensuring sustainable development, the leadership of my country has worked out the main components of the above-mentioned programme. They include the following:

1. The establishment of a system of industrial support, which means that Republican authorities are to be extended assistance in the establishment of the network of industrial support. This

is being done to make sure that the industry can better use the existing resources and better transfer to a market economy.

2. The promotion of industrial partnerships. The strategy here is aimed at involving international investment, establishing international partnerships to make sure that the existing industry facilities are competitive on the international level. These projects include the polyether manufacturing complex, building highways and others.
3. The improvement of the environmental situation. The implementation of this means that there will be in future environmental controls. There will be recommendations on this and training as well as environmentally friendly technologies brought in to use, especially when it comes to industrial waste. This is part and parcel of the contemporary concept of environmental management. If we do this we will improve the regional policy in the area of the environment and bring it closer to international norms.

The UNIDO specialists and the leaders of my Republic have decided that some projects will be assigned high priority. These include the building of the Ymaguzinsky Reservoir, the production of polycarbonites at Ufa-Himprom and also the building of the airport terminal in Ufa. This construction and the polyether complex is especially topical because nothing along those lines exists in the Russian Federation. This opens up prospects for the development of the chemical and light industry, and is especially important because there is a shortage of cotton and it is currently highly priced. For foreign investors what is very interesting is the project dealing with the manufacturing of polycarbonites, with an annual capacity of 10,000 tons. This project is to produce a unique construction material, for which there is demand not only within Russia but also throughout the world.

In order to implement these projects and the 140 others, we think we need to broaden our integration with foreign entrepreneurs and in general improve the business climate in the Republic. We realize that it is important to continue promoting entrepreneurship. In this regard, and within the framework of cooperation with UNIDO, we will start establishing the necessary infrastructure, for example the Agency for Industrial Promotion and Partnership. We have already started doing that in the Republic.

In conclusion I would like to say that we stand ready to broaden our cooperation with UNIDO also on other projects, such as for example the restructuring and improving the food industry in the Republic; improving the competitiveness of our forestry, wood processing and furniture-making industry; the development of light industry; improving the system of quality control, standard setting and certification of industrial goods produced in Bashkortostan; and the establishment of a centre for industrial cooperation and partnership for the purposes of small and medium-sized enterprises. We also stand ready to cooperate in other areas.

In conclusion, allow me thank the leadership of UNIDO and personally extend my thanks to Mr. Magariños, with whose coming into this position UNIDO has intensified its cooperation with the Russian Federation and its constituent parts, which has certainly heightened the prestige of this already well-respected international organization.

Thank you for your attention.

Panel 2

Globalization of Production Systems and Implications for Developing Countries and Economies in Transition
The Upgrading of Local Competitiveness

Theme Paper for Panel 2

UNIDO Secretariat

1. Background

Lower transport costs, new production technologies, liberalization, and the Internet are just some of the phenomena contributing to the globalization of value chains in a growing number of industries and the emergence of global enterprise networks involved in the design, manufacturing and marketing of related products. These networks are increasingly replacing the large integrated and vertical firms. They are more adapted to the new environment of competition, which requires firms to anticipate and react quickly to external changes and to continuously innovate and upgrade products and processes. Networks enable firms to focus on their core competencies and to outsource ancillary activities to more efficient enterprises and locations.

The way in which these global networks are organised and develop will have a profound influence on the conditions and dynamics of industrialization in developing countries and countries with economies in transition. Although the way in which they are organized usually differs according to the type of industry, research shows the existence of two broad types of networks. Producer-driven networks are spearheaded by firms which coordinate manufacturing networks and supply chains, and are most prevalent in capital and technology-intensive industries such as automobiles, computers, semi-conductors and heavy machinery. Buyer-driven networks are coordinated by large retailers, which organize decentralized production networks, typically in developing countries. They are usually found in labour-intensive industries such as garments, footwear, toys, houseware, consumer electronics and handicrafts. In both cases, lead firms control strategic activities such as research and development, marketing and logistics.

The actual geographical location of the various activities in the value chain is determined by local sources of competitive advantage, such as the availability of skills, capabilities and resources, the existence of strong demand and the presence of local suppliers. This in turn encourages networks to cluster in those regions where these advantages exist and can be developed. Research indicates that buyer-driven chains generate more regional clusters than producer-driven networks. The trend is for producer-driven networks in industries such as automobiles and electronics to concentrate in a limited number of regional clusters where they can organize and develop regional supply chains.

This trend towards global enterprise networks presents both opportunities and challenges for developing countries and economies in transition. On the one hand, these networks facilitate the development of local

clusters in industries where these countries have competitive advantages and, in particular, in labour and resource-intensive activities. On the other hand, it is precisely in the area of labour and resource-intensive activities that competition is becoming ever more intense. Hence, this type of activity is also one of the main dangers for developing countries and economies in transition. Unless they upgrade, innovate and build up more sophisticated competitive advantages than cheap labour and primary commodities, these countries will find themselves locked into competition based on low wages and failing to respect environmental standards.

The ideal, then, should be to achieve both competitiveness and sustainable growth and, in order to do this, firms and clusters in developing countries and economies in transition need continuously to innovate and upgrade their capabilities. Upgrading can encompass aspects such as improving capabilities and skills to raise quality and improving the efficiency of the production process itself; developing new competencies outside the actual production process, such as design and marketing skills; diversifying customers and market destinations; developing the capacity to introduce new products or to imitate leading innovators. This process of upgrading and innovation is particularly important for SMEs, which are at the heart of most industrial clusters in developing countries and which are taking on an expanding role in the organization of global production systems, including supplying global retailers and large assembly plants.

2. Issues

The main objective of the panel is first to analyse the dynamics of change in the organization and development of global enterprise networks and the opportunities and challenges this creates for developing countries and economies in transition; and, secondly, to examine if and how these prospects can be improved through government intervention.

The first panellist will present the most recent research findings on the dynamics of globalization and the increased importance of local factors in shaping the competitiveness and the process of upgrading and learning of firms, in particular SMEs.

In this respect, the main problem for small firms is not their size but their isolation from dynamic markets and sources of information, knowledge and skills. For this reason, there is a growing awareness of the potential contribution of sectoral and geographical clusters to innovation and upgrading of small firms. There is agreement among researchers that clustering helps small enterprises to overcome growth constraints and to compete in distant markets. But there is also recognition that this is not an automatic outcome.

Growth and upgrading experiences have been diverse. At one end of the spectrum, there are artisanal clusters which have shown little dynamism and seem unable to expand or innovate. At the other end are clusters which have been able to deepen their inter-firm division of labour, raise their competitiveness and break into international markets. And along this spectrum there are many intermediate cases. The general thrust of research findings is that there is a positive link between increased co-operation and improved performance and that joint actions by local firms enhance their ability to cope with new quality and speed requirements imposed by global competition.

Researchers have sought to specify the circumstances in which clustering boosts industrial growth and competitiveness. Their most recent work stresses the need to distinguish between incipient and more advanced stages of industrialisation. They argue that clustering is particularly relevant in the early stage of industrialisation as it helps small enterprises to grow in stages which are within their risk frontiers. However, collective efficiency only emerges where trust sustains inter-firm relations and where retailing companies are able to connect clusters to sizeable markets.

The panellist will then present recent research on the role of global retailing companies in the organization and dynamics of growth and innovation of clusters in developing countries and economies in transition. In many cases, it is the retailers themselves which have helped to organize local supply chains and to upgrade capabilities of local firms since such improvements are clearly in the interest of foreign buyers. However, more ambitious local strategies, involving, for example, design and marketing can be against the buyers' interests since they may result in the local firms involved setting up in direct competition.

The presentation will conclude with a review of the strategy and policy implications of enterprise networks for developing countries and economies in transition. Their strategy should be to enhance the development of competitive and innovative SME-based clusters and to promote linkages with global partners. It should be based on the establishment of local partnerships between the public and private sectors, in particular for the organization of decentralized networks of support services. These will help clusters and firms to upgrade their technological and organizational capabilities and will encourage entrepreneurial behaviour and innovative start-ups.

The second panellist will present new trends in the strategies of multinational and global firms in the organization and development of their design, manufacturing and marketing systems in industrialized countries as well as developing countries and economies in transition.

The panellist will explain that global firms tend to start by identifying growing markets and by penetrating these markets through exports. This is followed by the organization of a local marketing unit to analyze the needs and preferences of local buyers. On the basis of these findings, global firms improve and adapt their products to local conditions. Having achieved this, they then establish and organize local manufacturing systems, including local supply chains. In addition to a strong local market, the main criteria for localization are a conducive business climate, the availability of skills and capabilities, and the presence of potential suppliers. This represents a key challenge for developing countries and economies in transition, and will be analysed in greater details by the third panellist

The third panellist will analyse the key stimulants of foreign direct investment (FDI) under the conditions of globalization and will analyse the implications for developing countries and economies in transition.

He will show that over the past four decades there have been three "generations' of FDI. The first was driven by the need to access domestic markets, exploit new sources of raw materials and establish low-cost supply bases. Such investment was attracted by inherent locational factors: market size; raw materials availability; low labour costs.

The second generation was born when companies began to restructure their operations to face global competition. This led to complex fragmentation of processes, decentralization - or often regionalization -

of production and overall integration based on cost-minimizing strategies. To pursue a policy of global sourcing, firms had to rely on an array of domestically-created assets. These included a more sophisticated infrastructure (with an emphasis on telecommunications and transportation logistics); an educated labour force to supply the growing skill content of production; and systems of national innovation, including universities and quality centres.

We are now entering the third generation of FDI. Global firms are increasingly engaging in a strategy, the core of which is to enhance market position, accumulate resources and build regional platforms and supply systems to attain presence and dominant positions in key markets. The actual production of goods is taking a back seat to the supply of services of a very special type: solutions to complex problems. The second leg of the strategy is for companies establish themselves as system integrators and problem solvers. Not that production of goods is less relevant: obtaining critical technologies, specializing around core competences and manufacturing higher-value products remain permanent objectives; and for countries which aspire to be part of global production systems, the hurdles of domestic skill supply, technological competence and deployment of critical resources and institutions to support investment are increasing.

This third generation of investment presents enormous challenges for developing countries and economies in transition. First, the pace at which firms are merging, the variety of industries involved, the magnitude of the transactions and the resultant scale of companies point to long-term consequences which cannot yet be assessed. Second, the forces which drive investment flows seem to be increasingly beyond the control of developing countries and economies in transition. Consequently, both investment and production may become more and more concentrated in a few sites - possibly organized as regional supply bases. As a consequence, the ability of developing countries and economies in transition to attract foreign investment will be considerably reduced. This will be particularly true for small countries and the Least Developed Countries.

3. Points for discussion

The dynamics of the processes of globalization, innovation and technical change described above have had, and will continue to have, far-reaching implications for the industrial development of the developing countries and economies in transition. These implications are particularly profound for the small and least developed countries, which have to a large extent been marginalized as a result of these processes, and for the development of SMEs. This gives rise to the important question as to how these countries can, and should, respond to the challenges and opportunities arising from these developments.

Against this background, the following points are particularly worthy of discussion:

- How does the globalization of value chains and organization of global industrial networks influence the emergence and development of competitive and innovative industrial clusters in developing countries and economies in transition?

- How do firms and clusters become integrated into global networks and for what type of activities? What are the main problems and obstacles?

- How can global firms in buyer- and producer-driven chains contribute to the development and upgrading process of local clusters and supply chains?

- How do firms and clusters in developing countries and economies in transition learn to upgrade their capabilities to design, manufacture and market? How do global firms contribute to this process of learning and innovation?

- How can government and the private sector cooperate in the formulation and implementation of strategies and policies to support the development of competitive and innovative clusters and their integration in the global economy?

Moderator's Introduction

Frederic Richard[1]

The first panel yesterday has explained why industries agglomerate and cluster in specific geographical locations. The driving forces of this process are the existence of local competitive advantages such as the availability of skills, knowledge, natural resources; the size of the local markets; and the presence of an efficient supplier base.

In developing countries clusters have a tendency to emerge in resource and labour intensive industries. To achieve a sustainable growth, developing countries must upgrade the productivity and capabilities of these clusters and enter into more sophisticated and knowledge intensive industrial activities.

This second panel deals with this issue. It will analyze how globalization affects this process of upgrading and innovation. On the one hand, the globalization of production systems opens great opportunities for developing countries in terms of access to markets, knowledge and resources, and contributes to the integration of local clusters in the value chains of global retailers and manufacturers. On the other hand, however, competition is becoming increasingly strong, in particular in the labour and resource intensive segments of value chains and the requirements in terms of quality and speed of delivery are becoming greater.

This panel will examine these issues under three main headings. First, we will try to understand how technology changes and globalization cause major changes in the conditions of competition, in the organization of systems of production, and in the role of the multinational lead firms. Second, we will examine how these new forms of organization of production systems and the trends in the strategies of multinationals arising from this ongoing globalization process are affecting the ability of developing countries to industrialize and upgrade their capabilities. Finally, we will examine the role of government to see if, and how, governments can support the capabilities of their local industries to compete efficiently in this new global context.

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[1] Director, Industrial Policies and Research Branch, UNIDO. No formal paper was submitted. The text presented here is based on a transcript of the presentation.

The panel will have two main parts. The first part will give an overall presentation of the globalization process and examine how industrial clusters in developing countries, and in particular SME-based clusters which form the core of the industrial base of developing countries, can respond to the new conditions of competition. The importance of linkages between these local SME-based clusters and global firms will also be examined in this part of the panel discussion. The second part will focus in particular on the role of foreign direct investment, which is a key force to help developing countries to upgrade their capabilities and to catch up in their industrialization process. However, the requirements of foreign direct investment in terms of the availability of skills, telecommunications infrastructure and the existence of a supplier base are increasingly high. This part of the panel will examine the new behaviour of foreign direct investment, and the conditions under which it can contribute to the process of upgrading.

Paper 1
Local Upgrading and Competition in Global Markets

Hubert Schmitz[1]

1. The Upgrading Imperative

The vast majority of developing countries has undergone a process of trade liberalization, so the choice open to them is not *whether* to integrate into the global economy but *how*. It is this question of *how* which drives this paper.

Globalization brings both opportunities and dangers. One of the main dangers for developing countries is that they get locked into a race to the bottom where competition is achieved on the basis of lowering wages, disregarding labour and environmental standards and avoiding taxation. This kind of strategy would at best lead to immiserizing growth (Kaplinsky, 1998). This is not merely a danger for the future. There are some indications that this has happened in the recent past. On the one hand, globalization has benefited developing countries in that it has led to more sourcing of manufactured products from these countries. However, the increase in export activity has been much higher than the increase in income from such activity. The terms of trade of developing country manufactured exports have fallen relative to advanced country exports (Wood, 1997).

In order to achieve both export growth *and* sustainable income growth it is important for developing country producers to upgrade their activities. Such upgrading is essential for obtaining higher returns and there are two basic routes for doing so: The first is to shift to manufacturing products which command a higher price; the second is to acquire new functions in the global value chain.

How can this be achieved? What are the obstacles? Research and policy advice over recent years has stressed the importance of local factors for achieving competitiveness reflected in recent work on new economic geography, industrial districts, clusters and local innovation systems. This body of work has tended to be optimistic about the scope for local upgrading strategies. Another line of work has focussed more on the increasing importance of global players in structuring the upgrading and earning opportunities at the local level. This includes work on foreign direct investment in developing countries and the work on the increasing power of global buyers sourcing from developing country manufacturers. This line of work tends to be more cautious about the scope for local strategies aimed at upgrading and income growth.

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[1] Institute of Development Studies, University of Sussex.

This paper seeks to bring together the main lessons from these lines of work, that is from both the work on local production systems and on global buyers. It will not, however, deal with the question of foreign direct investment and its implications for upgrading in developing countries because this is the focus of a parallel paper by Claudio Frischtak.

2. New Economic Geography and Local Production Systems

A paradoxical feature of the recent debate on competitive advantage in global markets is the importance given to locality. Despite globalization and the emergence of relatively cheap global communication networks, authors across a spectrum of specialisms have emphasized the importance of geographical proximity and local sources of competitiveness. Terms such as synergy, economies of clustering, systemic competitiveness, local innovation systems or collective efficiency, express the main concerns in this debate. Some authors (e.g. Scott, 1996) predict that this concern will accelerate further as the globalization of product markets intensifies. In research and policy thinking on advanced countries, this convergence on the locality straddles four lines of work:

New economic geography: Since the mid 1980s economists have found a way of modelling increasing returns which has led to a new body of growth theory. Paul Krugman (1991; 1995; Krugman and Venables, 1995), particularly in his work on trade and geography, has put the increasing returns from economic clustering on the mainstream agenda. These concerns have been reinforced by econometric evidence that innovative activity tends to cluster due to knowledge spillovers (Audretsch and Feldman, 1996).

Business economics: Michael Porter also emphasises the importance of clustering (Porter, 1990; Porter and Wayland, 1995). He argues that competitive advantage in the global economy derives from a constellation of local factors which sustain the dynamism of leading firms. He has stressed the importance of proximity, not just of suppliers but also of rivals and customers for dynamic business development.[2]

Regional science: The interest of economic geographers and regional scientists in clustering is reflected in the recent industrial district literature which focused initially on Italy and then on many other countries in Europe and elsewhere (Becattini, 1990; Brusco, 1990; Markusen, 1996; Pyke and Sengenberger, 1992). It has also contributed to a new emphasis on the region as a nexus of untraded interdependencies - for example in the work of Michael Storper (1995) or francophone writings on the milieu innovateur (Maillat, 1996).

Innovation literature: In the literature concerned with technological development there has long been a focus on the individual firm and a strong distinction between innovation and diffusion. Over the last ten years this has given way to a greater concern with learning-by-interaction (between producer and user) and first national, then increasingly regional, systems of innovation (Braczyk, *et al.*, 1998; Cooke and Morgan, 1998; Edquist, 1997; Freeman, 1995; Heidenreich, 1997; Lundvall, 1993).

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[2] The term 'cluster' is also central to Porter's (1990) analysis where it is sometimes used, as in this paper, to refer to a sectoral and geographical concentration of firms; for example, the ceramic tile cluster of Sassuolo, Italy. In other parts of Porter's work, however, 'cluster' is much broader, referring to a group of industries with strong vertical ties and located within one country, but not always geographically close.

While most of this work refers to industrially advanced countries, it has inspired recent work on developing countries. There is now a small but growing body of literature concerned with the relevance of sectoral and geographical agglomeration for industrial growth and upgrading. What follows is a summary of the main findings of this work, drawing in particular on the articles in a recent Special Issue of *World Development* on Industrial Clusters in Developing Countries (Nadvi and Schmitz, 1999).

Compared with a decade ago, there is now more optimism concerning the growth and export prospects of small manufacturers in developing countries. Research on industrial clusters has made a major contribution to this shift in the debate. There is increasing agreement that clustering helps small enterprises to overcome growth constraints and compete in distant markets, but there is also recognition that this is not an automatic outcome (Schmitz and Nadvi, 1999).

The growth and upgrading experiences have been diverse. At one end of the spectrum, there are artisanal clusters which have shown little dynamism and seem unable to expand or innovate (e.g. McCormick, 1998). At the other end are clusters which have been able to deepen their inter-firm division of labour, raise their competitiveness and break into international markets (e.g. Meyer-Stamer, 1996; Nadvi, 1997). Along this spectrum, there are many intermediate cases, (e.g. Knorringa, 1996; Rabellotti, 1997).

Researchers have sought to specify the circumstances in which clustering boosts industrial growth and competitiveness. Their most recent work stresses the need to distinguish between incipient and more advanced stages of industrialisation. They argue that clustering is particularly relevant for the early stage of industrialisation by helping small enterprises to grow in riskable steps (Schmitz, 1999a). Case material from Asia and Africa show both the importance and limitations of this argument. Other case studies (from Mexico, Brazil, Pakistan and India) focus more on mature clusters that include medium and large enterprises. They examine the ability of such clusters to cope with global competitive pressures and they specify the circumstances that make the difference between success and failure (Knorringa, 1999; Nadvi, 1999; Rabellotti, 1999; Schmitz, 1999b; Tewari, 1999).

The main research findings are as follows:

1. Industrial clusters are common in a wide range of developing countries and sectors.
2. Clustering has helped small enterprises to overcome well-known growth constraints and compete in distant markets, nationally and abroad.
3. However, collective efficiency only emerges where trust sustains inter-firm relations and where traders connect clusters to sizeable markets.
4. Joint action of local firms enhances their ability to cope with the new quality and speed requirements imposed by global competition.
5. Within clusters, greater co-operation is positively correlated with improved performance.
6. Increases in vertical co-operation have been more substantial than increases in horizontal co-operation.
7. Global competitive pressures have led to increasing differentiation within clusters.
8. Future research on upgrading needs a shift in emphasis from internal to external linkages and from production systems to knowledge systems.

The main policy lessons from this body of work are[3]:

1. Successful clusters cannot be created from scratch; there needs to be a critical mass of enterprises and skills (however rudimentary) that outside assistance can "hook into".
2. External support for clusters works best where industrial policy is decentralized and builds on public-private partnership.
3. The lessons from fostering clusters and networks are summed up in 'The Triple C Approach to Local Industrial Policy'. To be effective, interventions need to be customer-oriented, collective, and cumulative.
4. Strategic responses to global competitive pressures cannot just rely on private joint action but require public agencies as catalysts or mediators.

3. Global Value Chains

One of the main points of the previous section was that the upgrading potential of local firms, in particular SMEs, depends at the local level on the synergies created by clustering and networking. This section argues that, at the global level, the upgrading potential depends on the market structure which these SMEs feed into.

The most successful clusters were typically operating in what Gereffi (1999) calls buyer driven chains. Recent research on such value chains suggests that an increasing number of developing countries engage in contract manufacturing for a decreasing number of global buyers. This constellation characterises in particular the labour intensive sectors in developing countries. Schmitz and Knorringa (1999) show that in many cases the buyers (usually foreign) have helped local producers to upgrade production, particularly to raise quality and speed. Such upgrading was clearly in the interest of foreign buyers. However, more ambitious local strategies concerned with design and marketing can be against the buyers' interest. In one of the cases studied, such conflict contributed to the collapse of a major local programme for moving the cluster up the global value chain (Schmitz, 1999b). It is an example of the centrifugal forces of globalisation destroying local upgrading strategies. In short, we need to understand the external circumstances which promote or block the upgrading of local producers. This requires complementing a focus on the collective efficiency of local firms with insights from work on global value chains.

The remainder of this paper shows why this shift is important and which new questions need to be addressed.

The value chain perspective provides two particular insights into the upgrading process. Firstly, it emphasises that the process of creating value is not confined to production. Products are brought to market through a combination of activities. Therefore, upgrading may involve any of the following:

1. Improving capabilities in production. In footwear, for example, the current challenge is to raise quality and the speed of response without raising cost.
2. Developing new competences outside of the production process, such as design and marketing skills.

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[3] For papers on the policy relevance of the recent research on clusters in developing countries, see (Altenburg and Meyer-Stamer, 1999; Humphrey and Schmitz, 1996; Tendler and Amorim, 1996; Weijland, 1999)

3. Diversifying customers and market destinations.
4. Developing the capacity to introduce new products or to imitate leading innovators quickly and successfully.

The second insight of the value chain perspective is that an increasing amount of international trade takes place between formally independent companies within networks, rather than through arm's-length transactions or intra-firm trade. The lead firms of global value chains are playing an increasing role in organizing trade. These actors range from the transnational producers who source inputs from suppliers around the globe, to the retail chains which do not themselves make goods but play a key role in organising production at locations scattered around the world.

Three linked questions are critical for developing country producers:

1. Inclusion/exclusion. How do firms enter into international value chains?
2. Opportunities for adding value. What type of work is allocated to developing-country firms in the chain? Will it sustain employment and incomes?
3. Upgrading. Does the chain allow for learning and upgrading of developing-country producers?

These issues have been explored in value chain studies, for example, on:

1. The garment industry in East Asia (Gereffi, 1999);
2. The footwear industry in India, China, Brazil and Italy (Schmitz and Knorringa, 1999);
3. The auto components industry in Brazil, India and South Africa (Barnes and Kaplinsky, 1999; Humphrey, 1999; Humphrey, *et al.*, 1998);
4. The furniture industry in South Africa (Dunne and Morris, 1999);
5. The hotel furniture industry in Kenya (Schneider, 1999); and
6. The chain from UK supermarkets to producers of fresh fruit and vegetables in Kenya and Zimbabwe (Dolan, *et al.*, 1999).

It is hard to summarise this very recent work in the short space available. More useful for this Forum is a focus on the role of global buyers in upgrading local producers in developing countries. Given this focus, the relevant question is not whether global buyers help local producers to upgrade but in what circumstances they are more or less likely to do so.

Three sets of circumstances seem critical:

1. Are producers at an incipient or advanced stage?
2. Do they operate in price-driven or quality-driven chains?
3. Is the upgrading limited to production or does it extend into design and marketing?

Incipient versus advanced stage: The upgrading contribution of buyers varies with the needs of producers. New producers are likely to require much more help than well-established ones. The argument is not that advanced exporters have nothing to learn from buyers. The proposition is that first, buyers' support is often crucial for entering a new market but diminishes over time. Second, the focus of buyer support shifts from intra-firm to inter-firm upgrading. For example, some buyers help advanced producers to improve the management of their supply chain; or they support the abolishment of local testing facilities with international quality or environmental standards.

Price versus quality-driven chains: The more product quality matters, the greater the demands on the producers and their suppliers, the greater the buyers' interest in upgrading these producers. Buyers operating in quality-driven market segments tend to have a conscious policy of building long-term relationships with their manufacturers. Buyers in such chains do not believe in "factory hopping" and help local producers to raise quality, speed and flexibility.

Acquiring capabilities in non-production activities: A further important distinction is between upgrading within the sphere of production and upgrading into non-production activities such as design and marketing. The problem is that marketing, and often also design, are part of the buyers' own guarded core competence. Far from expecting support for such upgrading, one would expect buyers to prevent it. Whether they succeed or not probably depends on the degree of buyer concentration. In other words, where producers work for many buyers, the upgrading into non-production activities is less likely to be blocked.

Table 1 draws together those determinants that we consider most strategic and most widely relevant for upgrading and earning opportunities within the sphere of production. Clearly, producers will want to avoid the North Eastern field (price-driven market segment with high buyer concentration) and prefer the South Western field (quality-driven market segment with low buyer concentration). But this could be an unrealistic and static reading of the table: New producers from developing countries will often have to start in the price-driven segment and the initial upgrading within this segment may well be high. Dynamizing the table would require making it three-dimensional and adding the distinction between incipient and advanced producers.

Table 1
Upgrading and earning opportunities in export manufacturing

Market segment	Buyer concentration	
	High	Low
Price-driven	Upgrading: low Gains: uneven	Upgrading: low Gains: even
Quality-driven	Upgrading: high Gains: uneven	Upgrading: high Gains: even

4. Policy Implications

The policy implications from recent research on value chains include both old and new arguments. The old lesson concerns the importance of effective infrastructure for the flow of materials and information (roads, ports, airports, communication lines) and speedy customs clearance for importing components and exporting finished goods. However, relegating these to a list of public sector duties is of little help. Successful examples of public-private partnership are probably better role models.

The second policy concern is the long-overdue integration of buyers in technical assistance projects of donor agencies. None of the interviewed buyers expressed enthusiasm for this idea, fearing that they would

be drawn into politicised sourcing. The majority, however, confirmed that they are prepared to discuss this new role with bilateral or multilateral agencies, provided that the aim is not charity but upgrading for competitiveness. Tested role models for channelling technical assistance through buyers do not exist, but the idea is already gaining ground in pilot projects.[4] More experimentation is needed but it requires long-sighted buyers and technical assistance agencies prepared to take risks and invest in a new customer oriented approach. This would need to include investment in more research on, first, the circumstances in which buyers play a negative or positive role and, second, ways in which the positive role can be strengthened.

The third policy issue concerns access to developing country markets. As set out above, upgrading and earning opportunities are often not structured by anonymous market forces but by the lead firms in global value chains. Their governance of global chains could be effected substantially by new technologies. Electronic commerce offers the possibility of multiplying the outlets for local producers and of establishing more direct relationships with customers in advanced countries. The upgrading requirements and distribution of gains that arise from digital intermediation are uncharted territory. This is a very specific and potentially very important field in which UNIDO could take the lead by commissioning research and offering policy advice and technical assistance.

[4] For example, the 'Manicaland Business Linkage Project' in Zimbabwe seeks to build up the capacity of local manufacturers through 'buyer-monitoring'. It is an experiment funded by NORAD, carried out with the Federation of Zimbabwe Industries (Grierson, et al., 1999).

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Paper 2
Globalization of Production Systems and Implications for Developing Countries and Economies in Transition
The Upgrading of Local Competitiveness

Didier Lombard[1]

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1. International direct investment is the fastest growing economic phenomenon in today's world economy

- Total world annual inflows have been multiplied by a factor of 4 in a decade to a record US$644 billion in 1998.
- Global stocks of foreign direct investments reached the US$4,000 billion mark at the end of 1998, more than twice their 1990 level (US$1,770 billion).
- Contrary to alarming expectations, the growth of investment flows accelerated in 1998: The 1998 figure was 39% higher than the 1997 figure.

2. It is at the core of globalization

The ubiquitous presence of major multinationals through cross-border investment is the symbol of a global world.

3. Until 1997 the share of developing countries was growing steadily. 1998 marked a temporary (?) setback to this decade long trend

- Between 1987 and 1992, annual investment flows to developed economies were on average 4 times larger than flows to developing economies. Between 1993 and 1997 this figure decreased to 1.6 times.
- In 1990 stocks of foreign direct investment in developing countries accounted for 26% of stocks in developed countries, for 43% eight years later.

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- Only one developing country (China) was among the top 10 recipients of international investment ten years ago, but it was near the bottom of the list in ninth place. In 1997, four developing countries (China, Brazil, Mexico and Singapore) had reached the top 10 league.
- However, 1998 data show a sharp reverse of these established trends: Investment flows to developing countries declined in absolute terms from the all-time record of US$172 billion in 1997 to US$166 billion. The same was true for flows to Central and Eastern Europe at a much more modest level, from US$18.5 billion to US$17.5 billion. At the same time, investment flows to developed economies sky-rocketed by a whopping 68%. It is still premature to conclude whether this is a reversal of established trends - which could destabilize some emerging economies at a time when other financial facilities are more difficult to secure - or a temporary phenomenon. My own perception is that it may only mirror the opposing movements in global asset prices in 1998, deflationary in developing countries and inflationary in developed countries.

4. **International investment has become more important to developing economies than to developed economies in the past years: In other words, economic growth is more vulnerable to setbacks in inward foreign investments in developing economies than in developed economies.**

- Inward foreign direct investments represent 10.3% of gross fixed capital formation in developing countries versus 6.5% in developed countries. It is a marked reversal of the situation prevailing at the beginning of the decade.
- The ratio of foreign direct inflows to GDP is more than twice as high in developing countries than in developed ones.
- While inflows in developed countries are mainly in services, almost two thirds of investment flowing to developing countries is still in the manufacturing sector.

5. **What are the factors behind this growing share of developing countries? There are many contributing factors, of course.**

- In the short term, it is the liberalization of investment legislation in developing countries: In the past ten years 95% of new regulatory measures taken in this field by individual countries were geared towards liberalization. It is all the more significant then that almost all countries in the developing world are involved in this deregulatory process, even those receiving very few investments or countries with a very bad track record in this field.
- There has been no multilateral institution or instrument to foster this movement. It has in most cases been a unilateral or bilateral development and ultimately appears to be sustained, however powerfully, only by the sheer forces of market.
- In the medium term, it is the limit to growth of mature economic activities in the developed world, in particular in the industrial sector (i.e. automobile or consumer goods).
- In the long term, it is a matter of demographic patterns: A growing share of retired baby-boomers in developed countries will need the financial dividends of economic activities throughout the world to make ends meet. An evidence of this: As the share of developed countries in total world investment inflows decreased steadily in the past years until 1997, its share in world outflows remained steady between 85% and 90%.

6. **What are the main potential benefits for developing countries of a greater opening to foreign direct investment?**

- Additional economic growth is the main goal of these policies, of course. Sheer pragmatism was in fact at the root of the progressive reversal which has been taking place in the past 20 years: The obvious success of a handful of countries, like Singapore, which resisted the dominant ideology of the 1960s and 1970s based on statism and hostility towards multinationals, and acted as a beacon to other developing countries trapped in inadequate economic policies.
- Strengthen local industry by exposing it to the expectations and requirements of international companies investing in the country: Various econometric studies mentioned in the UNCTAD World Investment Report 1999 seem to show that these so-called crowding-in effects were consistently taking place in Asian countries in particular.
- Access to new technology through technology transfers of multinationals.

7. **Attracting foreign investment may look like a difficult challenge at a time when international competition in this field has never been so fierce. However, sound and no-nonsense policies can make a difference.**

- Not only is competition tough but some large regions of the world, like Africa, are at pain to attract significant foreign direct investment in spite of more open policies. In 1997, 32 developing or central and eastern European economies managed to attract investment flows of more than US$1billion. In 1998, 20 of those 32 countries registered a decrease in their performance and, on the whole, only 29 countries made it over the US$1 billion mark. In 1997, the best ever year for investment in developing countries, the four most attractive countries already mentioned (China, Brazil, Mexico and Singapore) managed to get almost exactly half that total. The whole of Africa, including the Arab countries of North Africa, attract far less investments than tiny Singapore.
- It is therefore all the more important for decision-makers to be aware of what the best practices of successful countries are.
- Being realistic about one's own pros and cons is key: Investment promotion agencies must not overplay their country's assets in front of investors. If access to the local market remains the principal objective of investors, developing countries must not forget that a growing and large population is meaningful in economic terms only if it has a real purchasing power. Moreover, producing locally at additional cost is of decreasing interest at a time when a growing number of developing countries belong to free-trade zones including neighbouring states.
- Keeping existing foreign investors happy is of paramount importance. In a country like France about 80% of new investments are undertaken by companies that are already settled. Existing investors are allies of their host countries in at least two ways: For communication purposes, of course, but also because they may have an economic interest to see either suppliers, clients or partners to come along.
- Reliability of public policies is a closely followed parameter. Consultants in particular monitor fiscal policies and put a special attention on all matters related to freedom of capital transfers.
- Efficient infrastructure is an increasingly important prerequisite to attracting investment. This is especially true of telecommunications. In this field observation suggests that tolerance of

international firms to technical difficulties has in fact been decreasing. For foreign affiliates of multinationals relative isolation seemed easier to cope with in past times. Fortunately telecommunications is also an area where tens of major operators are eager to put in place services dedicated to international companies anywhere in the world.

8. **One question remains for our friends from developing countries: How far to go in liberalization? In particular, questions arise on three topics :**

- What about the rules on minimal local content or compulsory re-export of products or services?
- What are the reasonable constraints in terms of eligible sectors?
- Is there a threshold to the public acceptance of foreign investment by the general population ?

On these matters, a couple of remarks.

- Different kinds of strategies can be successful: A few countries went ahead full speed to a full integration to the world economy. Other countries were more restrictive, using foreign investment policies as a tool in their own industrial policy: In most cases it meant a sharp limit to the freedom of foreign companies in terms of capital structure or market access. In my own country, which has been highly successful in this field (in terms of stocks of direct foreign investments it is number 1 in the Euro-zone, number 2 in The European Union, and number 4 in the world), restrictive legislation was nonetheless in place until the mid-1980s.
- At one point, for political reasons, inward investment has to be balanced by outward investment.

Paper 3
Globalization of Production Systems and Implications for Developing Countries

Claudio Frischtak[1]

1. Introduction

This short paper discusses the process of globalization as it affects developing countries' ability to participate as producers of industrialized goods.

We start with a small digression, posing a classical question, namely, what drives economic growth? Or, on the presumption that pure factor accumulation in terms of land, labour and capital is subject to decreasing returns to scale, what drives productivity growth?

It is arguable that *learning*, a cumulative process, endogenously generated and subject to increasing returns, is responsible for most gains in productivity, and thus, ultimately, for growth.

Learning, as a concept, applies to both individuals and institutions. *Educated* individuals learn; and so do *flexible*, *open* organizations, which adapt to a changing environment.

What is the object of learning, insofar as growth is concerned? In the simplest of terms, this includes technologies, markets, as well as codes of behaviour or, more generally, codes on the basis of which people communicate (as the language of business).

From the fact that learning, being at the base of economic growth, is a cumulative process (it accumulates over time, with experience, output or use), and subject to increasing returns, one may infer that there is only a single approach to development: Lifting ourselves by the bootstraps, through education and knowledge dissemination, the establishment of adaptive institutions which promote savings and investment, consistent with the culture and norms of societies, and clearly, hard work (at least in the early stages).

Does that mean there are no shortcuts to economic growth? We have in fact observed from time to time countries "leapfrog" or accelerate their rates of growth by bringing in critical skills, technologies and investment. Thus growth is not only brought about endogenously, but would be the product of a complex interplay between:

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- Building flexible, learning-prone institutions and accumulating skills and knowledge within production units; and
- Bringing in at various stages of a country's economic history people, technology, investment.

It is unquestionable that for most of the advanced developing countries, foreign direct investment has had a transforming role. It has introduced novel forms of organizing and managing production, new technologies and marketing tools, while often repositioning countries with respect to the international market by setting up export-oriented platforms.

It is also true that the nature and drivers of foreign direct investment has been changing: Moving away from traditional motivations of jumping tariffs, tapping natural resources or establishing a low-cost production base to export markets. All these remain important, but as the very character of production changes - towards global production systems - firms contemplate investment on a different basis, namely, the extent to which it fits with its global production strategy and requirements, which increasingly point to concentration of production around a few platforms, and complex forms of source and integration.

More recently, a new veil has fallen over this movement of globalization of production, as we have entered an unprecedented (at least in this century) frenzy of mergers and acquisitions with no end in sight. Insofar as the motivation for such operations is to acquire size and specific weight in global markets, production economics *per se* has taken a back seat. Still, there are indications that growing industry concentration is being accompanied by higher levels of plant concentration in fewer countries.

All this bodes ill for developing countries. At this point we can only speculate. Section 2 discusses the shifting motivation (and requirements) for foreign direct investment and Section 3 the possible responses of developing countries to industrial growth and investment requirements in an era of globalization of production and concentration of capital. Section 4 draws brief conclusions.

2. Foreign Direct Investment and its Key Drivers in the Age of Globalization

Looking back to the last 40 or so years, we observe three "layers" of foreign direct investment (FDI). They are not necessarily separated in time, but may be regarded as successive generations in terms of complexity in their motivation, variability in geometry, scope of impact and competences required for effective government response.

The first generation of investment was driven by the need to:

- Access domestic markets;
- Exploit new sources of raw materials; and
- Establish low-cost supply bases.

Such investment has been discussed at length in the literature[2] and was attracted by *inherited* locational factors: Market size; availability of raw materials; low cost of labour.

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[2] See, for example, the multivolume *United Nations Library on Transnational Corporations*, edited by John H. Dunning, Routledge, London and New York, 1994.

Governments clearly influenced the size and distribution of such investment through their efforts to protect domestic markets; establish export-oriented infrastructure to channel raw materials out of the country; and by introducing certain institutional innovations (such as EPZs, special manufacturing zones, etc.), differentiated tax regimes and streamlined approval procedures. They led to an enormous growth in FDI over the years, which has expanded at rates considerably above world trade and output.[1]

The second generation of investment is characterized by a focus on what may be called "production economics", which started in earnest when companies began to restructure their operations to face global competition. This led to a complex fragmentation of processes, decentralization, or often regionalization, of production and overall integration based on a relentless implementation of cost-minimizing strategies.

To pursue a policy of global sourcing - thus helping to set up or densify global production networks or systems - firms had to rely on an array of domestically *created assets.* These included:

- A more sophisticated infrastructure (with an emphasis on telecommunications and transportation logistics);
- An educated labour force to face the growing skill content of production; and
- Systems of national innovation.

The accumulation of technological endowments at the national level clearly benefitted not only transnationals, but also domestic firms. To the extent that some domestic firms learned to deploy those resources effectively, they sometimes became partners, suppliers and competitors, quite often targets, but above all, an important element of inter-industry markets in developing economies.

What is the role of governments with respect to second generation investments? In addition to creating a stable and receptive policy environment, and have in place an efficient infrastructure, in order to be active in the global production value-added chain, countries had to invest heavily in education and skill formation, innovation, technology transfer and start-up mechanisms, information and other knowledge disseminating networks.

It is unquestionable that compared to first-generation investment, *the hurdles went up*:

- Fewer governments became capable of being an effective interlocutor to increasingly sophisticated investors, with more complex and demanding resource and institutional requirements; and
- Fewer domestic firms had acquired the size, level of technological and managerial sophistication, and financial means to function as effective counterparts of companies which were driven by global production strategies, and were looking for firms that could follow them around the globe.

We can find many local exceptions - start-ups that became reliable suppliers; aggressive mid-size companies that effectively penetrated international markets; innovative producers that conquered important niches; and even a few large players from developing economies who became adept at the second generation game (Hyundai in South Korea, Ispat in India, Cemex in Mexico, Techint in Argentina, Embraer in Brazil, among others). More often than not, however, they have been exceptions. Even as exceptions,

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[1] See United Nations Conference on Trade and Development, *World Investment Report 1998 - Trends and Determinants*, United Nations, New York and Geneva, 1998.

they nevertheless point to some regularities in terms of capabilities and resources that allowed those firms to flourish:

- A core of technological competence, built around highly-qualified engineers. A pool of engineering skills and the quality of applied scientific knowledge have served as breeding elements of successful firms.
- Systematic efforts at the level of the firm in absorbing knowledge, improving practices, bechmarking against industry leaders. Most successful companies have had strong leadership which continuously strove to better performance, while responding to shifts in market patterns.
- A core of managerial competence, centred around marketing, finance and project-oriented skills, having for reference international practice and standards.
- The presence of a set of institutions - universities and research centres, metrology, quality, productivity and information networks, innovation and start-up financing agents - open to and driven by society's demands, be it in terms of skills, knowledge, technological and market-launch support, and rules which, if not levelling the field, at least facilitate local companies to compete in the market.

The third generation of investment: In this day and age, firms are increasingly *playing strategy*, the core of which is to *enhance size, accumulate resources and build platforms to attain global presence and dominant positions in key markets*. Investment is flowing at an accelerated pace to such markets: As a result, most is being directed to developed regional blocs; some to industrializing countries with sizable economies; and a trickle to the less developed economies.

Simultaneously, the production of goods is taking a back seat to the supply of services of a very special type: solutions to complex problems facing clients, which require an array of goods, sometimes manufactured by the company, sometimes by competitors. Thus the *second leg of the strategy* is for companies to set themselves as system integrators and problem solvers.

Not that production of goods is less relevant: Obtaining critical technologies, specializing around core competences and manufacturing higher-value products remain permanent objectives. For countries which aspire to be part of global production systems, the hurdles of domestic skill supply, technological competence and deployment of critical resources and institutions to support investment are moving in only one direction: Up.

The logic driving global players can hardly be reduced to the pursuit of (efficient) production. For companies visualize few seats around a notional table - the global market. Buying access to one of those seats takes precedence over purely economic considerations. Critical size as a business, in the relevant industry and markets, is what matters most.

3. What should developing countries do?

We may want to preamble this discussion with three observations:

1. The pace at which firms are merging, the variety of industries involved, the magnitude of the transactions and the resultant scale of companies, point to long-term sequels which it is still too early to assess. At this point, we can only conjecture.

2. The forces which drive investment flows seem to be increasingly beyond the control of any single state, let alone from developing countries. There is a real risk that most will become no more than spectators, their markets and citizens marginal to the dynamics of wealth creation.
3. Finally, and as a result, investment may be directed to fewer platforms - possibly organized as regional supply bases - and production may become even more concentrated. Ultimately, the development gap may widen and no amount of technological optimism or hopes for an internet-driven economic democracy may hide the fact that the poorer and less developed countries will be falling irremediably behind.

We face an enormous challenge. And there are no obvious or simplistic solutions. Yet, it helps to go back to a few basics.

First, countries need good, effective (not necessarily large) governments. Weak government capacity (or governance) is simply incongruent with the minimum yet complex demands from investors - in terms of economic management, human resource development, infrastructure investment and the ability to establish a dialogue with players of any size or relevance.

Paradoxically, the spread of the forces of globalization weakens or dilutes the very capacity required from states to deal effectively with such forces.

Second, people - both as citizens and economic agents - need a future to believe in, and perceive that there is a path which leads to improved livelihoods and greater wealth. This depends on leadership, and the ability to project and communicate a long term vision, and a strategy of national development.

This may sound old, passé, at least for countries well integrated in regional blocs, and for those which are naturally in a leadership role. For others, these nations must increasingly lift themselves "by their bootstraps", and credibly define national goals and the means - *human and institutional at the core* - to achieve them.

This does not mean that such countries can only survive in autarky. But it does mean that the "production reach" of small, poor and resource thin countries in a world of waning first generation investments, will tend hardly to go beyond their borders (Table 1). In these circumstances, a strategy of integration - be it at a global, regional or subregional level - is no panacea. On the contrary, such countries must support the development of local production, starting from "ground up", focussing on traditional segments (generally consumer goods, construction materials, foodstuff) and a few selected niches of comparative advantage.

It is unquestionable that the toughest development nut to crack is the promotion of efficient economic and industrial growth in those countries. More than ever, the "three fundamentals" - education, infrastructure and institutions - are critical: *Education* so people can extend their horizons and acquire the basic skills to engage in productive activities; *infrastructure* to connect people and firms, integrate regions and countries, transform and move goods; and *institutions* to establish and enforce basic civil and economic rights and obligations. If the pace of progress in the last two decades is any indication, we may observe a shrinking or at best static production reach among these countries, as the process of globalization and concentration of capital accelerates in the future.

Table 1
The Reach of Industry in Developing Countries

	Production "Reach"		
Size of Economy	**Global**	**Regional**	**Local**
Large	Few idiosyncratic instances	Selected modern segments	Will tend to retain broad industrial base
Med-sized, mid-income	N	Few idyosincratic instances	Most traditional industries and many modern segments
Small and poor	N	N	Selected traditional industries

Note: N = nil.

Poor, but relatively well endowed - from a natural resources perspective - developing countries have an obvious advantage over those with a more fragile resource base. They are generally able to attract investment to exploit those resources, and reap associated fiscal benefits. But few can avoid the (production) crowding out effects (and the corruption) often associated with large infusions of cash, establish a domestic production base in activities which potentially cluster around the production of raw materials, progressively integrate "downstream" and eventually become a non-marginal regional supplier. Thus, these economies face not only the challenge of extending their production reach by attracting investors to a modern competitive sector, but of avoiding the destructive effects on traditional industries and production niches, with which resource abundance is often associated.

The reach of mid-sized developing economies in a context of growing concentration and regionalization of production will possibly decrease over time. Regional exceptions will tend to be idyosincratic in nature - based on some long-term comparative advantage or the result of cumulative learning, which allowed a company to establish a virtous track, and which made the economy a centre of production of a specific good for the region.

The prospects for large developing economies and regional leaders are brighter. With a broad industrial base, and an array of firms which have built their competence over time, including a solid knowledge of the domestic market, industry in those countries will change, no doubt, but will most likely survive. There will be greater intra-industry specialization as trade expands and producers are nudged to the international market, while uncompetitive activities will contract or altogether vanish, and many leading firms will be acquired by international competitors. Still, despite some degree of deindustrialization in product-areas for which certain low-cost alternatives have an absolute cost advantage (as northern Mexico and the special economic zones of China), the spread of global production systems will not bring the demise of industry in large economies. Moreover, many of these countries will begin operating as a regional platform of companies implementing global production strategies. Thus, while there may be some contraction of activities among firms catering locally, the position of large developing economies will most likely be

strengthened regionally, but their producers - with rare exceptions - will most likely remain marginal global actors.

To change this course of history, developing countries will need to take purposeful actions: Countries will need to endogenize certain drivers, as summarized in Table 2, which will alter the current path.

Table 2:
Development Drivers in an Age of Globalization

Size of Economy	Exogenous Drivers	Framework Conditions
Large	Technology	National Innovation System
	Capital	Capital Markets
Mid-sized, mid-income	FDI targeted at regional export platforms and supply-chain integration	Active FDI policies Differentiating factors
Small and poor	Domestic Entrepreneurs	Facilitating Business Environment Active policy for domestic entrepreneur formation

The question that we pose here is: What framework conditions (in terms of policies, institutions, systems) would be necessary for developing countries to expand their production reach? What kind of public-private cooperation is possible and effective?

Clearly, we are not in a position to provide a full answer, but only partial indications of what may be needed for:

- Poor and small economies to constitute an industrial base catering to domestic needs;
- Mid-sized economies to establish regional production platforms and integrate local suppliers into global production systems;
- Producers from larger economies to be able to project themselves into the global economy.

Governments in poor and small countries should spend their scarce resources by establishing a set of rules - and enforcement mechanisms - within which industry can flourish. We refer here to a very basic regulatory framework: Property rights, the enforcement of contracts, company laws, codes regulating entry and exit, and related institutions of a commercial economy. Investment must be secure other than from normal market risk, the transfer of resources guaranteed, except in clearly defined (and insurable) *force majeure* circumstances.

Though such rules are necessary, they are not enough. Knowledge needs to be disseminated and "seeded", and learning promoted. As in any economy, large or small, developed or not, innovation (broadly construed) plays a transforming role. In particular, by introducing new and better ways of producing goods (and services), and stimulating learning at the firm level through continuous and purposeful efforts to improve productivity, quality and performance of goods, poor and small countries can create a network of small and medium-sized firms, the basis of an industrial market.

Is there a role for government in directly promoting firm-level learning? To the extent that institutional failure is systematically high, we should be cautious in suggesting another institution or agency. It is true that certain public-private arrangements seem to work better, but even if one follows the canons of institutional effectiveness, one must be careful in creating new bodies. Working with existing institutions, granting them greater autonomy, finding businessmen to lead them, and ensuring they cater to existing or elicited demand may be wiser.

Moreover, there are here very few shortcuts that poor and small countries can try. One approach is to attract home emigrants and others that have experienced life and work in more advanced economies, and helping them (with market information, ideas and, above all, a receptive minimum-hassle business environment) to develop new business opportunities.

For those that stayed home, governments should be investing in training and education. Young entrepreneurs with basic managerial skills, technically-inclined individuals as apprentices, and a core of engineers and managers in tertiary professional institutions, strenghtened by returnees, can form the basis of sustainable local industrial growth for countries that are (and will remain for the foreseeable future) at the margin of globalized forms of production.

In addition, countries should progressively attempt to develop niches of excellence, initially around a few companies that strive for international recognition. They may leverage on the emigrant community as a springboard to external markets (as has been the case with the food and beverage industries from a number of smaller economies); or they may look for technical and market cooperation from SMEs from more advanced economies, which has proven to be a useful way of bringing local firms up to current standards and practices, and opening doors to third markets. Projects that match foreign and local SMEs, particularly focussed on specific industries, are worth encouraging.

Mid-sized (and mid-income) economies, as already noted, generally count with an industrial base catering to domestic needs and a modern segment, which in a few instances function as a regional platform. Their integration in the global economy will fundamentally depend on their ability to attract FDI aimed at setting up regional export platforms ("stealing away" such platforms from their natural location - larger economies and regional leaders) or establishing production units integrated into their regional supply chain.

From this perspective, mid-sized economies must *differentiate* themselves. In addition to active FDI policies, these economies must present factors which set themselves apart, and compensate for their smaller markets. Excellent infrastructure facilities; strong education and training programs; effective government agencies and mature government-business relations; and above average quality of life and amenities are known to have made a difference.[4]

The challenge faced by larger economies in view of their receding position in the global arena - and their consolidation as regional bases for international producers - is in some regards the most complex. In order

[4] In this regard, Intel's investment in Costa Rica is illustrative. It underscores both the importance of preparing government agencies and local business associations to undertake substantive dialogue with site-selection teams, and the need for high-level, ongoing discussions with international business leaders, to raise a mid-sized/mid-income country's profile and "sell" it as a regional base.

to project thmselves globally, they need domestically-based global actors, which face enormous technology and capital availability hurdles. How to overcome them?

Again, there are no simple answers. In schematic terms, countries must *first*, use existing technological assets and capital pools intelligently and effectively; for that, policy and institutional reforms are in most instances necessary. And *second*, they must mobilize additional resources - domestic and foreign - and make them available to domestic firms.

Increasing the availability and lowering the opportunity cost of capital is essential if firms from larger developing economies are going to acquire other companies - international competitors with significant market access or hard-to-obtain technologies - and make a dent into global markets. Macroeconomic reforms which promote stability and financial deepening, combined with institutional and policy changes geared towards the development of both debt and equity markets, including access by local firms to such markets internationally, can be regarded as preconditions for global projection of domestic players.

Technological resources also need to be made available to stimulate domestic company growth. Those assets - in the form of teams of scientists and engineers, blueprints, papers and other forms of technological information - have often remained underutilized within universities, research institutions, and patent offices, among others. Establishing national innovation systems so as to promote the effective use of those resources is clearly of paramount importance. The objective is to build advanced technological and managerial competence, and structure channels for a two-way resource flow between institutions and firms, so that what is available in the country is used most effectively.

Finally, in view of the extremely fast pace of change in certain industries - as in information technology - being at the forefront is quasi predicated on establishing oneself in regions where advanced research is being conducted and innovation spawned. This may involve buying an existing company or starting a new venture. Both require resources and a long-term commitment to technological excellence. More important, they presuppose a mindset by local companies to regard global markets as premier targets and frontier technologies as required assets in their normal course of business. Even for the largest or the most apt of players, such an approach is still an exception. It will take a concerted effort - by government and business alike - to project the large developing economies - and their premier firms - as independent forces in the global arena.

4. Conclusion

This paper discussed some of the implications for developing economies of the globalization of production systems. The process of globalization, as well as the accelerated pace of concentration of capital, wealth and income, do not bode well for most developing countries. The development hurdles have gone up. Governments face enormous challenges. More than ever, good government - and effective government capacity - is key. Firms need a supportive business environment, which help company growth; modern infrastructure linking firms to markets; and massive investments in education, training, skill acquisition and dissemination of knowledge.

Distinguished Speaker

Péter Hónig[1]

Mr. Chairman,

First of all let me express that the Government of the Republic of Hungary welcomes the idea of the Sustainable Industrial Development Forum. This kind of meeting enables us to summarize the experiences of our joint efforts in the field of international industrial development, and to think over the role of industrialization in the economic development of our countries in the new millennium. The Hungarian Government hopes that the Forum will generate adequate follow-up deliberations after the General Conference, too, for instance within the frameworks of the Regional Fora. That could be a positive outcome of using a part of the limited time of the General Conference for the purposes of the Forum.

Mr. Chairman,

As you might recall Hungary has always supported the reform process of UNIDO. Hungary, as a beneficiary of UNIDO Funds as well as a country making efforts to strengthen its donor activity, feels that it is important to raise the level of efficiency of UNIDO's activities in assisting the international industrial development. In our view the Sustainable Industrial Development Forum is also an action aimed at enhancing this efficiency.

Mr. Chairman, Distinguished Delegates,

Entering the new millennium, the world economy looks less the sum of co-operative national economies but looks more and more like a single market and production area. A key indicator of the globalization is the rapid expansion of foreign direct investment. According to the UNCTAD World Investment Report the six-fold expansion of foreign direct investment from 1985 to 1995 has outpaced the growth of world output and trade. According to this source, there are more than 40,000 transnational corporations with more than 270,000 foreign affiliates around the world. Their activities are broadening. Two thirds of the world trade is carried out by transnational corporations. Roughly half of the trade of multinationals is carried out within the corporations themselves, i.e. a third of the world trade consists of intra-firm exchanges. The new technologies and the gradual dismantling of national barriers to inward and outward foreign investment have opened immense opportunities for firms to invest abroad. The economic interdependence of nations is increasingly production-based and built on cross-border co-operation, strategic alliances (spreading to

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[1] Under Secretary of State of the Ministry of Economic Affairs of the Republic of Hungary.

R&D, etc.), and is not just trade-based. This form of interdependence is referred to as deep integration, because it broadens and deepens cross-border linkages.

According to the experience of developed industrial countries the formulation and implementation of a successful industrial and economic policy economy require the continuous co-operation of industrial and economic policy makers in governments, organizations representing economic interests, chambers of commerce and economy, technical associations, and organizations representing the interests of employees and regional groups. In Hungary a considerable part of the communication links and co-operation among the different groups of economic players is facing renewal or establishment. The organizations representing economic interests of different groups of society and technical associations should have a bigger role than they have at present, because the technical information on the possibilities of the firms and their possible reactions can be found in these organizations.

In Hungary a Board for Investments has been established to provide a permanent framework or continuous dialogue between major foreign investors and the Hungarian Government. Through the establishment of this Board the Ministry of Economic Affairs expects to reach:

- Attractive surroundings for further considerable investments to Hungary;
- Provision of efficient operation; and
- Strengthening of mutual confidence.

Mr. Chairman, Distinguished Delegates,

In this period our country faces the great challenge to join the European Union. Although Hungary has always belonged to Europe, in the forty years before the change of the political system it was hindered from joining in European development. Now, it is our main objective to determine the measure and the necessary sources for the optimal accession. All the programmes and solutions in order to improve the procedure of exchanging information among the state organizations, production and trading firms, the implementation of supporting projects may result that the real sphere does not only endure the procedure of joining up to the European Union but at least partly, it could also form this procedure, with regard to the accelerated globalization, too.

Globalization presents opportunities and risks for the national economies. With international production across borders, it is apparent that many economic activities do not belong to one organization in one country only. Production activities and functions can be physically separated - while remaining organizationally integrated - and located anywhere in the world. In these circumstances the developing countries can generally gain competitiveness by adoption of advanced technologies, if they put emphasis on the establishment of the necessary infrastructure and technical background services, too.

Mr. Chairman, Distinguished Delegates,

In this context we propose that UNIDO should put special emphasis to investigate and analyse methods and necessary actions.

- To upgrade local competitiveness using its special experience in technology transfer;
- To develop local quality systems with the necessary technical support services; and
- To develop the human resources.

In this way UNIDO could really assist the developing countries in supporting the advantageous effect of globalization, while decreasing the risks such as marginalization, difficulties in competing with international players, cheap imports, and lack in operation of quality system.

Regarding the programmes for development of quality management and metrology infrastructure in the developing countries we can inform you on the results of our new action which have been implemented to develop the missing technical background services in the countries of the South African Development Community. The quantity of the measuring instruments cannot justify the establishment of necessary efficient services by the manufacturers in this way the smooth operation of quality systems cannot be implemented. As a result of German-Hungarian cooperation, a step-wise programme was worked out on the basis of the site conditions in 1999 for the development of instrumentation technical support services and taking into consideration the self sustainability of such services. In this programme the National Metrology Laboratory of the Republic of South Africa can also be involved to elaborate a more efficient way of the technology transfer. Participation in and support of similar programmes by the Hungarian Government in European countries in transition cannot be ruled out in the future.

A further important area of industrial globalization is the cleaner production. For this purpose the Hungarian Cleaner Production Centre (HCPC) has been established in 1997 with UNIDO support. The Centre is a part of an international network and at the same time it co-ordinates the nation-wide network of information centres, educational and research institutions and consultants working in the field of cleaner production and preventive environmental management. The philosophy of the HCPC is to promote preventive environmental practices and the improvement of corporate environmental management through the principles of cleaner production and to enhance the state of the environment in Hungary. After organising the successful TECHCOM conference in 1998, HCPC hosted the 6th European Roundtable on Cleaner Production (CP) in September, 1999. This event brought together theoretical and practical experts from all around Europe to discuss the most pressing questions related to the promotion and practice of cleaner production including government regulation, new methodologies and tools, the institutional background of CP, relationship with other preventive methodologies, etc. The CP harmonises its actions and training programs with other foreign CPs which are the members of the international network.

Mr. Chairman, Distinguished Delegates,

1999 has been the first year of the implementation of the Donor Policy of Hungary which was elaborated in co-operation with UNIDO Secretariat, especially with the adequate contribution of Europe and NIS Bureau, in order to supervise our modest but hopefully efficient donor activity. It can be stated that this Policy, based on the new UNIDO service modules and priorities, has met our expectations and the real needs of the recipient community. Therefore this Donor Policy will be followed in our future actions too, in line with the above expressed views, and for the benefit of countries in transition in our region as well as the developing world. The Hungarian Government believes that the implementation of this Policy can help UNJDO to make the philosophy of Integrated Programmes more sophisticated.

Thank you Mr. Chairman

Distinguished Speaker

Maria Elena Cardero Garcia[1]

"This panel will examine if and how the globalization of value chains in an increasing number of industries - including textiles, clothing, automobiles and electronics - and the strategies and organization of global firms in those industries can enhance the dynamics of industrialization of developing countries and countries in transition. On the one hand, globalization of production systems provides new opportunities for developing countries and economies in transition in accessing markets and resources, in upgrading skills and knowledge and in stimulating development of local supplier networks. On the other hand, the increasing competition between developing countries to attract activities of global firms is often based on the availability of cheap labour and on tax incentives. This type of competition can drive developing countries and economies in transition into a trap of increased industrial activities without accompanying income growth."

The discussions have brought forward a dichotomy in the way we perceive industrialization. On the one hand, we are told that manufacturing generates growth and promotes development through derived demand, job creation, investment and research externalities, technological spillovers, and increases in productivity. Manufacturing for export is thought to be particularly dynamic, since over the last half century world trade has grown almost twice as fast as world output, and world trade in manufactured goods has grown almost four times as fast as manufacturing output. The implied policy deduction is that trade liberalization stimulates exports and thus, industrialization and growth.

On the other hand, UNIDO regressions (which are shown in the discussion papers for this forum) show that the link between per capita income and the share of manufacturing output in total GDP is weakening with respect to the 1970s. In the 1990s a higher level of per capita income can be systematically linked to a higher share of manufacturing output in total output only among countries that have very low levels of industrialization or a large population. There is no link at all in developed countries. Perhaps this is due to the extraordinary growth of trade in services, which has grown twice as fast as trade in goods and by 1996 represented about one fourth of total world trade.

This brings us to another question: Do exports really stimulate growth? If they do not, then export-led industrialization seems pointless. And available statistics for the period between 1961 and 1997 seem to show that rising exports do not support accelerating growth in major developing countries, with the exception of the Asian "tigers". By applying polynomial tendencies to the statistics, Latin American export

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[1] Director-General, Office for the Coordination of Economic Affairs, Ministry of Foreign Affairs, Mexico

growth rates have increased, while GDP growth rates have actually fallen. In the new "tigers" both growth rates have fluctuated a great deal but the tendency shows little acceleration in GDP growth, although the growth of exports has increased rapidly. In Subsaharan Africa, tendencies after the mid-1980s show no acceleration of the growth of GDP, which remains at low levels although export growth has accelerated considerably. These results are surprising and perhaps deserve further study by UNIDO.

In any case, as Sanjaya Lall has shown, there are several patterns of industrialization which have led to vastly different results in the domestic economy, especially with regard to technological innovation. As regards trade liberalization, the experiences are far from uniform, as should be expected from the differences among developing countries and the policy mix applied in each. Sanjaya Lall has pointed out that in the Republic of Korea and Taiwan Province of China export-led growth together with a comprehensive industrial policy generated a highly diversified and competitive base, resulting in high local content in manufacturing. In contrast, the new "tigers" and China rely on low wages to attract foreign direct investment and do not have a strong industrial policy, so that there are weak linkages between transnational corporations and local industry. Other Asian countries which have relied on import substitution (India, Pakistan, China) have low domestic technological content in manufacturing.

Experiences in Latin America are also non-homogeneous, but it may be said that in general, export-led growth strategies have resulted in rapid trade liberalization but have not been supported by a strong industrial policy. And as I mentioned before, tendencies show that although export growth rates have accelerated, GDP growth rates have fallen. This is the case for Mexico, and I would like to make a few remarks on the Mexican experience.

During the period of protectionism in Mexico, access to imported inputs was limited and whether firms became integrated vertically or horizontally, they relied on domestic inputs. As protectionism gave way to trade liberalization in the mid-1980s, and once producers had access to international suppliers, imports of intermediate goods rose rapidly. The result was that the domestic content of production fell and the manufacturing balance of trade is consistently negative in spite of the spectacular growth of maquiladoras, which must produce a surplus.[2] Productive chains in local industrial centres were disrupted by open trade. Small and medium domestic firms faced the greatest difficulties in adjusting to an open environment, and have not been able to create supply linkages to exporting firms.

At the same time, goods became more competitive and exports have risen much faster than gross domestic product. Manufacturing has come to represent 90% of exports, and oil has lost its relative importance in foreign trade. However, the benefits of trade liberalization have been unequal and have been concentrated in a small number of sectors and firms. Thus in 1996, 10% of exporting firms generated over 90% of export revenues.

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[2] According to the 5th Government Report, the manufacturing balance of trade was in deficit by US$15.4 billion in 1991, US$24 billion in 1994, US$0.9 billion in 1995 and 1996, US$10 billion in 1998 and it will be a slightly higher figure in 1999, since in June the deficit amounted to US$5.9 billion. According to Banxico, on the basis of data provided by INEGI (National Institute of Statistics, Geography and Informatics), the manufacturing deficit amounted to US$7.2 billion in 1985 and US$13.1 billion in 1980. From 1980 onwards the balance has always been negative.

Maquila, or assembly of foreign inputs, represents almost half of Mexico's total exports. As it serves mainly the United States market, it is located mostly along the US-Mexico border, although in recent years this activity is increasingly being directed towards non-border locations. Today non-border maquiladoras (or assembly firms) absorb about one third of total employment in this type of assembly activity.

Employment in the maquiladoras is very large indeed. One sixth of total manufacturing employment - about one million jobs - is in the maquila business.[3] Yet this activity contributes very little to total output in Mexico. Although it is very important in a few industrial sectors such as electronics, electrical and automotive equipment, or textiles and clothing, it generates only 2.8% of gross domestic product and 13.8% of manufacturing output. Other than labour, domestic content is almost nil. Domestic inputs are about 2% and 14% of imported inputs.[4] Perhaps this is a good example of market failure. The use of resources in this activity is suboptimal, when viewed from the collective interest. There are few spillovers of technology or know-how towards other industrial activities. There are virtually no domestic suppliers, no linkages to the domestic economy.

In Mexico regional industrial clusters, whether maquiladoras or not, have formed around a few dominant industrial activities (such as electronics in Tijuana, computers in Guadalajara and Aguascalientes, and several industrial corridors for the automotive industry). But in order to strengthen domestic productive chains, small and medium enterprises must be successfully integrated into these clusters, through productive efficiency, better organization and higher use of technology.

The foremost challenge for Mexican industrial policy is to create productive chains within an open economy. Measures are being undertaken to improve infrastructure, promote technological modernization, create labour and management training programs, provide incentives for higher quality, deregulate and ensure better access to credit. These measures are supported by other sector and regional coordination programmes, which have proved successful elsewhere in creating productive chains. Attention is being directed to eight sectors in particular: Manufacturing with high technology, automobiles, light manufacturing, petrochemicals, mining, agro-industrial productive chains, forest products, and public sector supplies. Efforts are being directed towards improving the industrial information infrastructure, through greater contacts among suppliers and national information networks for suppliers. Technology is being promoted through regional research systems in which private industry and both state and federal governments provide funds for research and training in projects which satisfy regional needs. As a member of APEC, Mexico participates in the creation of partnerships and networks, which are emphasized in APEC activities to promote science, technology and industry.

All of these efforts are channelled in the right direction, according to the existing paradigm. Yet in view of the alarming statistics on domestic content in the maquiladora industry and the negative balance of trade in manufacturing, further efforts in industrial policy are required. Sanjaya Lall is quite right in suggesting that liberalization and new trade rules are here to stay and should be taken into account in new strategies; old paradigms of import substitution and protection are no longer viable alternatives.

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[3] According to the 5th Government Report, in 1998 the number of persons employed in the processing industry was 6.9 million and the number of persons employed in the maquiladora industry 1,008,031. In May 1999 the figure amounted to 1,120,303.

[4] INEGI data.

I would suggest that the following elements of Mexico's industrial policy need to be further reinforced:

- Development of domestic markets - production for domestic consumption - as a first step to developing domestic suppliers and fostering the growth of small and medium enterprises. Ruling out protectionism, this may be achieved through the active promotion of an integrated market, by fostering information flows and promoting rapid growth.
- Higher expenditure on R&D. This can be achieved by a combination of public and private efforts. Fiscal incentives may be used more intensely to encourage innovation by private firms. At present total federal expenditure of all types on science and technology is only 0.45% of GDP, while total expenditure on R&D (including both public grants and outlays by private firms) is barely 0.34% of GDP.[5]
- Better credit facilities for industrial activities including R&D, training, and promotion of small and medium enterprises. Credit has been very limited in recent years due to the crisis in the banking sector; more credit, and easier terms, are urgently needed.
- Acceleration and deepening of efforts to promote cooperation among small and medium enterprises, as well as to create partnerships and networks.

[5] Conacyt, *Indicadores de Actividades Cientificas y Tecnológicas* (Indicators of Scientific and Technological Activities), 1997. The average for OECD countries is approximately 2% of GDP.

Distinguished Speaker

Ombretta Fumagalli Carulli[1]

Mr. Chairman
Mr. Director-General
Delegates
Ladies and Gentlemen

It is a great privilege for me to participate in the deliberations of this meeting which brings together distinguished representatives of more than 160 member states of the United Nations Industrial Development Organization, who have come her to explore in depth the complex and important issue of socio-economic development, especially in the industrial sector.

I would like to express my appreciation, first of all on behalf of the Intergroup "Parliamentarians for the Jubilee", and also in my personal capacity, for the gracious invitation which was extended to me to come here today. I am also very grateful for the attention paid to the political but also social and humanitarian initiative in which I am personally involved, and which I would now like to briefly describe to you as I have already had the opportunity to do last April when I spoke to the ECOSOC in New York. Then I could note the effectiveness resulting from contacts with the United Nations Organization, and the interest shown by the delegates in the activities of the group Parliamentarians for the Jubilee, and the project for international cooperation amongst various parliaments around the world on critical issues for the future of humankind. I would also like to very kindly thank the Director-General, Mr. Carlos Alfredo Magariños, who has made possible this meeting with the representatives of governments and people throughout the world.

Italy, as you are no doubt aware, is deeply committed to cooperation with all of the specialized agencies within the United Nations system, and particularly with UNIDO. It is involved in activities aimed at poverty eradication, increasing material and cultural growth, and the improvement of living conditions in the least developed countries. This commitment is a moral as much as a political priority for us .

The Intergroup "Parliamentarians for the Jubilee", which it is my pleasure to chair, is an association of parliamentarians representing all of the parties in the Italian parliament. The goal of the Intergroup is to promote social, economic and civil progress, as well as dialogue amongst peoples through the moral appeal represented by the grand jubilee of the year 2000.

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[1] Member of the Italian Senate. President of the Intergroup "Parliamentarians for the Jubilee". The paper was delivered in French. The English text presented here is based on a transcript of the simultaneous interpretation.

The intergroup was established in 1997. After two years we already have 260 members from both chambers of the Italian Parliament, and we are trying to promote the establishment of similar groupings in parliaments throughout the world.

Our parliamentary colleagues who work on all continents and belong to various religions share the same goal, i.e. promoting the well-being of all of the peoples. What unites us is the conviction that the celebration of the Jubilee, of this day, of the year 2000, is a wonderful opportunity to revitalize our commitment through specific measures in areas related to social progress and economic development.

We have chosen three topics for action and analysis, and we are now proposing them to those colleagues who would wish to work on them jointly in future. They are as follows: The external debt of developing countries, religious freedom and human dignity. These three topics are essential for the well-being of humankind, along with the cherished but of course still remote goal of universal peace.

At this stage of preparing our programme for the Jubilee of the year 2000, we are concentrating as a matter of priority on the crucially important issue of the foreign debt of least developed countries, and more specifically the 41 countries which were classified by the World Bank as the Highly Indebted Poor Countries, HIPCs. We have to try to work for a substantial reduction, if not a complete cancellation of this debt. The year 2000 is a very important stage towards this goal. This is one of the reasons which compelled us to present our programme to the United Nations, which is after all the main institution bringing together the representatives of the countries which are beset by this issue.

The plight of the HIPCs has to be the focus of attention of governments and international organizations. Parliamentarians, in turn, have supported the efforts of civil society, NGOs and private associations within their countries to alleviate the debt of these countries to international financial institutions.

On our side, we do play the role which has been allocated to us. The Italian intergroup is trying to work actively with the government of Rome to renegotiate the financing plans and introduce this question within the appropriate financial fora, beginning with the G-7. We have also organized a campaign in Italy to try to bring together the necessary finances to lighten the debt burden of some of the HIPCs. At the same time we are trying to make the government pass a law under which public funds would match what has been collected by citizens within the framework of this campaign. We hope that similar initiatives will also be taken on board by the governments of other industrialized countries for the benefit of the countries in the Third World.

Here, in this august assembly, I would like to launch an appeal to the developed countries to increase their aid and assistance extended to developing countries. UNIDO, in its area of competence, has, and will increasingly have in future, a fundamental role to play to provide these countries with the necessary technology and mechanisms and know-how necessary for the improvement of their level of industrial development, and by consequence, the improvement of the general living conditions of their people. We are already well aware of the important role played by the Organization in this process.

Under the leadership of the Director-General, Mr. Magariños, UNIDO has established with success a radical transformation of its organizational structure and it became more dynamic, effective and efficient as a result, and can be held up as an example for all of the United Nations family. I think we have to

acknowledge the accomplishment of Mr. Magariños, especially since he has succeeded in reconciling a reduction in the budget and staff of this Organization with a greater concentration of activities in those specific areas in which it has unchallenged comparative advantages, making sure that its human and financial resources are not scattered and therefore establishing a new basis for the future of UNIDO.

In this context we have noted with great interest the importance attached to the activities carried out for the benefit of African countries, the countries which are in the greatest need of assistance. The decisive step in the right direction was the formulation by UNIDO of integrated programmes for these and other developing countries. This programme aims at supporting these countries in their economic development, whilst bearing in mind all of the factors and sectors which are capable of ensuring balanced, sustainable and ecologically compatible development. My country is in the front ranks to support these programmes concretely, especially in India, Tunisia, Egypt, Mozambique, Ethiopia, and Uganda, to list but a few examples of our commitment to the integrated programmes. In future our intention is to broaden our financing to other countries, African and non-African.

Cooperation between Italy and UNIDO concentrates on the promotion of investment and on extending assistance to small and medium sized enterprises, following the model which has already been proven successful in the case of Italian development.

By way of example, I would like to quote the agreement under which a trust fund was established between Italy and UNIDO allowing for the creation of the Cairo Office for Investment Promotion. This office can use an existing Italian credit line which enables Egyptian SMEs to acquire technologies and know-how. This project began in February 1998. In the area of SMEs Italy is also financing a three-year project under which the Italian model of industrial development is being adapted in some developing countries (India and Tunisia). Another important project funded by Italy is a programme bearing the title "Enterprise Incubators", which is trying to create the necessary conditions for emerging enterprises in the least developed countries.

Recently Italy approved two projects in the area of industry and environment, which is a priority for UNIDO, in Mozambique and Ethiopia. This sector is of major importance for UNIDO because of its special competence in this area and also because of the ramifications of Agenda 21 and the Kyoto Protocol which is to be taken in conjunction with the very well-known Montreal Protocol. This is an area where there is a very close cooperation indeed between Italy and UNIDO.

Another important project deals with the financing of the component "Information and Investment Promotion" in the integrated programme aimed at enhancing the competitiveness and sustainability of industrial development in Uganda.

There are also other projects for other countries which are now being finalized.

Another important initiative in which Italy is participating actively is the agreement between UNIDO, FIAT and the Indian government in the field of automobile components in India. This agreement aims to raise the international competitiveness of the Indian enterprises working in this area by identifying the technical difficulties faced by them in their production processes and by increasing their productivity. The entire economy of the country will benefit from this agreement.

The help extended to development by Italy through UNIDO, and in cooperation with UNIDO, also involves other instruments, and I will only quote the two major ones: The International Centre for Science and High Technology (ICSHT) in Trieste and the UNIDO Investment and Technology Promotion Office (ITPO) in Milan/Bologna. The goal of the first is to transfer knowledge and technology for developing countries to set up a nucleus of scientists which could become the basis for their industrial development as well as technological and economic development. For its part, the ITPO works in close contact with a network of similar offices throughout the world. It works on projects and helps government players in the promotion of partnerships and investments.

In both cases we are talking about important activities through which Italy highlights future direct participation in these initiatives aimed at helping developing countries. We think that our commitment here has already been understood and appreciated by the beneficiary countries.

Now I would like to back to the topic of the Jubilee of the year 2000. What we expect from it, is that it becomes an occasion to ponder the value and quality of human life, and at the same time to give a new impetus to our political leaders and public opinion to work for a real improvement in the economic and social conditions of the disadvantaged countries. That is why we think that industrial development and the indebtedness of the poor countries contradict each other. Industrial development is difficult, if not impossible, if we are dealing with the impossible burden of debt.

In order to promote dialogue in this area we will organize five conventions, one per continent, where we will examine the various proposals. I can already announce here, and it is my pleasure to do so, that Mozambique has agreed to host the convention planned for the African continent. Argentina has also agreed to host the convention for the Americas, and is therefore participating actively in this initiative. Mr. Mario Cafiero, the son of the vice-president of the senate, Senator Antonio Cafiero, is coordinating the intergroup of Argentinian parliamentarians for the jubilee, and his task is to approach all of the countries of Latin America and North America and ensure their support for our project, tailoring it, of course, to the conditions of the individual countries and continents.

Let me specify that there are already had 100 countries from 5 continents participating in this effort, and I am not talking only about the countries of the Christian tradition, but also those of the Islamic and Judaic tradition, in conformity with the inter-religious dialogue as recommended in the letter announcing the Jubilee, "Tertio Millennio Adveniente".

In the year 2000 the final ceremony of the jubilee will take place in the presence of the Pope John Paul II on 5 November 2000 in Rome where parliamentarians from Jerusalem will join the other delegations comprising heads of states and governments which will arrive in Rome from five continents. If all of the members of parliament will consider the Grand Jubilee in this light, their commitment will certainly help us to reaffirm the dignity of the human being and strengthen the solidarity within the great family of humankind on the dawn of the third millennium.

I am quite certain that today's forum will also be of great help and support to this initiative, and will make an effective contribution towards our efforts, making them successful on behalf of the suffering, who are appealing to us to show concrete gestures of human solidarity.

Distinguished Speaker

Bunro Shiozawa[1]

Mr. Chairman,
Director-General,
Distinguished delegates,
Ladies and Gentlemen,

Its my great pleasure to make a presentation at this Forum. The issue I was asked by the UNIDO Secretariat to address on this occasion is the relationship between large enterprises and SMEs, and their implications for the transfer of technology. My brief presentation on this subject will be based on practical examples of the Japanese experience in the development of SMEs.

Let me turn first to the factors affecting relations between large enterprises and SMEs. As shown in Figure 1, the large enterprise is hoping, of course to obtain cheap labour, and sometimes also miscellaneous services such as the maintenance of machines. It may also be looking for additional production facilities to save capital resources in an environment of fluctuating demand and high-cost capital equipment. In order to avoid such investments, large enterprises therefore try to find SMEs to cover sudden increases in production demand, assigning some of their production to the SMEs under the name of the large enterprises. In some cases, the relationship between the large enterprises and SMEs may be more developed, with SMEs providing special or unique skills to large enterprises or selling special parts large enterprises. Such developed relationships between large enterprises and SMEs are very frequent in Japan.

On the other hand, large enterprises give assistance to SMEs in terms of technical guidance, training and similar services.

The factors affecting the development of SMEs are shown in Table 1. Three cases can be distinguished. In one, local natural or human resources are the main drivers of development of the SMEs. In the second, SMEs develop as sub-contractors of large enterprises. Two patterns can be identified in this category. The first is where large enterprises try to establish a knock-down operation, i.e. only assemble the completed parts into the final product. The other case is where the large enterprises try to purchase specialized parts from the SMEs. This type of relationship between large enterprises and SMEs can be seen as a kind of

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[1] Director, Technical Cooperation Division, Ministry of Trade and Industry, Japan. No formal paper was submitted. The text presented here is based on a transcript of the presentation.

division of labour between them. The last pattern would be where the market forces drive the development of SMEs. This refers particularly SMEs that develop near a major market where large demand exists and allows SMEs to develop by themselves as long as they have the necessary entrepreneurship, technology and human resources.

Table 2 presents actual examples of Japanese SMEs. There are more than 10 or 12 regions in Japan where a large number of SMEs are located in a rather narrow area. Each area has a special history, and the SMEs located in it have established very unique relationships with large enterprises, of which I will explain a few. The first row shows an example of SME development based on local resources in the town of Sanjo in northern Japan. The SMEs in that area utilize the metal production skills they have developed over 100 years ago because the area is a producer of iron sand. They have sustained themselves in this area by utilizing the special skills that they have accumulated.

The second row shows a different type of SME accumulation in Hitachi city in the northern part of Japan, which is the home of the Hitachi corporation, a very famous appliance and computer technology company. In this area many SMEs have been developed as subcontractors of Hitachi Corp. This represents a second type of SME development process.

The last row refers to the Tokyo Jonan area, a suburb of Tokyo. This area is unique because a large number of market-oriented SMEs developed by themselves here, and created a special network between them, which is an important source of technical innovation. One SME can rely on other SMEs to provide special parts or to develop unique technologies to finalize the production of goods targeted at the large market of Tokyo Metropolitan city.

It may thus be noted that a number of factors affect relationships of SMEs and large enterprises, and the degree of technology transfer which will take place between large enterprises and SMEs. As shown in the list presenting various types of relationships between SMEs and large enterprises in the middle of Figure 2, the degree of technology transfer will increase as we go down the list. The factors affecting this transfer of technology are given in the bottom of Figure 2, and include the type of industry, natural resources, labour costs and labour skills, the type of production processes, proximity to the market and the size and quality of the market.

In summary, the following factors may be regarded as important for the development of SMEs:

1. The creation of a domestic market. Even large enterprises are located near the market. Knock-down operations will not provide a large opportunity for technology transfer. If SMEs are located near the market, they will need to produce goods suited to that market and employ new technologies to do so. The creation of a domestic market, within a stable domestic economy and a sound economic policy framework, is thus very important.
2. Human resource development is also very important.
3. The appropriate policy-making and capacity building function of the government is very, very important. In particular, the government will need to alleviate market failures, which make it difficult for SMEs to develop by themselves.

Figure 1
Types of Business Relations between Large Enterprises and SMEs

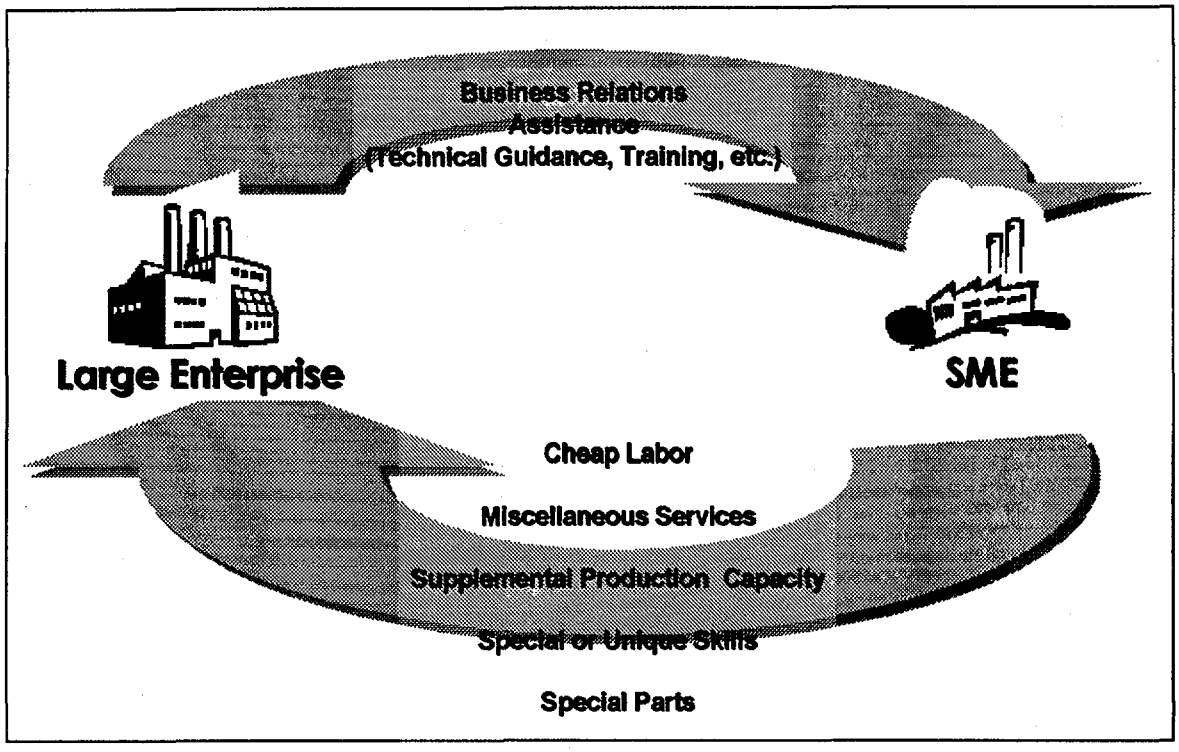


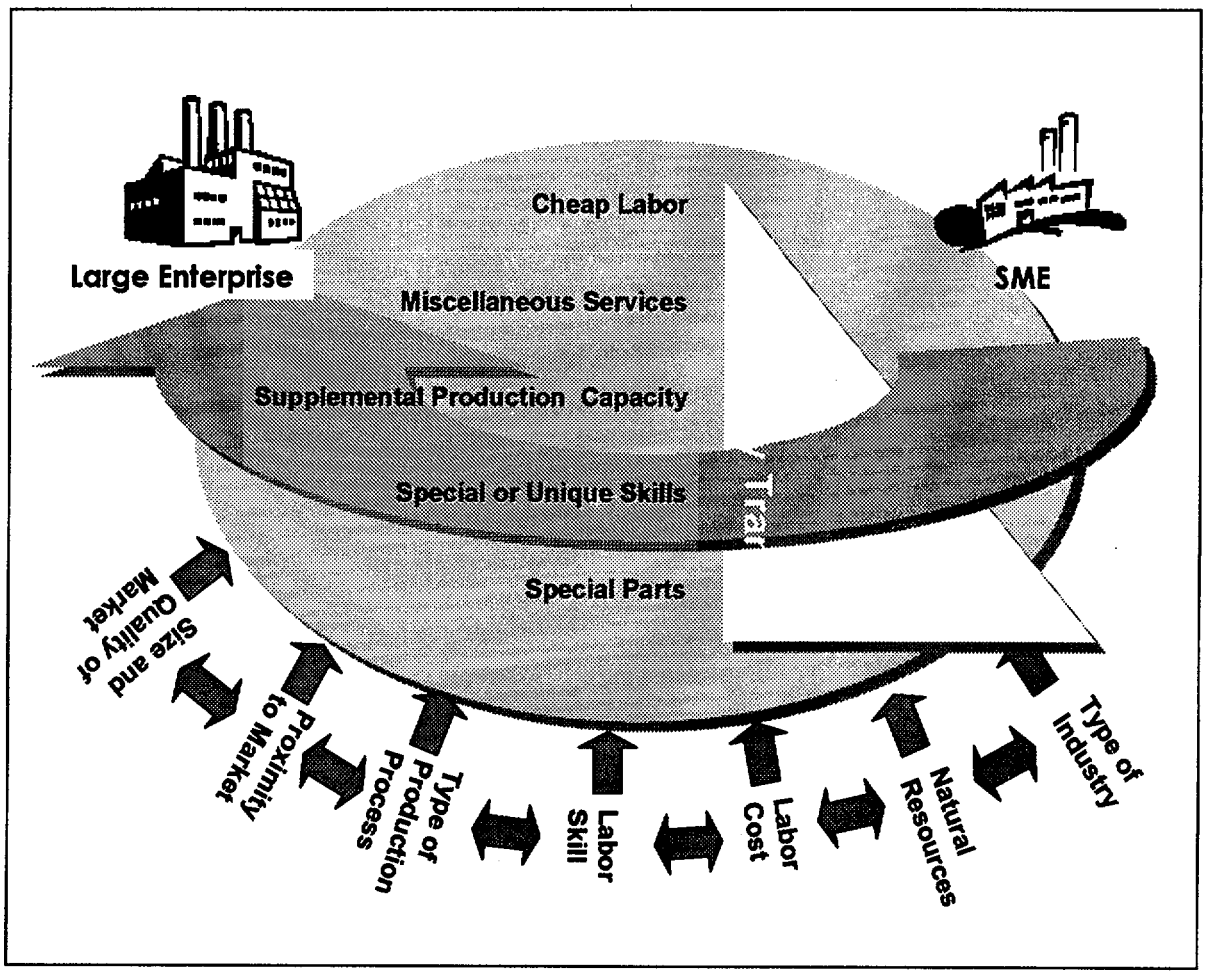
Table 1
Factors of SME Development

Factors		Role and Function of SMEs	Advantages/Disadvantages
Local Resource-based SMEs		Producing goods using locally available natural resources and/or locally accumulated techniques.	Dependent on availability of local natural resources and demand for the products. Depending on factor technologies consisting of a production process, potential of SMEs to evolve into more sophisticated industry will vary.
SMEs as sub-contractors	**Heavy Industries**	Provision of cheap labour. Provision of miscellaneous services (waste treatment, maintenance services, etc.).	Less opportunity for technology transfer.
	Assembly Industries (Knock-down Operations)	Provision of cheap labour. Provision of maintenance services.	Less opportunity for technology transfer. Possible accumulation of technical skills through provision of maintenance services.
	(Division of Labour in Manufacturing Processes)	Function as a buffer of production capacity. Provision of special skills and/or parts.	Large opportunity for technology transfer. Increased potential to acquire other business opportunities.
SMEs Located Near Market		Provision of unique techniques and products. Independent supplier to niche markets.	Playing as an independent enterprise. Local accumulation of specialized technologies may create other new technologies. Local accumulation of SMEs having specialized technologies may create "Local Brand Effect".

Table 2
Examples of Types of SME Locations in Japan

Location	Type of Industry	Topics of Development
Tsubame/Sanjo area (Niigata Prefecture)	Metal products Machinery products	Origin is a nail production industry using locally produced iron sand. Very convenient water transportation and land transportation services were also available. Tableware industry has been a leading industry, but competitive edge of the industry has been eroded due to the appreciation of the yen.
Hitachi area (Ibaraki Prefecture)	Electric appliances Machinery products Non-ferrous metals	Spin-offs from sub-contractors of a large conglomerate company, Hitachi, created an accumulation of SMEs in this area.
Ryoumou area (Gunma and Tochigi Prefectures)	Automobile parts Machinery products Electric appliances Plastic products Food processing	Silk textile industries and an industrial pyramid developed under Nakajima Manufacturing Industries Co., an aircraft manufacturer disbanded after WWII, was the origin of the accumulation of SMEs in this area.
Suwa area (Nagano Prefecture)	Precision machinery Electronic parts	Originally a silk reeling industry was established in this area. Evacuation of industries from metropolitan areas during WWII triggered the development of a new group of SMEs in this area. Competitive advantage in transport cost of precision machinery products was available.
Ueda/Sakaki area (Nagano Prefecture)	Electric appliances Automobile parts Food processing Textiles	Industry invitation policy has continuously been applied by local government in this area.
Kawaguchi area (Saitama Prefecture)	Metal products Machinery products Paper and pulp Steel	There is a large market (Keihin Industry Complex) near the area. Steel casting technology has been a core technology of most SMEs in this area, and casting steel made by Kawaguchi has become a famous brand name in Japan.
Tokyo Jonan Tokyo	Machinery products Electric appliances Metal products Precision machinery Printing Chemicals/Pharmaceuticals	There is a large market (Keihin Industry Complex) very near the area. Subcontractors of large enterprises from various industries and including the Keihin Industry Complex form a technology network in this area. The network itself has become a source of technology innovation.

Figure 2
Large Enterprises/SMEs and Technology Transfer



Distinguished Speaker

Stefan Salej[1]

Mr. Chairman,
Mr. Director-General,
Your Excellencies,
Ladies and Gentlemen,

I came from the factory floor. I think that I am one of the few to do so, after the many academicians who have talked to us. I want first to address the issues of foreign direct investment and global sourcing raised in the previous discussions. In this context, I just want to mention four examples of foreign direct investment in Brazil, which is one of the biggest receivers of foreign investment. I will show that company policies play a major role with regard to global sourcing and the relations between foreign direct investment and local small and medium sized enterprise.

Let me give you the example of the French Carrefour and the problem that we are facing now in Brazil as a result of the high degree of concentration in the food chain and supermarkets. Carrefour is encouraging French small and medium sized companies to invest in the countries where they are active. It has the so-called system of *portage*, whereby it picks up small companies in France to come with it to Brazil and replace Brazilian suppliers. Existing Brazilian suppliers are also disadvantaged by the policy of "national global source" adopted by Carrefour. This means that a supplier from the state of Sao Paolo cannot supply to Carrefour if he will not be able to supply in all the country. Thus, small and medium sized Brazilian companies are frozen out of the supply chain of big companies or big food chains like Carrefour. The same is true of McDonalds. Similarly, when the Spanish Telefonica came to Brazil in the privatization process of the telecommunications industry, it came with Spanish suppliers who replaced all existing Brazilian companies. So, where are the joint ventures? Where are the partnerships? What is going on?

Global sourcing is thus double-edged, and depends on company policies. The Italian car manufacturer FIAT, for example, which is a good partner of UNIDO, has come to Brazil and established 130 local manufacturers, either by entering into joint ventures with existing firms or establishing new firms. We thus have examples of four companies with three different policies on the implementation of global sourcing.

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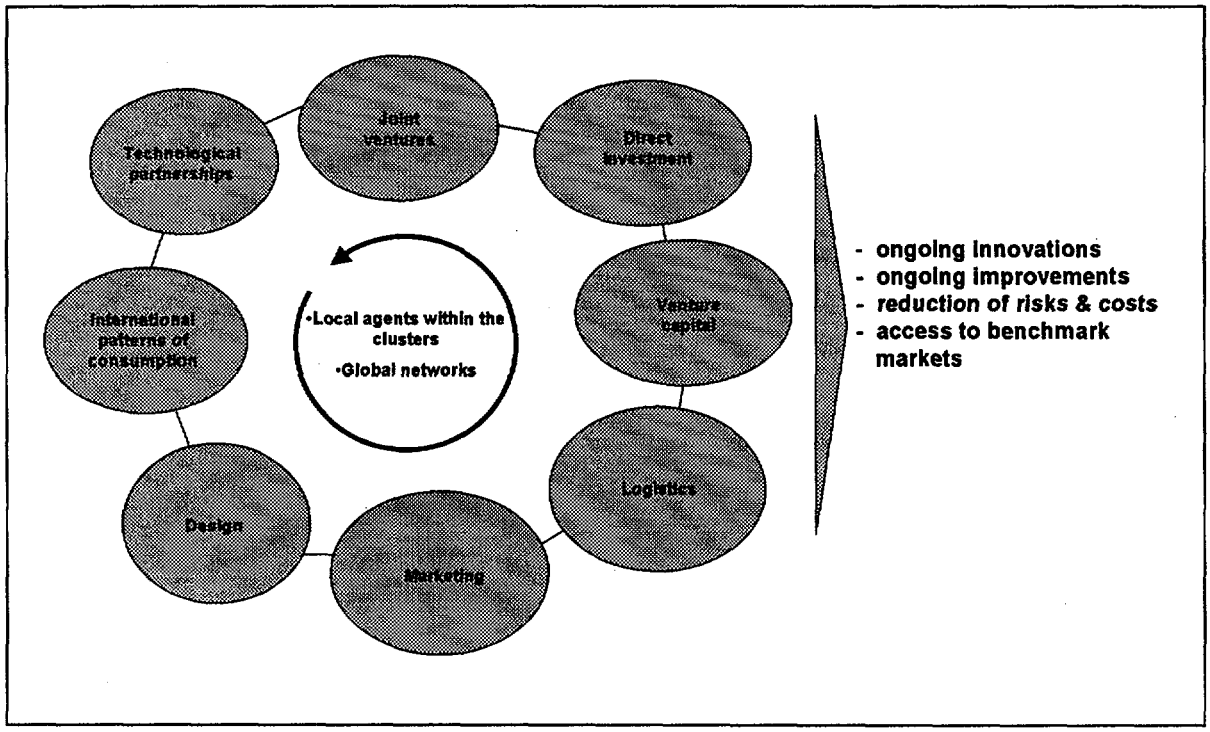
[1] Vice President, National Confederation of Industry, Brazil; President, Federation of Industries of the State of Minas Gerais, Brazil. No formal paper was submitted. The text presented here is based on a transcript of the presentation.

Foreign direct investment can therefore be a big danger for existing small and medium sized companies instead of helping them to upgrade their opportunities. It was mentioned earlier that the main responsibility for upgrading lies with the firms. I agree. But who is helping these local firms to upgrade with knowledge, with better education, with new technology, and so on. I think that this is a very important task for UNIDO, which incidentally I think should in the future not only be called UNIDO but UNISDO, the United Nations Industrial and Services Development Organization, since services are growing so quickly and assuming an increasingly important role in manufacturing.

Let me turn now to the issue of clusters. Much has already been said about how clusters work. Clusters are nothing new. In Iran carpet manufacturing clusters have been in operation for thousands and thousands of years. These days we are studying cluster development in Italy as well as many other countries, both developed and developing. But how can we realize the development of clusters? I think the first thing that we have to do is to accept the idea that clusters with a relatively high degree of productivity exist in every country. The basic idea is that successful clusters will make the most of the existing local potential and will extract excellence from their relationship with the global network. So successful clusters in developing countries and the countries in transition will have a high degree productivity - and this is the key word here - as well as international standards of quality and self-sustainability, even if they don't have a high technology content.

Another important point that has already been made and is highlighted in Figure 1 is that the main problems in many clusters are not related only to manufacturing but also to logistics, marketing and design. Efforts to upgrade such clusters will not be successful unless these matters are also addressed with support from foreign countries or organizations. Once again, this is the role, in my opinion, of UNIDO, or UNISDO.

Figure 1
Successful Clusters Require Networks Linking the "Local" and the "Global"



Allow me to explain to you our experience of cluster development in Minas Gerais. Minas Gerais is the second largest state in Brazil with a GNP of about US$85 billion. We are an export-driven economy. We have the highest exports per capita in Brazil, and our exports, especially of manufacturing goods, are growing at about 32% per year.

A study of all of the 350 clusters in Minas Gerais showed that 47 were viable. We decided to concentrate on the five most important of these, of which three are in agriculture producing cattle, poultry and fruits. Just to give an example, although Brazil is a tropical country it still imports about US$500 million worth of fruits yearly and exports only US$150 million worth of fruit. There is therefore a big market for fruit for us to expand into, both abroad and in Brazil. The fourth cluster is biotechnology and the fifth cluster is information technology.

By developing these five clusters we hope to create 62,000 new jobs. The gross additional output per year will be US$5.4 billion and GNP will increase by US$3.2 bn per year. This development programme is being undertaken in partnership between the government and the private sector. It forms part of the Brazilian national development programme called Avança Brasil, which is organized by the federal government with the help of international consultants. We have put this programme on a regional basis, led by the private sector and not by the government, although the government participates fully.

The process involved an investment of more than 38,000 consultant hours by a special team of 150 people. Building up a cluster is not an overnight job. It takes money, a lot of knowledge, a lot of hard work, a lot of innovation and a lot of hard work again, and it takes time. Our perception is that if we reach the projected results of the five clusters in five years time we will be very happy. But it will take at least ten to fifteen years to build up a successful cluster.

We insist very strongly that a partnership between the government and the business community is very important in such a regional development effort. While the business community didn't perform the government's job, it recognized its social responsibility to create new jobs and create employment. The business community cannot create only unemployment. Productivity doesn't mean unemployment. It means unemployment on one hand, but if you balance it on the other side, you can create employment in new areas even in industry.

The focus is very important, and it is very important for clusters in developing countries to be integrated in the international knowledge network. I believe that UNIDO has a very, very important role to play in the future in developing such clusters and other technologies of development. Clusters are one of many development technologies.

To conclude: What is important is a partnership between government and the private sector, a focus, a long-term system, knowledge, international relationships and hard work.

Thank you.

Distinguished Speaker

Carlo Filippini[1]

I would like to thank the chair for giving me the possibility and the honour for addressing such a distinguished audience. I shall be quite short.

I shall remember one negative trend in the past few years and try to put forward a couple of positive suggestions. The negative trend that has been highlighted in many recent studies has been the increasing inequality in developed countries as far as wage or income distribution is concerned. This is very clear in the USA and UK but also in Italy, Japan and Sweden. It is less clear in Germany and France.

Apparently we can see a similar trend to what happened last century in 1850-1914, and in the inter-war period. In the first period (1850-1914) there was a very strong globalization and convergence between countries, mainly through capital movements and very huge international migrations. In the second period there was protectionism and divergence between economies. Very often one thinks that this backlash, this reversal in globalization, was due just to World War I; that it was a sudden episode. On the contrary, even from the last decades of the nineteenth century, specially in the USA, there was increasing opposition to globalization, to free trade, to internalization.

Economists have put forward many explanations for this phenomenon of increasing inequality in income and wage distribution, that are usually based on the increased trade with emerging economies, especially east Asian economies. The other main explanation is based on skill-biased technological change that has been in favour of skilled workers and against unskilled workers. Two other explanations have been put forward, but these rely actually on the previous explanation of technological progress. One of these is the weakening of labour market institutions, especially unionization and minimum wage standards. The second is concerned with organizational change in firms. We now have a much shorter chain of command and fewer layers in any organization, and this too is due to technology. One can think of information and computing technology.

The basic dilemma is between trade and technological progress in finding the main culprit for this increasing inequality. Unfortunately, one can see growing evidence of people, politicians, organizations, and other groups, in increasing opposition to free trade. Today in Seattle there will be a big show of people protesting against the WTO free trade position.

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[1] Professor of Economics, Bocconi University, Milan. No formal paper was submitted. The text presented here is based on a transcript of the presentation..

One can be pessimistic and think that history might repeat itself. Actually, the Latins used to say that "historia magistra vitae". That is, there is a possibility, however slight, of growing opposition against free trade leading to a repetition of what happened during the inter-war period.

The positive suggestions I would try to make are based on my, albeit limited, knowledge of East Asian economies, and I think there is a possibility for east Asia and Europe to suggest new policies because of the specific characteristics of their development record. I would just point out two areas very briefly, education and research on the one hand, and small firms on the other.

In East Asia education has been always perceived as a value in itself for every person before thinking of it as an investment, as human capital, even if education was instrumental for upward social mobility. The basic idea was to implement harmony in the world between mankind and nature without a specific aim of controlling and exploiting natural resources. In Europe, on the contrary, mass - and often state - education was one of the most important tools to implement democratic values and promote growth. One of the main aims of producing knowledge in Europe was the possibility of exploiting nature and, in the recent past, the pervasive role of the state has been resisted and challenged.

An approach sharing some aspects of the two experiences might give positive results in checking the negative trend we are witnessing - namely, a synergy of public and private institutions and a more sustainable approach to natural resources. The existence of market imperfections, like externalities, public goods or asymmetric or imperfect information, will make public-private cooperation not simply useful but necessary. The state can also act as co-ordinator helping a matching of demand and supply.

My second point about small firms has been a theme that many other speakers and particular panellists have already dealt with in much more detail than I will do. In Europe small firms have played a rather important role, with peculiarities and differences in individual countries, of which the industrial districts experience, specifically in Italy, is worth a particular mention. Flexibility in adapting to changing situations and special labour relations have been quite important in making small firms successful. On the contrary, in East Asia small firms have been more dependent on big ones in a hierarchical relation of some kind, in particular the *keiretsu* system in Japan, even if in other countries, such as Singapore, we have a completely different scenario.

A new approach towards supporting these firms might solve some negative consequences of the Asian crisis with regard to unemployment and other social costs. More specifically, as many other speakers have already said, one ought to support clusters of firms instead of individual firms. Even if proximity is not sufficient by itself to generate entrepreneurship or efficiency, it is often an ingredient of success. In addition special attention ought to be paid to providing information about market or technological opportunities - a typical good that can be too expensive for a small firm to produce because of indivisibilities. One example of such cooperation between developed countries is a district-to-district project linking six industrial districts in Japan with six in Italy.

In short, to conclude, I think that East Asian and European institutions can contribute to the development of many economies by joining forces in presenting their own experience in a synergetic way.

Thank you for your attention

Panel 3

Industrialization Facing Environmental Challenges
Specific Contributions to Solving Large Problems

Theme Paper for Panel 3

UNIDO Secretariat

An extraterrestrial observer might conclude that conversion of raw materials to wastes is the real purpose of human economic activity. In order to drastically reduce the raw materials that flow through industrial economies and the burden that this flow has imposed on the natural environment, a new way a thinking will be required to deliver the services that people want. But the same shift in approach will also bring the economies into harmony with our biosphere, the natural environment that supports our life.

1. Background

The last two decades of our passing century have brought sweeping changes in political and economic systems. There have been unprecedented advances in information technology, dramatic increases of the world's population, globalization of production and trade, and changing production and consumption patterns, all of which have widened the gap between rich and poor. There is an emerging fear that many developing countries, and particularly the least developed countries, may gain little from the new economic growth. With over 6 billion people on Earth and a global GDP close to US$ 40 trillion, human activities are occurring on such a scale that they threaten the global life support system of the biosphere. OECD figures indicate that global energy consumption will increase by around 50 percent during the next decade, and about 90 percent of this increase will be met by the use of fossil fuels resulting in a 42 percent increase in annual greenhouse gas emissions over the levels of 1990. The global supply of freshwater is finite, yet demand grows annually by 2.5 percent, which is faster than the rate of population growth. In 2000 it is estimated that over 4 billion people (68 percent of the world's population) will be without sanitation services. Furthermore, projecting from the relatively small number of species of plants and animals about which enough is known, it is estimated that up to 10 percent of the world's species will become extinct by 2020.

In the early 1990s, Canadian researchers estimated the land area required to supply national populations with resources (including imported ones), and the area needed to absorb their wastes. They called this combined area the "ecological footprint" of a population. In some countries, the United States among them, the footprint is larger than the nation's area, due to their net dependence on imports or overexploitation of resources and waste absorption capacity. In fact, they estimated that sustaining the entire world at the American and Canadian level of resource use would require the land area of three Earths.

One of the main sources of pollution is industry and the products of industry, including the energy, mining and transport industries. The casual treatment of industrial waste in the past has had terrible environmental, health and economic consequences in most parts of the world. About 25 percent of the population of the Russian Federation reportedly lives in areas where the pollution levels exceed the maximum allowable concentrations by 10 times. An estimated 85 million Americans live within five miles of one of the 66,000 sites that handle hazardous chemicals. Over 4 percent of these sites could, at any time, ignite a catastrophic event comparable to that of Bhopal, India, in 1984 with an estimated 2,000 deaths and 100,000 injuries, which left about 50,000 people partially or totally disabled. The U.S. Environmental Protection Agency has estimated that the cleanup of the 1,400 priority sites would cost US$ 31 billion. And finally, an example from Africa: it had been estimated that about 70 percent of health care costs in Ghana in 1998, were linked to environmental health problems.

To address this threatening global scenario, the overall development objective should be to transform industry and its processes in such a way that they become consistent with the protection of the environment and attainment of sustainability. In other words, the goal is to achieve dignified, peaceful and equitable living conditions with a growing economy, that provides a healthy environment and a safe, high quality of life for the current and future generations. Growth of productivity is the centerpiece of economic growth. However, productivity cannot be increased without addressing the major global environmental concerns. These are climate change, depletion of the stratospheric ozone layer, loss of biodiversity, watershed degradation, pollution of oceans and seas and the toxic effects of persistent and bioaccumulating pollutants, that all adversely impact on natural resources and human health, which are the essential prerequisites for any industrial operations.

High productivity of employment cannot be achieved without social progress and sound management of natural resources and protection of the environment, which are the main elements of sustainable industrial development. Countries at different stages of their industrial development should formulate the most optimal environmental policy framework to facilitate their development process. With this approach, national environmental regulations will not constrain economic growth in developing countries. One of the most appropriate options, particularly for small and medium sized industries (SMIs), to achieve sustainability is the promotion and application of Cleaner Production. Cleaner Production can be defined as being the continuous application of an integrated preventative environmental strategy to processes, products and services in order to increase their eco-efficiency and also to reduce risks to humans and the environment. In particular, it refers to *production processes* that conserve raw materials and energy, eliminate toxic raw materials and reduce the toxicity of all emissions and wastes at the source; *products* that reduce negative impacts along the entire life cycle of a product, from design to ultimate disposal, and *services* that incorporate environmental concerns into designing and delivering services.

Most policy makers would agree that the time for environmental action is now. If major changes in the right direction do not take place now, the world will be a very damaged and unfriendly place in 100 years. To deal effectively with these major environmental concerns, specific environmental policies and regulatory measures have been introduced in the industrialized countries of the North. A European government, for example, believes that revolutionary social changes are needed if environmental sustainability is ever to be attained, with less emphasis on funding and more on partnership and cooperation. Another European government stresses the importance of integrated policies that cover the broad objectives of sustainability: social progress, protection of the environment and sound management of natural resources, as well as

maintenance of high levels of economic growth and employment. The OECD Environment Programme has classified the environmental regulations adopted to date into three categories. The first is command and control, which directly regulates behaviour affecting the environment, typically through permit and authorization procedures. The second promotes economic instruments to achieve its objectives. These modify behaviour using financial incentives (eco-efficiency and resource efficiency) and disincentives such as charges, taxes and fines. To improve environmental performance "green" tax reforms are being initiated. The third is "other instruments," which is a diverse category for mostly non-mandatory approaches for improving environmental performance. These include planning, information dissemination, tradable permits, voluntary agreements, extended producer responsibility, integrated product policies, environmental indicators and accounting, internationally harmonized criteria for product labelling and assessing of environmental safety, environmental impact assessment and environmental management systems, etc.

Developing countries and economies in transition are also facing environmental stress even if in many cases it is of a different nature. In many developing countries hazardous chemicals are still used as pesticides, which for a long time have been banned in the industrialized countries. In most developing countries, environmentally sound waste and sewage disposal is not practiced and logging and mining are still ruining the natural habitats at an increasing pace. The extent of the devastation caused by the last cyclone in October 1999 in Orissa State, India, that left close to 10,000 deaths has been at least partly due to cutting the protecting mangrove forests to convert the land to industrial shrimp farming. Without a responsible partnership between private industry and civil society organizations most of the developing countries will not be able to cope with such challenges. The United Nations should make a concentrated effort to develop an effective cooperation mechanism that involves consolidation of intergovernmental processes.

2. Issues

The first issue is the availability of cleaner and environmentally sound technology. There are three categories of environmentally sound technologies. The first of these categories includes technologies that are available for most manufacturing industries, e.g. recycling of chromium salts in the tanning and leather industry, use of non-chlorine bleaching techniques in the pulp and paper industry, use of modern composting technologies to deal with the waste in the food industry, use of biological processes instead of chemical ones in many processing industries (industrial enzymes), etc. Clean energy technologies (e.g., clean coal technology), energy conservation and process optimization in the manufacturing industries are also good examples of cleaner technologies. These examples and many others show that cleaner production has proven popular in industry, at least partly because these technologies, after an initial investment, pay for themselves, while the costs of controlling pollution and cleaning-up after the event never do and are becoming increasingly costly as new regulations are introduced.

The second category of technologies are those that are not yet fully developed, even if they might be commercially available. Such technologies have several disadvantages and limitations. Their overall cost is high, their ability to clean-up to an acceptable level is low, the time to complete the clean-up is long, and the maintenance of these technologies is not easy, hence their reliability is low. In addition, these technologies are, in many cases, not acceptable to the public. For example, there are eighteen technologies based on physical, chemical and biological methods available commercially to clean up sites and soils contaminated with hazardous chemical wastes, e.g., incineration, soil washing, chemical fixation, bio- and

phytoremediation, etc; but none of them meets all of the customers' expectations. Commercial technology is not available for clearing ports and waterways. In such a case (e.g., St. Petersburg), only the "trial and error" type of empirical approach can be applied. Even in the European Union the short-term outlook for an easing of environmental pressures is not encouraging, and some studies suggest a continuation of unfavourable trends up to 2010 in greenhouse gasses and climate change, soil degradation, waste accumulation, human health, and the state of coastal, marine, rural and mountain areas.

The third category, the "cutting-edge" technologies, are protected and, therefore, are not freely accessible. This is true both for environmentally sound cleaner technologies and waste management technologies. Most of these technologies are not available "off the shelf" in a ready-for-use form, because they have to be adapted to the actual technological situation, to the local raw materials, to the local production and consumption patterns, and they have to take into account the local climatic and soil conditions as well as local biodiversity. For example, integrated pest management, which is complex but the most successful environmentally sound technology for crop protection, takes into consideration the disease patterns of industrial crops and the most effective local variants of bio-pesticides when developing commercial production of the latter. This would require significant research and development costs, which should be included in the price of the product.

This categorization of environmentally sound technologies determines their price and consequently their affordability. The initial capital investment required to introduce a cleaner technology might be quite substantive but the pay back period is generally short due to the lower operating costs. Conversely, end-of-pipe technologies generally require an even higher initial capital investment and high operating costs. The highest benefit-cost ratios can be achieved with energy optimization projects, which in many cases, after a limited initial investment, will show cash savings from the first day of operation.

Both the cutting-edge technologies and the new, not yet fully developed environmental technologies are hardly affordable for most developed countries, let alone the developing countries and economies in transition. The European Commission proposed a new air quality target this year to reduce ground-level ozone concentrations, a major component of summer smog which can cause severe respiratory diseases. Although the recommended target value is in line with the standards of WHO, industry has stated that the costs of meeting this target are exorbitant. It is estimated that even if the target is allowed to be breached 20 times a year, it will still cost 7.5 billion euro per year on top of the 58 billion euro annual bill for the various other clean air initiatives already in the pipeline. The costs are also very high in other areas. For example, protecting the coastline against erosion, which is the main environmental problem in West Africa, could cost billions of US dollars with the current technologies.

This, then leads to the second issue: affordability. The industrialized countries can afford to apply the principles of sustainable development characterized by the sustainable use of natural resources, sustainable production and consumption, improvement in social equity and employment, and thus reduction in poverty. However, most developing countries and economies in transition cannot afford to invest from their own resources in environmentally sound technologies, without this having a negative impact on their social "safety nets". Consequently, they might repeat all the mistakes of the last 50 years of industrial development in the North and put an ever greater environmental burden on our very fragile biosphere.

A third issue stems from the fact that there are no simple answers to the question of how to control the looming problem of environmental degradation in the most optimal way, since there are numerous barriers to the transfer of environmentally sound technologies. These encompass information gaps and deficiencies; insufficient scientific, technological, professional and related institutional capacities to support the process of transition to acceptable levels of ambient environmental quality; as well as political and economic obstacles to its implementation.

One of the most frequently mentioned barriers for not reducing industry-related environmental problems is the perception that national environmental regulations are an unnecessary constraint on the industrial growth of developing countries. These are seen as a "constraint" because it is assumed that environmental regulations can only be implemented at the expense of a competitive economy. They are also seen as an "unnecessary" constraint because the social benefits of environmental regulation are perceived to be small in relation to the private costs of compliance.

3. Points for discussion

If it is true that environmental degradation and pollution do not respect political boundaries, but create a wide range of transboundary and global environmental issues, what new types of international cooperation, such as partnership or stewardship, should be developed which could more effectively address the threatening environmental scenario of the forthcoming third millennium? Since environmental degradation does not respect political boundaries, to address environmental issues in developing countries and economies in transition has a positive externality on developed countries and consequently it would create an incentive for the industrialized countries to offer financial support for the environmental clean-up in developing countries.

What type of incentives and enabling environment should be offered by developing countries and economies in transition to promote this new international cooperation that addresses all their environmental issues, and to attract foreign direct investment aimed at achieving sustainable industrial development? What are the efficiencies of specific government incentives to promote the transfer of environmentally sound, cleaner technologies and the transfer of waste recycling, reuse and recovery technologies?

Available evidence from both developed countries as well as developing countries and economies in transition suggests that environmental regulations are not "unnecessary constraints" on industrial growth. They are, in fact, necessary constraints because they protect public goods whose value (benefit) to society is greater on average that the private costs of pollution control and reduction. Are these suggestions convincing? The empirical evidence also suggests that these "constraints" are not significant for manufacturing industries. The costs of compliance with conventional environmental norms already achieved by industry in developed countries would be negligible for industry in developing countries and thus have no influence on its competitive position. Is there sufficient evidence to justify this position?

Not all environmental regulation of industry would result in social benefits exceeding private costs of compliance; in fact the opposite is sometimes the case. Some pollutants in small quantities and in some specific geographic locations might warrant less stringent regulation. Similarly, environmental regulation of industry in some situations will have, at least in the short term, a noticeable impact on production costs

and therefore on productivity. Energy and resource intensive industries and small plants, particularly in urban areas, will encounter financial problems in complying with environmental norms and some will become non-competitive and may be forced to close. What types of incentives could be recommended in such cases? Can reasonable lead times be proposed to introduce specific measures, such as environmentally sound technologies where environmental regulations have been or are too costly?

Moderator's Introduction

Zoltan Csizer[1]

For the past 50 years, the volume of world trade has grown an average of 6% every year. It is now 14 times the level it was in 1950, due in large part to the elimination of trade barriers such as import tariffs, quotas and other restrictions. During the same period, biodiversity has declined, pollution has increased and many of the world's natural resources have been seriously depleted. It is estimated that since 1970, some 30% of the planet's natural wealth has been lost, due to trends such as increasing greenhouse gas emissions, deforestation, soil erosion and overfishing. At the same time the gap between the poorest and the richest fifth has widened dramatically.

Unless the above trends would be changed, the human species will be the first in the natural history of our globe who will very meticulously record its own extinction, as a pessimistic scholar has recently described.

An ancient Arab parable tells of a Bedouin who asked a wise man whether he should trust his neighbours not to steal his camel. The wise man advised the Bedouin to trust his neighbours - but to tie up his camel anyway. The notion that one should trust but also control holds today as we wrestle with how to learn to live within the narrow limits of global environmental tolerance for the pollutants we discharge.

But will the ties and knots help? Will the environmental laws and enforcement of these laws provide a solution. We do not think that these measures alone will be sufficient. We believe that environmental laws cannot be efficiently enforced without a strong incentive that brings home cash every day. Such an incentive could be provided by a new type of industry, which is dynamically emerging to prevent pollution and utilize waste. If this new environmental industry will be successful as a business option, we will leave a better world to our children. How can UNIDO become an important player in this new area, we will make an attempt to show you in the next hour.

[1] Director, Cleaner Production and Environmental Management Branch, UNIDO.

Paper 1
Industrialization Facing Environmental Challenges Analysis of the Opportunities and Problems of Management and Governance

Jacqueline M. McGlade[1]

Ladies and Gentlemen,
Good Afternoon,

What I would like to do is take a small amount of your time and outline for you how we are going to define those environmental challenges in which industrialization must place itself. I would like to lay out a framework for you which has to work at both the local and the global level.

We have a fundamental paradox. As the world integrates economically, the component parts are becoming more numerous and smaller, but at the same time more important. At once, the global economy is growing while the size of its parts is shrinking. This is the fundamental dilemma that we face: That industry has to place itself across all of those spatial scales. It has to operate in the local environment whilst being a relevant part of the global economy.

How can we ensure sustainable development? I certainly do not have all of the answers, but I do believe that some of the panellists who will follow will give you some very good examples of ways in which we can look at solutions. We must not forget that sustainability is a dynamic process. It is an evolving body of values and ideas. It has a sense of preferred direction. There is no right or wrong, other than the environment, which naturally places constraints upon decisions. We have to be creative within that environment. Most of all, we have to think about sustainable development being a process which enables all people to realize their potential and improve the quality of their lives in ways that not only protect and enhance their own prosperity, but also maintain the planet's potential for the future. Specifically, then, we have to be able to identify what the challenges are, and where that process of sustainable development starts to be curtailed by environmental issues.

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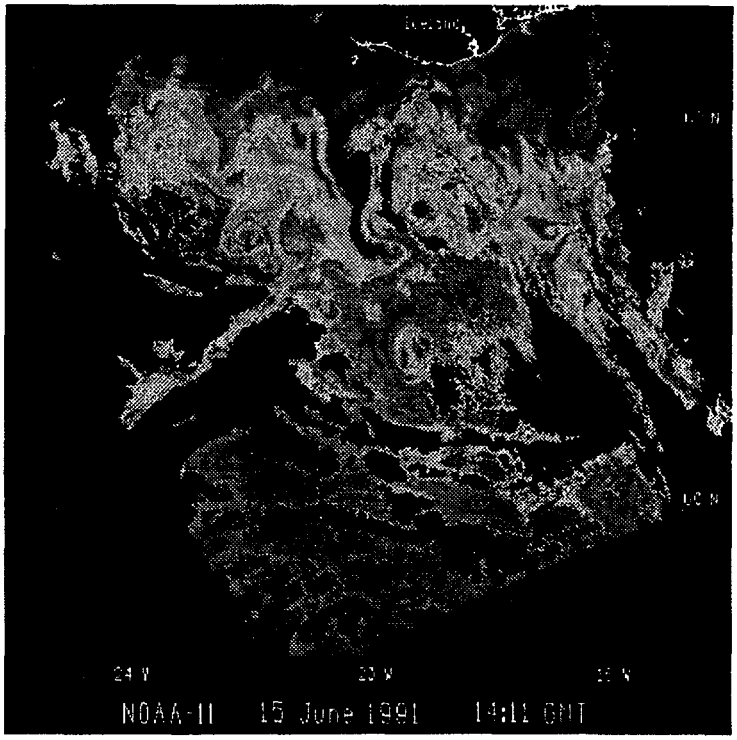
[1] Director, Centre for Coastal and Marine Sciences, Natural Environment Research Council, United Kingdom. No formal paper was submitted. The text presented here is based on a transcript of the presentation..

Most people who work in the industrial sector, from manufacturing all the way through to the service sectors, have to weigh up every day whether the environment should be treated as a burden or an opportunity. Fundamentally, we can treat it as a burden. If we are honest about industrialization, what many people would like to see is a very regulated process whereby environmental services are protected. But that is unrealistic. What we have to move towards are agendas where we create opportunities out of those potential burdens, where the environment and the processing of waste, recycling, become opportunities for new industries to emerge.

We are very good at monitoring the environment, albeit somewhat patchily in some parts of the world. We roll out technology, such as satellite imaging, which tells us about change. The picture in Figure 1, a remote-sensing image of the North Atlantic, represents fairly standard technology which is becoming more and more readily available on our desktops. Very critically, however, what we are observing here is a phenomenon in the ocean which is occurring over thousand of kilometres: An algal bloom. It is a part of the production cycle that we haven't even begun to tap. What our monitoring of the environment will tell us, moreover, is that whilst some of it is very uncertain, and there are risks associated with it, there is much that we don't know, but much to make opportunity out of. On a day-to-day basis, any company, large or small, has at least five or six areas of risk and uncertainty, including environmental uncertainty and the issue of resource distribution.

Figure 1
Remote Sensing Image of an Algal Bloom in the North Atlantic



Fundamentally, we would be adding to these burdens if we force industries to confront regulatory uncertainty as well. Not only would they then have to contend with supply and demand fluctuations, and

geopolitical instability, but we would create perversity by adding inappropriate regulatory frameworks. Let me give you an example. With all the best intents, the European Union put through its books something called a Hazard Analysis at Critical Control Points (HACCP) system. This was intended to protect the population from contaminated food, particularly in the fisheries sector. The idea was to define the risks of potential biological, chemical and physical hazards for human consumption at point of entry into the market, irrespective of where the fish are sourced from. It turns out that the cost of putting this system in place is of the order of US$1.7 million. Imagine what that means for countries like Namibia or Senegal. For such countries the need to comply with this system becomes a significant barrier. And yet, a lot of those fish are returned to those countries because they fail this barrier, and are taken up for human consumption purposes anyway. This is what I mean by regulatory perversity, and we have to be extremely careful about the regulatory frameworks we establish.

As was mentioned earlier, the World Trade Organization is meeting at the moment in Seattle. In addition, there are a number of other factors that influence different industries. There are the Lomé Conventions, for example, and there are quality controls and standards. Most important for industry, however, are the transaction costs that all these factors entail. Whenever a transaction occurs, we have to ask ourselves whether our international conventions on the environment are causing industries to become mischievous; to not adhere to regulations; to cheat wherever possible.

In a fairly formal way we have lexicons, books, and libraries filled with regulations. What we really need to do, however, is not to devise new regulations but to make the existing regulations work. They have to work in our favour, and we have to look at things in a new way. What we are working with in the United Kingdom, and in other countries, is what I call the regulatory ladder. We have international conventions, and the Kyoto and Montreal protocols, but we also have legal structures. More and more, in addition to regulation we have operational mechanisms that enable not only industry but society to engage in that debate. A classic way to make society sit up and pay attention is something called the "Hall of Shame". This is where one effectively names and shames industries that are not performing according to some criterion. In some countries we have even gone so far as to get hypothecation - in other words we are taxing environmental pollutants at source. This requires a very sophisticated fiscal regime, and a lot of political will to deliver. Finally, we've got mitigation. We should start at the beginning, provide clean technologies and integrated pollution controls so that we don't create, or at least minimize, pollution from the very outset of the process.

There are a number of fiscal and social responses, and I would simply say that just as we think of justice being the principle of law, we also have to remember that renewal is the first principle of the biosphere. If one removes that capacity, one won't have the potential to move forward. To give an example, if we think about incentives and disincentives and some perverse behaviours, we can quite often see regulations creating what I would call environmental Maginot lines. We have all our guns lined up to face that big industrial impact on pollution, but right behind us there is the whole of society creating pollution. We may not notice its impact because it is done on an individual basis, but when one collectivizes this impact, it actually becomes very severe. We are in danger of creating these Maginot lines all over our regulatory arena. It may therefore be more important to launch social awareness campaigns. Last week in the United Kingdom we launched probably the largest environmental audit of society ever undertaken. It was conducted through a very widely read newspaper, which has a circulation of 15 million people, and we already have millions of returns to enable us to understand whether people turn the taps off when they

brush their teeth. More importantly, industry is participating in that audit. We have to be much clearer about what the real environmental challenges are before we regulate ourselves into a box. What we are trying to do is make a difference in the long run.

It all boils down to governance, and how various kinds of regulations fit in. We need to go back to a blank sheet of paper, and to think about the first-order governing: How do we define the problems and the opportunities? The debate is very broad; in discussing the environment one can include everything one wants to, but that is just not possible. We have to focus, we have to chase ideas, and we have to take them down to the level of operations and delivery; down to the level of the household and the small and medium-sized business. More importantly, we also have to think of second-order governing: We have to balance needs and capacities, and in this particular area we have to assess whether the density of energy that is distributed to our industry is appropriate. There is a very large debate in progress about renewable energy, but it is inconceivable that one could deliver the right density of energy to the right level of industrial requirement through the use of renewable energy sources alone. That trade-off has to be worked out very carefully. We have to look at chances for cooperation, and more importantly, in meta-governance terms, we have to think about hierarchical behaviours. In considering regulation, we have to think about how the market is working, and also about the participation of society itself.

Looking at both industries and government throughout the world, we can actually see an emerging process of governing without government. We have areas where we can see the minimal state, where industry essentially is not regulated. We have forms of corporate governance which need to be examined very carefully to see whether environmental challenges are actually being written directly into them. We have new public management, which has to do with accountability, providing fiscal rigour, but again, at the end of the day, where does profitability fit into that? Finally, we have areas such as good governance and the socio-cybernetic system, which shows how society interacts. Particularly worrying are the the self-organizing networks into which more and more industries are organizing themselves on the ground through electronic links and other forms of communication. These are entirely outside the normal frameworks in which regulation and governance would occur. In fact, we are moving to a form of virtual governance.

This inevitably leads to what I call the hollowing out of the state. We can already see signs of this, where some multinationals and other companies in fact have more robust governance procedures with environment embedded in them than governments. The state is thus becoming only a secondary player when it comes to delivering environmental goods on the ground.

You think because you understand *one*, you must understand *two*, because one and one makes two. What I am trying to say, really, is that you have got to understand *and*. If you want industry and you want environmental protection, you've got to understand the *and*. I fundamentally believe that UNIDO, and some of the projects that it is currently involved in, is the *and*. That is really what I think we need to concentrate on, and particularly in the next few presentations I think you will see examples of where the *and* is really being worked on.

There are inter-related bodies of activities which are really a chain. We have to go right from the beginning in any particular programme or project on the ground. We have to look at the effectiveness of resource management. Are we minimizing waste, right at the beginning of the process, before we even roll those resources into the factory for production? Do we worry about where the water is coming from, etc? We

have to think about the power of government in this. We have to think about whether this is too high a regulatory burden industry so that it cannot pay attention to that resource minimization. We have to look at the potentials and limitations of the market to deliver the resources to the industry before it actually starts producing. We have to assess private and public responsibility, the basis for cooperation, and the prevailing management structures.

The other part of the loop is the global and local knowledge that resides within what one would call "indigenous knowledge", although I think that that is a misnomer. What it really implies is that we have experts everywhere, but that they do not normally think of themselves as experts. Nevertheless, such experts have local, culturally biased and yet relevant information that needs to be fed into the process. In particular, I have worked on a number of programmes where we see that small industries have very little access to best practice. They do not seem to be able to acquire the information that would allow them to make good decisions. Thus, another issue that I think the UN family has to help put forward is the way in which small businesses can actually access that wealth of knowledge which can then be put into the local context.

Systems, expert systems, do exist, but I think a danger that in thinking of them one gets too diverted into determining who the expert is. Often one thinks of an expert as someone with a Ph.D. who has worked for many years in a particular community. In fact, an expert is someone who delivers on the ground, operationally, and knows how to run a business. In this connection I think that it is very important that this particular panel has someone who is running a business, who has that experience, and has acquired it from the bottom up.

Similarly, we need to provide good decision-making tools in which the necessary information and knowledge are embedded. That is the real dilemma. We have to break through disciplinary boundaries to enable that kind of information to be put firmly on a robust footing to allow the correct decisions to be made, both in the company and the regulatory sector.

What I hope that I have outlined here is that we can have a regulatory ladder. We have to be more flexible. We have to respond to local conditions. Development is really about linking people, resources and energy to go in some preferred direction. It is not about creating Maginot lines left, right and centre, or boxing ourselves in. It is about using resources in innovative and creative ways; about creating an industry, for example, out of the waste itself. It is also about accountability, not only to the shareholders but also to the local environment and the local community.

Thank you very much.

Paper 2
Linking Industry and the Environment
The Experience of Synder, Inc.

Edward C. Yeh[1]

Ladies and Gentlemen,
Good afternoon,

Before I begin my presentation, I would like to say a few words in Chinese. I come from Nanjing in the province of Jiangsu. I grew up in Taiwan. After college I went to live in the United States. So I'm an American Chinese, one could say. In the United States I joined Synder Incorporated, which has a biological engineering section as well as other engineering sections. We have achieved a lot of success, and in a project in Wuxi we have facilitated the transfer of technology and made a modest contribution, of which we are proud.

In the 1980s the Chinese government decided that it would like to upgrade the country's industrial enzyme technology. As part of the seventh five-year economic development plan, it selected the Wuxi enzyme plant as the recipient for the technology, and Synder from the United States as the technology donor for this project. The funding for this project was provided by both the Chinese government and UNIDO.

The production of industrial enzymes is a fermentation process. Basically, one takes microbial organisms, grows them out in the laboratory, and then transfers them to reactors. There one enables the microbial organisms to produce the products, in this case the industrial enzymes. Eventually, one has a biomass separation phase and then one concentrates the enzyme, and formulates and markets it. It is a fairly straightforward fermentation process.

The contribution of Synder for this project was threefold:

1. We assisted Wuxi to improve their microbial strain, thereby generating yield increases ranging from 50% to more than 5 times the original level;
2. We introduced membrane technology to China. Specifically, we introduced two membranes. The first membrane is a gas membrane to filter the air. In any fermentation process, sterile air

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[1] President, Synder, Inc., USA. No formal paper was submitted. The text presented here is based on a transcript of the presentation..

is needed. By moving from a cotton filter to this thin film high-tech filter, we were able to sterilize the air completely and thereby to eliminate the severe contamination problem previously prevailing in the plant.

3. The second kind of membrane technology we introduced was the liquid membrane technology, which was used to replace the evaporation process previously employed by the Wuxi plant. This not only saved a lot of energy but also enabled us to produce a much higher concentration and more pure products, while at the same time significantly reducing production costs.

The environmentally sound technologies that we introduced in Wuxi basically fall into two areas:

1. Software: We trained three technicians from the Wuxi plant in our headquarters in California for eight months, where they were taught how to handle the culture and use the new technologies being transferred from the United States to China. In this context we realized how important it was for the new technology to be used correctly in order to ensure its full effectiveness.
2. Hardware: We introduced new, improved, updated hardware to replace the not-so-efficient, not-working-very well, existing equipment.

By combining the software and hardware improvement, we were able to reduce the contamination by 90% at least, and virtually eliminate it. We also worked with the Wuxi plant to implement the ISO 9000, which is a very important tool in our opinion to enhance production, follow certain guidelines, and ensure quality. By introducing the filters to the plant we eliminated pollution, increased yields, and significantly reduced the energy cost per unit of enzyme.

In the roughly ten years that we have worked with the Wuxi plant, its sales have increased from US$1.8 million to US$18 million. It has reduced its labour cost because it reduced its labour requirement from 900 people to 500 people. It has not experienced a significant increase in its energy costs, and its waste has been greatly reduced because it has to sewer every contaminated batch, untreated, into the reservoirs and lakes around the plant. As a result of the quality increases achieved by implementing ISO 9000, we have also achieved world-class products. That is the dream of any developing country, to export one's products to gain hard currency. By implementing the new technology we enabled the Wuxi plant to export its products to the world market.

The Wuxi project has yielded a number fringe benefits:

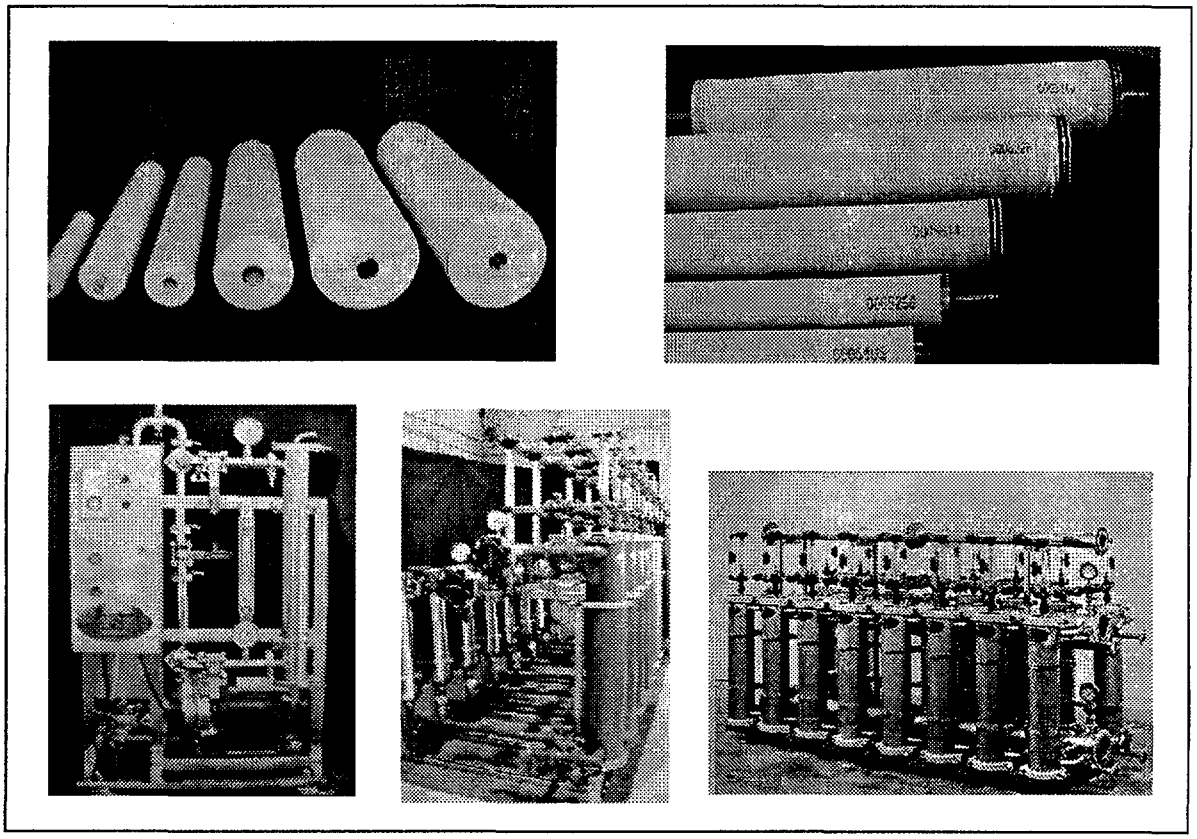
1. We shortened the time for acquiring this technology. At the time when China decided to import this technology, the country was undertaking its own research. By importing this technology it was able completely to stop its R&D. By their own calculations, they saved about 20 years on R&D.
2. The downstream industries also benefitted from the better, cheaper industrial enzymes, in particular the starch processing enzymes produced at Wuxi. This enabled them to make higher-quality enzyme-converted glucose instead of acid-method glucose and also resulted in energy savings. Similarly, the alcohol, food processing and detergent industries also benefited.
3. There was a significant spillover effect. All the other enzyme plants in China, of which there are a total of around 80, wanted to have the new technology. Within two years, all of the Chinese enzyme plants were converted to this higher efficiency, higher yield, lower contamination manufacturing method.

4. By introducing the new membrane technology, we also stimulated the Chinese membrane industry, which is a very important technology for contamination control.
5. Because the Chinese enzymes have made this quantum leap, foreign enzyme manufactures were stimulated as well. Novo, the largest enzyme manufacturer in the world, decided to invest US$100 million in Tianjin to build their own enzyme plant in China. Thus, from Wuxi we introduced more competition, which is very healthy. Genencor, the second largest enzyme manufacturer in the world, also wanted to come to China. It did the smart thing. It bought us. It wanted to buy our shares, so at the time we decided it was the right thing for us to do, so we sold our joint-venture shares to Genencor. Now the joint venture is called Genencor-Synder.

Because of the success of Wuxi, we came on the radar screen of the American ambassador to China, Mr. Stapleton Roy. In 1993 he came to visit the plant to see how the whole project was implemented. I told him that basically the project was undertaken without the assistance of the American government.

In 1993/1994 we realized the importance of membrane technology and decided to invest in this technology ourselves. We therefore established a subsidiary company, Synder Filtration, which focuses on making spiral wound organic polymeric membranes to separate particles in liquid. The range includes membranes for a variety of industrial applications, including food processing and sanitary applications and for the automotive industry. In addition, the company also makes appropriate housings for these membranes. Examples of these membranes and housings are presented in Figure 1.

Figure 1
Membranes and Housings Produced by Synder, Inc.



The lesson we learned from the project in Wuxi is that we believe UNIDO can act as an incubator. It can provide the seed money for the international transfer of technology and work as a catalyst to identify the commercial opportunities for the use of value-added processes in developing countries, such as those widely used in the developed countries.

An example would be the use of whey protein. After the production of cheese, the clear upper layer of the milk that is left is called whey. In the past, it was discharged as a contaminant into the environment. With the new membrane technology, the whey proteins are not only recovered, but they have a very high market value as a health food. Similarly, the lactose is also recovered by this new technology, which enables the waste to become a valuable bystream. The same is true for the paint used in the automotive industries. Prior to the introduction of the membrane technology it was discharged as a contaminant into the environment. With the membrane technology the paint can be recovered and recycled, which also reduces manufacturing costs.

In conclusion, I would say that the lesson we are learning here is that by finding the commercial value of new technologies in developing countries, one can justify the transfer of technology rather easily.

Thank you very much.

Paper 3
Industrial Energy and Industry

Cahit Gürkök[1]

Mr. Chairman,
Ladies and Gentlemen,

I will talk on energy, the twin brother of environment. The point of view which will lead me through my presentation is naturally effected by my background, that is a long path from academic work including the development of protection equipment for electric power systems, through manufacturing industry to my United Nations years. My UNIDO work has included involvement in a large number of energy-related projects addressing both industrial sector-specific and multi-sectoral energy problems.

Energy has picked up incredible momentum as a global issue and it will not be wrong to say that it has assumed the top place on the international agenda after the Rio Summit in 1992. In 2001, the Commission on Sustainable Development will discuss energy. Therefore, including energy in the UNIDO Forum on Sustainable Development is very appropriate.

Energy is linked to almost all global issues. It is in fact at the heart of the sustainable development theme. A summary of those issues with which energy has links are:
Energy and socio-economic issues
Energy and environment
Energy and the economy
Energy and security

With regard to the socio-economic issues, poverty alleviation is the most important issue in the world agenda. It cannot be achieved unless energy services are provided to the masses for cooking, lighting, industry, transport, etc.

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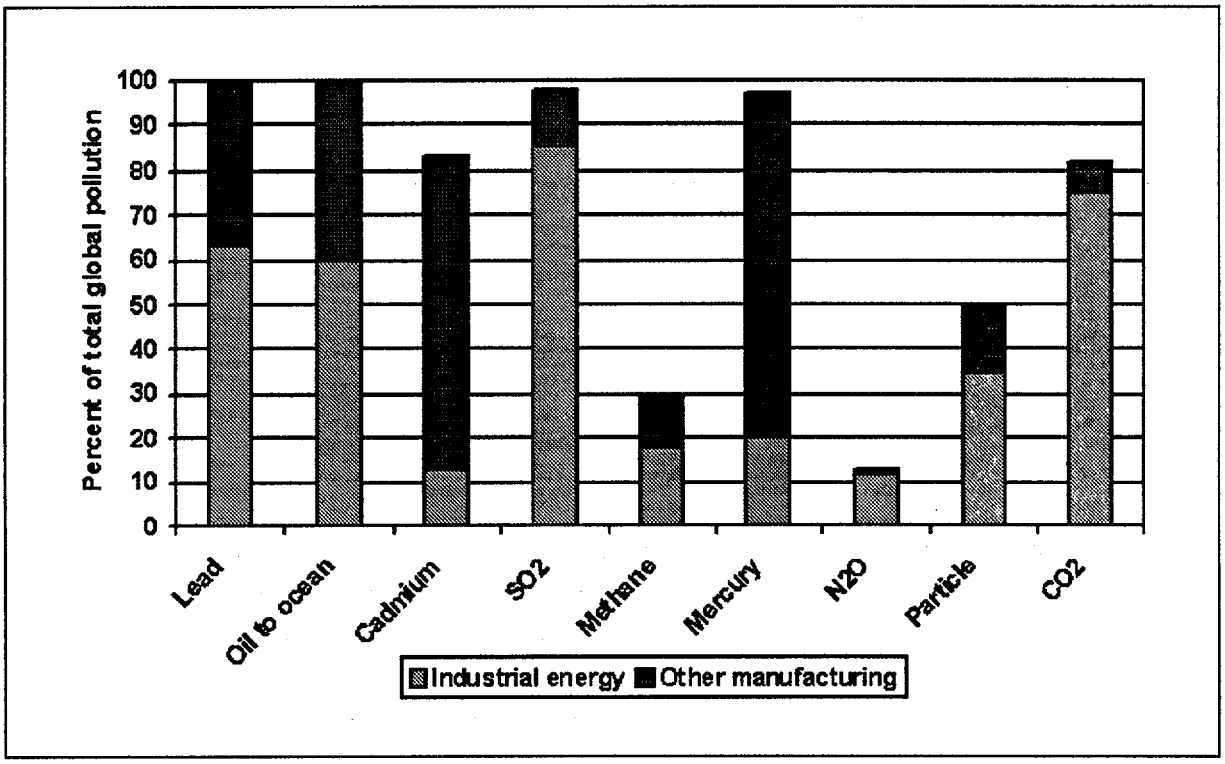
[1] Director, Industrial Energy Efficiency Branch, UNIDO. No formal paper was submitted. The text presented here is based on a transcript of the presentation..

With regard to the environment, it must be acknowledged that most of the pollution in the world is caused by industry. Industrial energy has the lion's share in this mess. Figure 1 shows the contribution of industry in the global pollution scene.

Figure 1
Energy, Pollution and Industry



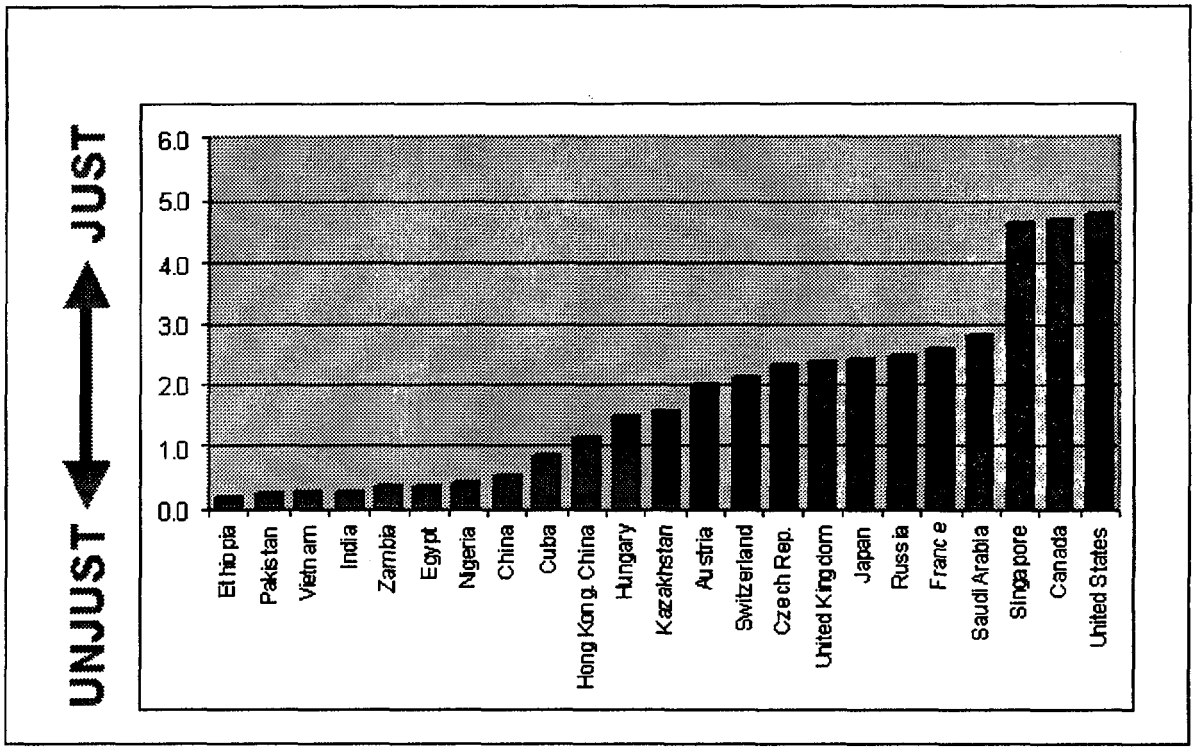
In assessing the relationship between energy and the economy, it may be noted that rates of growth of gross domestic product and energy consumption are very closely linked at low income levels. This link is broken only at high income levels. For example, on the average, these two variables are completely de-linked in the OECD countries. The conclusion to be drawn from this analysis is that without much more per capita energy consumption, no developing country can achieve economic prosperity. In short, no energy means no industry and no industry means no development.

We can define an "indicator of justice" describing the access of individual countries to energy resources. If sharing was just, then every country should have had an indicator value of one. But as you would guess, it is not the case.

$$Energy\ SHARE = \frac{\frac{(Total\ energy\ consumption\ of\ the\ country)}{(Total\ energy\ consumption\ of\ the\ World)} \times 100}{\frac{(Population\ of\ the\ country)}{(Total\ population\ of\ the\ World)} \times 100}$$

As shown in Figure 2, there is injustice. Some countries, such as the OECD countries and developing countries endowed with fossil fuel resources, have shares much larger than one, while most of the developing countries have low shares. If sustainable development is the target, then this injustice must be corrected.

Figure 2:
Global Distribution of Energy Use



Similarly, an indicator of efficiency can be defined. This indicator shows the effectiveness with which a country uses energy to generate GDP. If the world was an "all-efficient" world, everybody should have scored one.

$$Energy\,EFFICIENCY = \frac{\frac{(Total\,energy\,consumption\,of\,the\,country)}{(Total\,energy\,consumption\,of\,the\,World)} \times 100}{\frac{(Total\,GDP\,of\,the\,country)}{(Total\,GDP\,of\,the\,World)} \times 100}$$

Figure 3 shows that the developed countries are efficient in using their energy share. The inefficiency of developing countries requires utmost attention. If fast growing developing countries such as China, India, etc. cannot improve their energy use efficiency, the pressure on energy resources will be huge.

Figure 3
Inefficiency in Energy Consumption

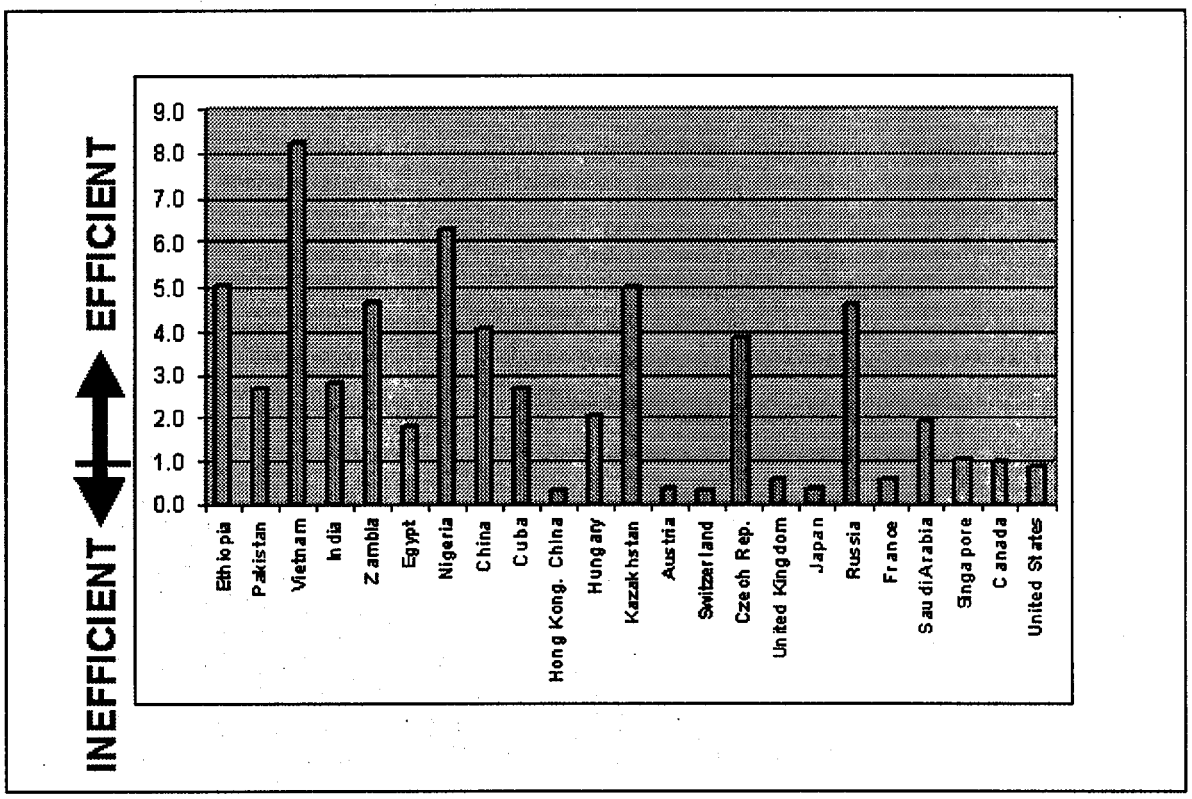
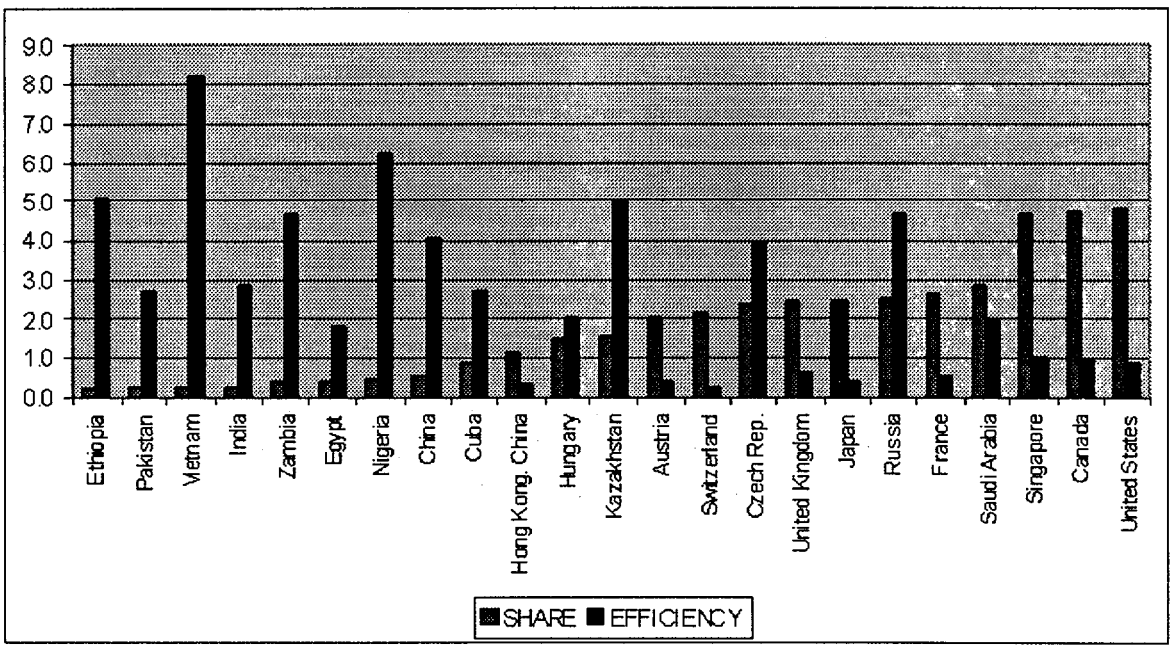


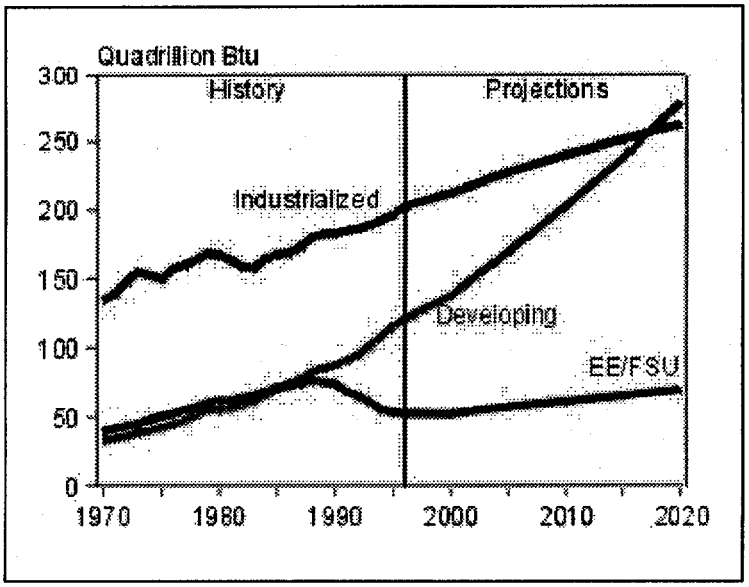
Figure 4 combines the injustice in sharing energy resources and efficiency of energy use in the creation of wealth. Even if it includes only a sample set of countries, it amply demonstrates the size of the problem.

Figure 4
The Problem



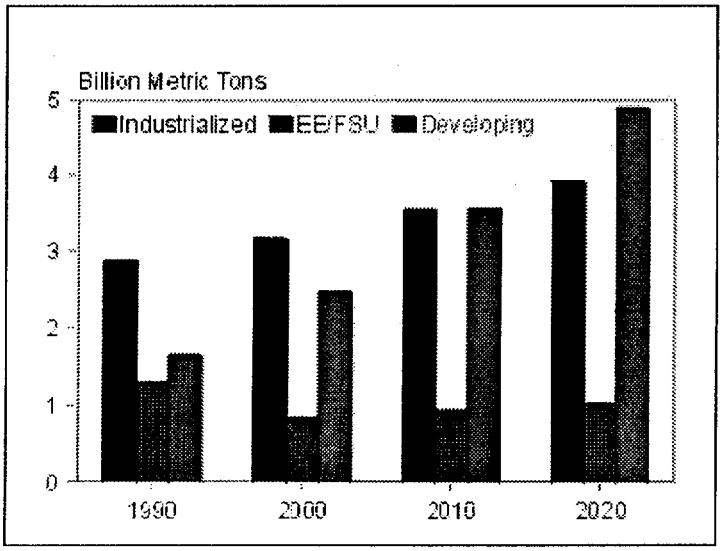
As shown in Figure 5, energy consumption scenarios predict that the rate of increase of energy demand in developing countries will surpass that of in developed countries.

Figure 5
Global Energy Consumption Scenarios



As a result of that assumption, the CO_2 emissions which cause global warming and climate change will increase faster in the developing countries. This is illustrated in Figure 6.

Figure 6
CO_2 Emission Scenarios



Industry in general, and a few energy-intensive industries such as iron and steel, non-ferrous metals, etc. are and will be responsible for the bulk of the CO_2 emissions in developing countries.

Another property of energy-related pollution is its transborder nature. It is both bad because it is involuntary pollution and good because the increased attention may help to bring solutions.

Bringing solutions to energy issues include removing barriers to the use of energy-efficiency. Both manufacturing processes (including power generation) and product designs are considered.

Utilization of low greenhouse gas emitting technologies in power generation and energy-intensive industries is another area of interest.

Renewable energy resources are almost the ultimate answer to climate change.

Considering the foregoing analysis, one can conclude that if energy is not available or its generation and use cause pollution then it is a constraint. But, on the other hand, if it is available and clean then it is a solution. The Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanisms of the Kyoto Protocol make use of this fact.

Increasing the availability, efficiency and cleanliness of energy in developing countries presents a huge burden. Technology development, transfer, financing and monitoring of operations are some examples. The international community must discuss the most important issue of burden sharing.

The formulas for burden sharing can only be found if the process is open, parties have courage, diversity and creativity are promoted, all parties show respect to the sensitivities of each other, and actions are taken without delay.

Mr. Chairman,
Ladies and Gentlemen,

The Global Environment Facility is probably the largest multilateral mechanism providing grants to environmental and energy projects. You will now see a 1-minute video prepared by the GEF Secretariat showing the coverage of their operations. At the same time, I will blend the related UNIDO Programmes in the screen. The compatibility of GEF and UNIDO programmes is obvious.

Mr. Chairman,
Ladies and Gentlemen,

Thank you

Paper 3
The Private Sector in Plastic Waste Management
The Ghana Case Study

Edwin P. D. Barnes[1]

1. Introduction

Ghana, like most developing countries, has over the past two decades seen a steady increase in the use of plastic materials for various uses. Thus, plastics are replacing steel and other engineering product materials as major components of utility goods and home appliances. This move away towards the use of plastics in these areas may be attributed to the unique properties of plastics, their versatility, inertness, light weight and strength in the application areas of packaging, automobile parts, home appliances and construction, among others.

Unfortunately, associated with plastics (as it is with other materials) is the issue of the waste generated. Plastic waste management in the country has a number of problems, primarily because of the fact that the materials are not biologically degradable, thus creating aesthetic problems both at disposal sites as well as the streets and drains where the materials are indiscriminately littered over long periods of time.

A number of proposals have over the past few years been made to address the waste problems associated with plastic materials, especially plastic packaging materials. These include a ban on the use of plastic packaging materials and their replacement with paper or some other biodegradable materials.

2. The Plastic Industry in Ghana

There are over forty (40) plastic producing industries in Ghana. These have an installed capacity of about 26,000 metric tonnes per year, although capacity utilization is only about half of this. The factories produce a range of assorted plastic products based on imported granules. Items produced include buckets, toys, containers for various uses, pipes for water, electric cables and sewerage as well as food packaging materials and furniture. In addition, about 10,000 metric tonnes of various finished plastic products are

[1] Chief Director, Ministry of Environment, Science and Technology, Ghana.

imported into the country. These include plates, buckets, toys, cutlery, and containers for various uses and carrier bags.

Most of the plastic producing industries are located in the Accra-Tema area. The basic raw materials used by the industries include polyvinyl chloride (PVC), polyvinyl acetate, polyurethane, polyethylene terephthalate, polystyrene, polypropylene, and polyethylene (HDPE, LDPE, LLDPE). Table 1 shows some of the types of plastic raw materials imported into the country as well as the quantities for 1995 and 1996.

Table 1
Imported Plastic Raw Materials, 1995 and 1996

Polymer Type	Total Quantity (metric tonnes)	
	1995	1996
High Density Polyethylene	6547.3	5954
Low Density Polyethylene	5714.2	7462
Polypropylene	2671.7	3400
Polyvinyl Chloride	5312.3	1517
Polystyrene	320.3	18
Polyvinyl Acetate	160	20
Copolymer of Propylene & Ethylene	246.5	-

3. Plastic Waste Generation

A solid waste generation assessment undertaken in the Accra metropolis in 1993 indicated that plastic waste constituted about 4%, with paper accounting for 5%, glass 2%, and metals 2.6%. While the levels for the other materials are decreasing or have not changed significantly, in 1996 the amount of plastic waste increased to about 5%. Of the total estimate of 9,500 tonnes of plastic waste generated, about 6,500 tonnes, equivalent to 70% of the plastic waste generated, consisted of plastic bags and films made from polyethylene.

Plastic wastes may be classified into two categories, namely pre-user (industrial plastic waste) or post-user (consumer plastic waste). The problems associated with plastic wastes are generally attributed to post-user sources. This is because the pre-user type of waste tends to be recycled in-house by the plastic industries and added to the feedstock of raw materials.

The post-user plastic wastes generally come from low-density polyethylene food packaging materials, plastic bottles, polyethylene and polypropylene bags and sacks and polyethylene containers. They are generated from homes and retail shops, as well as manufacturing and agricultural industries.

4. Effects of Plastic Wastes on the Environment

Of all the domestic and industrial wastes generated in the country, plastic wastes pose the worst problems with respect to environmental cleanliness. They are found littered around the streets, drains, gutters and disposal sites. The materials choke drains and gutters creating stagnant waters, which serve as breeding grounds for mosquitoes and other disease carrying insects. During the rainy season, the choked drains and gutters lead to flooding.

In the streets, the plastic materials create aesthetic environmental problems. Being non-biodegradable, plastics create aesthetic problems also at disposal sites, where they tend to be managed through burning. Unfortunately, the burning leads to other pollution problems with the release of obnoxious gases such as hydrochloric acid, isocyanates, formaldehyde, dioxins and furans into the atmosphere.

5. Arrangements for Plastic Waste Management in the Country

The traditional method for environmental waste management has been that of command and control, with legislation and other such authorization measures being used as the means of attaining better environmental management. This arrangement calls for the institution of strong monitoring and enforcement regimes, especially in relation to institutional and human capacities. The costs associated with this type of arrangement have tended to be very high and the trend now has been towards the introduction of other measures, with the legislative regimes
being used as the last resort.

Under the Environmental Protection Agency Act, (Act 490 of 1994), all investments are to be covered by environmental impact assessments (EIAs) and these are to be approved by the Environmental Protection Agency (EPA) before the investment starts. Through this means, all possible environmental issues are to be addressed before the activity starts. For existing firms, the EPA requires the submission of Environmental Management Plans (EMPs), which define how existing environmental issues are to be addressed within a specified time frame agreed upon by the investor and the EPA. While this arrangement may be viewed as a permitting system, which can be classified under the command and control regime, the EIA and its associated EMP may be described as planning tools aimed at ensuring the use of the most environmentally satisfactory methods for achieving desired goals. Through the use of the EIA and EMP, investors are encouraged to use the ISO 9000 and ISO 14000 standards to ensure that the production systems not only address quality issues but also environmental ones.

While the use of the ISO 9000 standards, which deal with quality management systems, is well appreciated in the country with a number of manufacturing and service industries using them, the ISO 14000 standards on environmental management systems are yet to be better appreciated by most operators in the country. This applies most especially to the small and medium scale enterprises. Through the efforts of the Ghana

Standards Board, the national standardization organization and the EPA, appropriate arrangements are being put in place to address this.

As indicated earlier, the plastic industry in Ghana recycles essentially all the industrial plastic wastes that they generate. The major problem relates to user-plastic wastes, a problem beyond the control of the plastic industry but being the responsibility of individuals and other manufacturers and retailers who use such plastic materials mostly for packaging purposes. Unfortunately, the mode of use of such materials lead to their being scattered all over the country making collection difficult.

The basis for the management of the country's plastic wastes revolve around the so-called 4 Rs - recycle, reuse, reduce and recover. A major arrangement promoting this concept is the Waste Stock Exchange Management System, (WSEMS) developed by MAMSCO Venture Ltd., a local firm engaged in management, environment, engineering and tourism development consultancy activities.

6. The Waste Stock Exchange Management System (WSEMS)

The concept of WSEMS identifies industries and organizations producing what types of waste (gas, liquid, solid) and industries, which can use/trade, the waste as a primary/secondary raw material. The WSEMS focuses on the 4Rs: recover, reuse, recycle and reduce, as a means of pollution prevention and control. The system also addresses UNIDO's Ecologically Sustainable Industrial Development (ESID) and Cleaner Production Programmes.

The WSEMS was developed as a strategy under the Gulf of Guinea Large Marine Ecosystem Project. The Project, funded primarily by the Global Environmental Facility and implemented by UNIDO, aimed at addressing the health of the Gulf of Guinea Large Marine Ecosystem. It involved six countries bordering the Gulf. With pollution from land-based activities being critical elements in the pollution of the Gulf of Guinea, the WSEMS was seen as a way of reducing the quantities and types of industrial pollutants, which could find their way into the Large Marine Ecosystem. The System has the following components for its implementation:

1. Feasibility study to identify the tradable wastes to maximize reuse and recycle;
2. Dissemination of feasibility report to stakeholders;
3. Feedback/reaction from stakeholders for finalizing a report;
4. Establishment of electronic-mail based information data bank on tradable waste; and
5. Commissioning and consolidation of the WSEMS into a self-financing privately run institution.

With support from UNIDO, MAMSCO Ventures Ltd. has undertaken activities 1 to 3. Support is currently being sought from various donors in order to complete the cycle of activities. In the meantime, the company has registered the concept as a proprietary and is promoting it in a number of countries in Africa.

It is estimated that the company will need about US$160,000 to set up the Waste Stock Exchange Management System.

7. Economics of Plastic Waste Management

As with other waste management arrangements the WSEMS has estimated the quantities of post-user plastic wastes generated in the country and the possible industries with facilities for processing the wastes. The major problem identified with the programme for the management of the post-user plastic wastes relates to its collection. These materials tend to be scattered all over the urban and rural areas. In homes, there are no special arrangements for separating the plastic materials from other types of waste.

Thus, there is the need for appropriate strategies to be developed to promote the collection of these wastes for any secondary processing. These strategies include:

- Provision of facilities in homes for the separation of plastic and other types of wastes;
- Designation of appropriate transit points within the communities for handling the different wastes; and
- Appointment or hiring of itinerant collectors who will be paid for the quantities of plastic wastes collected.

In order to reduce the bulk of plastic materials, the Institute of Industrial Research of the Council for Scientific and Industrial Research has designed a compression machine. This machine is currently waiting for a private entrepreneur to have it developed for commercial use. The estimated price for the machine is about US$3,000.

The lack of a collection system which may be deemed to be economical has hampered the activities of a number of entrepreneurs who have expressed interest in going into the recycling of post-user plastic wastes. The Ministry is seriously looking at various measures to make it economically worthwhile for any such entrepreneur. Under the current legislation, which makes it an offence for even individuals to pollute the environment, it may be possible to prosecute individuals who litter the environment with plastic wastes. This, of course, has serious social and financial implications for its implementation.

8. Cleaner Production Systems

As part of its programme of promoting the use of environmentally sound technologies, the Ministry is having discussions with UNIDO towards the establishment of a Cleaner Production Centre in the country. This would be mainly aimed at the small and medium scale enterprises, in which category most of the plastic industries fall. Though most of the industrial plastic wastes are recycled, thus not creating an environmental problem, the production of the waste and its subsequent recycling is an additional cost, which can and should be avoided. More energy is needed to process the same quantity of material and in many instances the recycled plastic material cannot be used for the original products intended.

The Cleaner Production Centre will thus assist the plastic industries in improving their production systems to ensure that their products meet acceptable quality standards and at the same time there is reduction in the quantities of waste produced with its attendant savings in terms of energy used and nature of items produced, leading to higher profits.

It is worth mentioning that, through the introduction of better production systems to small and medium scale aluminum cooking utensil manufacturers in the country, there was a marked improvement in the negative impacts, which their operations used to have on the environment as well as their profits. The same has been found with a paper-processing factory in the country, which produces toilet rolls and other paper items. The Cleaner Production Centre can assist the plastic industries in achieving similar positive results in their operations.

9. Awareness Creation

A major activity in the Ministry's programme for the management of plastic wastes, as well as littering in general, is in the area of awareness creation. Under the auspices of the Ministry, various non-governmental organizations as well as the Environmental Protection Agency engage in awareness-creation programmes using the various media - electronic and print - to create awareness on the dangers associated with plastic littering. In addition, traditional informal forms of communication - durbars, concert parties, etc. - are used as part of the awareness creation programme.

Associated with the awareness creation activities are various clean-up campaigns organised by the Ministry and the non-governmental organisations. These help in showing in practical terms what environmental cleanliness is about and also to create the awareness in the public about what is expected of them.

Participation in clean-up campaigns has not generally received the desired support, especially within habitable communities in the urban areas. The general feeling has been that the inhabitants pay their rates to the District political authorities, who have the responsibility for keeping the streets and drains clean. They thus do not see why they should take on the added responsibility of engaging in clean-up activities when they have fulfilled their civic obligations. Unfortunately, many of these inhabitants are not aware of the district bye-law which puts the responsibility of keeping clean the surroundings of one's house, the drain in front of the house and half of the width of the road in front of the houses on the occupants.

Implementation of this bye-law is, however, a major problem. The sanctions associated with the bye-law are so insignificant that the cost of prosecution is far in excess of the sanctions. There is thus no incentive for the prosecution of such offenders.

There is currently a programme in place to consolidate all the country's environmental laws. It is hoped that the legislation relating to the maintenance of environmental cleanliness will be reviewed to make the sanctions more of a deterrent than is the case at present. Basically, the legislation should be available to serve as a deterrent rather than for it to be used as the primary tool for environmental management.

10. Conclusion

Plastic waste management is an issue of major concern in Ghana. Industrial plastic wastes provide feedstock for the production of various plastic items thus reducing the importation of the new raw materials. Unfortunately, recycling implies reprocessing of the same material with the implication that for the same material more energy is used in processing the material to achieve a desired end-product.

In the home, plastic products are reused for various purposes. These include containers for water and other food items and as wrappers for food items to be kept in refrigerators and freezers. It is only when the plastic items have outlived their usefulness that they are finally committed to the disposal sites.

The major problem associated with plastic wastes relates to user plastic wastes. Though various arrangements have been put in place to promote the recycling of such plastic wastes, the major problem identified relates to their collection. The lack of any system for discrete plastic waste collection makes it difficult to have a cost-effective system for plastic waste management.

As with general waste management, the Waste Stock Exchange Management System provides a satisfactory framework for managing plastic wastes. The most important aspect, which will need to be addressed, relates to the cost or price to be associated with the waste. At a reasonable cost, plastic waste will become an important revenue source for entrepreneurs whose primary business will be the collection and sale of plastic waste since the market is available for the use of the materials. Addressing an environmental problem will then create an avenue for new jobs within the country.

The private sector is viewed as the major institution to promote waste management activities in the country. The role of Government is basically seen in the provision of the appropriate enabling environment within which the private sector is to operate.

Distinguished Speaker

Yuri Spiridonov[1]

Mr. President,
Ladies and Gentlemen,

Let me express my sincere gratitude for the opportunity to address the Forum from this high rostrum on the most pressing for humanity environmental issues.

The Republic of Komi, one of the largest regions of Russia, is located in the extreme North-East of Russia's European part.

Komi is rich in unique natural and mineral resources. The overall energy resources exceed 170 billion tons of conventional fuel. There are deposits of oil, coal, bauxite ores, manganese, titanium, gold and diamonds. The timber stock is estimated at 2.8 billion cubic metres.

Komi is a constituent entity of the Russian Federation. As an independent member of the international cooperation, Komi is entitled to conclude economic and commercial agreements with Russian and foreign business partners. The Republic has become an active member of various international programmes and projects.

Since 1997, Komi has been actively cooperating with the United Nations Industrial Development Organization, and this year the UNIDO project "The Republic of Komi: Sustainable Industrial Development and Competitiveness" has been launched there. Being aware of the need to use the vast experience of UNIDO in Komi, we have endorsed a subsidization of the project through a trust fund. The new UNIDO project office operates in the capital of Komi, Syktyvkar. The international experts had drafted and trained a number of the local specialists, who now operate the UNIDO software and documentation, and work as the project team. The new UNIDO Integrated Programme for the Republic of Komi is being developed on the basis of the new UNIDO approaches to technical assistance.

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[1] Head, Republic of Komi, Russian Federation. No formal paper was submitted. This Address was delivered in Russian. The English text presented here is based on an official translation presented by the Permanent Mission of the Russian Federation.

The environmental issue constitutes one of the most meaningful programme components. In Komi, the environment is distinguished by a whole range of adverse climatic conditions such as low temperatures, strong winds, high humidity, a protracted winter, and thus by a high vulnerability of nature and a slow recovery of its processes. On the other hand, however, the Republic possesses the powerful potential of its natural resources that has predetermined a high pace of local industrial development, which mostly tends towards fuel, energy and raw
materials. In the Republic, the establishment of efficient mechanisms for the use of natural resources is taking place concurrently with the transition of the region to a market economy.

Most of the Republic's governmental bodies responsible for the use of natural resources and environment protection are brought together in one structure: The Ministry of Natural Resources and Environment Protection.

The Republic faces ecological problems related to its industrial production, but it has also gained some positive experiences in the resolution of these problems, including with the help of the international community.

In 1994, a pipeline accident resulted in an oil spill of nearly 69 hectares over the tundra. Thanks to the World Bank and the European Bank for Reconstruction and Development, which allocated as a credit about US$ 124 million, the enormous work to clean the oil-spill and modernize the pipelines has been successfully completed, and the situation is being continuously monitored to prevent the recurrence of such disasters in future.

The forests that cover nearly 80 percent of the territory of Komi are not only a huge industrial resource, but their picturesque description as the "Lungs of Europe" characterizes their important role not only for Komi but also for the entire continent. Some 15 percent of the Republic's area consists of protected reserves - national parks, heritage sites, etc. These include the Yugyd Va (Bright Water) National Park, which is on the list of UNESCO World Heritage Sites. However, we understand that it is impossible merely to preserve the nature and return to the primitive production technologies. The challenge that we are trying to address now is to set up a sustainable forestry management system. Since 1996, the Komi Government has implemented a number of projects on the promotion of the so-called model forests in cooperation with the World Wide Fund for Nature. The experts regard these projects as having promising prospects. A human being should live in harmony with nature.

It should be noted that the managers and owners of the enterprises in the timber and oil & gas industries, as well as those in the other sectors, have gradually realized that the use of less environmentally hazardous technologies, even if they are more expensive, do result in higher profits. The efficient utilization of raw materials and energy pays off substantially. For two years we have been successful in implementing the Russian-Norwegian Cleaner Production Programme in Komi. The experts qualified under the programme have introduced the newly gained cleaner production tenets in their enterprises, which have benefited economically from it while at the same time reducing the adverse impact on the environment.

We are convinced that in the light of the industrial globalization it is important to avoid the errors of the past, and to explore and introduce modern technologies and cleaner production techniques promptly. This is a global problem, and therefore it must be solved jointly. The ecosystems do not have boundaries. The

international community must foster the transfer of cleaner production technologies to those regions where there is a pressing need for them, and, primarily, where the production is directly related to the use of natural resources.

For Komi, where oil and bauxites are produced, this challenge is quite urgent. We regard as an opportune step the establishment of the Future Generations Fund in Komi. which is committed to facilitate in prospect the solution of the key problems such as the population migration, employment, and the preservation of the traditional crafts and cultures of the Northern indigenous populations. As the experience of other countries with similar forms of funds has shown, the proceeds from the efficient use of such funds can gradually replace the proceeds from natural resources as they are gradually depleted.

The Komi Government has always attached great importance to the rational use of the natural resources. Therefore, the UNIDO Integrated Programme for the Republic of Komi has incorporated issues related to the establishment of a Cleaner Production Centre in Komi along with the efficient use of industrial energy. The fact that the overall expenditures of the Komi Government with respect to the development and implementation of this Integrated Programme are expected to amount to US$ 1 million confirms our serious intentions. We also expect the international organizations and financial institutions, as well as the private sector, to take part in this programme.

It is time for us to get concerned about the problems that will be faced by our future generations who will live in the areas where non-renewable resources are produced.

The intensification of the cooperation between UNIDO and the Republic of Komi coincides precisely with the period of transformation of this Organization. Today, when the Republic of Komi can see the real results of the UNIDO activities within the Republic, one can state that the transformation process has been on the right track.

Mr. President, in this connection, I would like to express our profound gratitude to the UNIDO Director-General, Mr. Magariños, and to all the Secretariat for the efforts made to disseminate in our Republic the experience gained by the international community in providing assistance in industrial development.

Thank you, Mr. President.

Panel 4

The UNIDO Partnership Programme
A New Approach to Promoting Small and Medium Enterprises

Theme Paper for Panel 4

UNIDO Secretariat

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1. Background and Context

The ongoing process of globalization, i.e. the increasingly international organization of economic production systems, is reflected in a rapid intensification of cross-border economic transactions. International investment and technology flows, driven largely by long-term strategies of transnational corporations as major players, have reduced the economic significance of geographical distances. Countries around the globe find themselves in competition with each other as potential investment locations. This competition is determined by a variety of factors. Generally, it can be observed that the economic regulatory frameworks governing the attraction and operation of foreign investment in various countries have converged substantially thus losing their significance in shaping investment strategies. At the same time, simple labour cost advantages are losing in relative importance, with the result that it is non-price factors (such as product quality and reliability and the related skill requirements) which are assuming a greater role.

Within this global economic scenario, the challenge for the majority of developing countries is twofold: First, not to be bypassed by internationally mobile investment flows, and second, to ensure that foreign investment is brought to bear on the domestic economy in terms of generating a broader developmental impact. In a nutshell: Not to get caught in a situation where enhanced integration into the global economy would lead to increased regional development disparities within the domestic economy. Being part of the global economy - if it is to be politically and socially sustainable - must tangibly affect the economic realities and the lives of people in the developing countries in terms of additional employment, broad-based regional development and eventually poverty alleviation.

A key mechanism for coupling global integration with domestic development is the promotion of linkages between investing transnational corporations on the one hand and local small and medium enterprises on the other with a view to pulling them into international supply chains as suppliers of parts, components and services. At the end of this millennium, tens of thousands of companies are active in investing across national borders, thereby generating more than three quarters of world trade. Clearly, these companies have a genuine economic interest in enhancing the sourcing of production inputs from the local economy and thus in upgrading the required capabilities of small and medium enterprises which are part of their vertical supply chain. This in turn leads to demanding managerial and technical requirements being placed on those small and medium-scale suppliers which are integrated into global just-in-time delivery systems.

The broad issues raised above will be discussed in greater detail in Panel 1 and Panel 2 of the Forum on Sustainable Industrial Development. It is with this overall perspective in mind that UNIDO has launched its new Partnership Programme aimed at contributing to a globalization process that is both economically effective and socially and environmentally sustainable.

2. The Approach

The UNIDO Partnership Programme is to be seen in the context of creating a constructive goal-oriented cooperation between the UN system and the global business community. It represents an innovative approach of building partnerships between private sector actors - both international corporations and local industry - civil society organizations including research institutions, developing country Governments and UNIDO itself.

The UNIDO Partnership Programme has for the first time been applied in India with the objective of improving the structure of the country's automotive component sector and of enhancing the performance of domestic enterprises in this sector to transform them into globally competitive suppliers. As a result, foreign investment flowing into the country's automotive sector would be able to benefit from stronger backward linkages with a pool of efficient local component suppliers

Compared to some other developing countries, particularly in East and Southeast Asia, India has joined the global locational competition for foreign direct investment only in recent years. It was at the beginning of the 1990s that the country's Government began to open up the economy to foreign investors with a liberalized investment environment. Transnational corporations were quick to respond and have multiplied their investment stakes in India within only a few years. In particular the automotive sector, since its full liberalization in 1993, has shown a remarkable annual growth rate of more than 20% in terms of the number of vehicles manufactured. Most global automobile manufacturers have set up joint ventures in India, of which some 20 have been approved so far.

Against this backdrop, the Indian Government has identified the domestic automotive component sector with its small and medium enterprises as requiring further strengthening with the aim to upgrade their performance, increase their supply capacity, improve product quality, enhance domestic value-added, generate technological and managerial learning and create productive employment opportunities. This is also to be seen in the perspective of the implications of the entering into force in 2002 of the WTO agreements which call for the ending of local content regulations. Unless the structure of the automotive component industry has been rationalized by that date, there is a danger of entire segments of this sector being wiped out by global competitors, thus leading to displacement and growing unemployment of significant numbers of workers.

In response to this challenge UNIDO has put together a multi-sectoral team comprising the following Programme Partners with distinct roles and interests:

- The Government of India assumes overall ownership of this initiative; it ensures that a broad developmental perspective remains at the forefront; it will maintain a favourable business environment; and it acts as official counterpart and coordinator.

- FIAT S.p.A. (represented through Magneti Marelli, the FIAT Group's automotive component system company) as a leading global player in automobile manufacturing is raising its investment profile in India. The company has an obvious interest in rendering its investment as cost-effective as possible and in meeting local content requirements. It is thus interested in gradually building up an efficient industrial system to support its activities in India.

- In terms of Indian private sector support institutions, the Automotive Component Manufacturers Association of India and the Automotive Research Association of India represent the voice of industry. They will be crucially important to ensure sustainability through institutional capacity-building, be it in specialized training, quality issues, or environmental dimensions.

- The European Institute for Management (INSEAD) is among the leading global business schools. It operates a dedicated research centre on the automotive industry and commands specific contextual knowledge on Indian industry.

- The Prince of Wales Business Leaders Forum (PWBLF) - as a global advocacy and capacity-building organization for socially responsible business - has pioneered new modalities of cooperation between the UN, the private sector and civil society. In this role, the Forum enjoys full endorsement from the UN Secretary-General. In India, as in many other countries, it acts as promoter and facilitator of UN-Business cooperation.

Private-public partnerships of this nature can have a significant and tangible impact on the people, institutions and enterprises they involve. While each Partner has their own agenda and interests, these are brought to bear on common objectives jointly defined by the Partnership, based on the strength, know-how and experience of each partner.

The Partnership Programme started implementation in December 1998 with a joint needs assessment. For the first one-year demonstration phase a regional focus has been established. Some 20 companies in the Pune/Mumbai region have been selected to constitute a representative sample in accordance with agreed criteria. These enterprises have benefited from expert advice and shop-floor assistance in areas such as management, quality upgrading, productivity enhancement, market access and supply chain management.

UNIDO itself has brought to the Programme its multi-dimensional expertise and existing networks. At Headquarters itself, a cross-organizational team has been set up under the lead of the Private Sector Development Branch. In addition, UNIDO's extensive network of Investment and Technology Partnership Offices is a key player to promote any investment opportunities emerging from the Programme.

To facilitate monitoring of progress, UNIDO has designed a set of transformation indicators and impact measures which allow a systematic assessment of performance changes at the company level as a direct result of Programme activities.

3. Panel Discussion: Main Issues

All Programme Partners will be represented on the Panel. They will provide an assessment of the tangible results achieved so far at the level of the participating enterprises as well as an outlook on the challenges and tasks ahead in the Programme's main phase starting in the year 2000. Drawing on the experience gained in this first application of the UNIDO Partnership Programme it is intended to stimulate a broader discussion of some of the key issues involved in this new type of partnerships. The following questions may be seen as pointers to the kind of debate envisaged to take place:

Challenges facing multi-sector partnerships

- How do Member States assess the actual and potential role of the UNIDO Partnership Programme as an innovative mechanism to design and deliver technical cooperation services at the country level? Is it perceived as constituting an appropriate response to the importance of private sector actors as drivers of industrial development? How can UNIDO ensure that its essential role as honest broker and neutral provider of technical services is not jeopardized by commercial interests of other Partners? In what ways can the developmental goals of UNIDO and the economic objectives of business be mutually supportive? Do the benefits of such innovative Partnerships outweigh the costs involved in creating and nurturing them? Ultimately: Can development cooperation as a global public good be made more effective by teaming up with players who are linked to the logic of the market?

Orientation towards partnership

- The emergence of public/private partnership as an approach to development is relatively new in many parts of the world, and many of the key actors are unfamiliar with the practice, profoundly sceptical or suspicious of commercial motives entering the traditional arena of public policy. How can key actors in development become more orientated towards testing and implementing partnership approaches and methodologies?

Consensus-building

- Which mechanisms are best for ensuring that a sufficiently broad consensus is built among all Partners at the defining stage of a specific Partnership Programme? In the light also of the limited resources available, how does one arrive at the right prioritization and sequencing of issues?

Competence in partnership building

- Cross-sector partnerships require new skills of all participants in terms of communication, understanding, transparency and management of private interests in public policy and in development cooperation. How can partnership-building skills become a core competence of UN organizations, business and other participants, and how can required capacities be built up?

Broad developmental impact

- What are the necessary framework conditions for partnerships between UNIDO, developing country Governments, the business community and civil society to generate clear-cut economic returns and at the same time broader developmental impact? In other words: How can it be ensured that the benefits created by a Partnership extend beyond the realm of just a few participating enterprises? Can it be assumed that the participating enterprises share a broader interest in tackling sector-wide development constraints? What are the implications of various government policy measures, such as taxation, on the performance of the sector?

Replicability

- Is the UNIDO Partnership Programme designed for implementation only in highly circumscribed country and sectoral contexts or does the approach lend itself to broader application? Can it be replicated, in particular, also in African and least developed countries and in other industrial sub-sectors, such as in agro-processing?

Sustainability

- Through what measures can sufficient technical and institutional capacity be built up to render the impact of a Partnership Programme sustainable after the withdrawal of UNIDO and other external Partners? From a broader social perspective, what mechanisms can be put in place to ensure that the benefits generated by the Partnership Programme are shared also by the work force of the participating enterprises?

Moderator's Introduction

Wilfried Lütkenhorst[1]

Mr. President,
Your Excellencies,
Ladies and Gentlemen,

It is a great pleasure for me to act as moderator of this Panel. Before actually starting to moderate, I have the pleasant duty to place Panel 4 into its proper perspective.

We are now moving to the final theme of this Forum before the Director-General will wrap up the main overall findings and conclusions later this morning. Thereby we are also moving from a more general discussion in the previous panels to the presentation of one concrete Programme - which we refer to as the UNIDO Partnership Programme. A Programme which translates some of the concepts discussed up to this point, in particular in the context of Panel 2, into practical application. It was the great German philosopher Immanuel Kant who said so lucidly: "Concepts without experience are empty. Experience without concepts is blind." Very true, indeed. In this sense, we will now be discussing precisely the nexus between UNIDO's globally oriented research role and its crystallization in terms of concrete technical cooperation programmes. This intersection between theory and practice invariably offers rich food for thought and I hope that it will also trigger a stimulating debate today. Let me provide you with a few up-front observations.

First of all, what is the UNIDO Partnership Programme? It is a programme which seeks to develop a viable new approach towards supporting capacity-building for small and medium enterprises - and to do so jointly with major players in the business world having an interest in strengthening their supply chains. In other words: The Programme moves from the traditional bi-polar donor-recipient relationship towards a broader multi-dimensional partnership approach. It takes on board partners from different domains which all too often used to be neatly separated in the past: government, international and domestic industry, civil society, research and development. This Panel thus covers a highly topical issue. As we all know, the strong emergence of non-governmental actors and the ensuing phenomenon of hybrid governance structures (combining domestic and international, public and private entities) is one of most debated trends in the theory of international organization and development.

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[1] Director, Private Sector Development Branch, UNIDO.

Clearly, this is a reflection of a growing perception of a mutuality of interests. As UN Secretary-General Kofi Annan put it at the Davos World Economic Forum in 1998: "Creating wealth, which is business's expertise, and promoting human security in the broadest sense, the UN's main concern, are mutually reinforcing goals. Thriving markets and human security go hand in hand. A world of hunger, poverty and injustices is one in which markets, peace and freedom will never take root."

No doubt, the private sector has been discovered as a partner by the UN system (and let me add, not only, as is sometimes alleged, since Ted Turner donated one billion dollars) just as many private companies have come to recognize the value of working with the UN. Their roles are different, of course, and so is their contribution. In a somewhat simplified and stylized perspective, one can say that in international economic development the UN is more geared towards providing the soft infrastructure of analyses, policy advice, norms and standards as well as important technical cooperation services, while business contributes primarily wealth-generating technologies, innovation, resources, markets, capital and above all productive employment.

These days, joint UN/business declarations and activities have themselves become a growth market, though not always accompanied by tangible results. It is only natural that UNIDO - considering its mandate in industrial development - is taking the lead in this process through concrete activities on the ground with carefully selected partners.

The case we are presenting to you today in this Panel is both country-specific and sector-specific: We will talk about India and about the automotive component industry - an industry which, as we heard yesterday - represents a producer-driven global supply chain. We will discuss the challenges facing this sector, and what the Programme has done in response, to upgrade the capabilities of small and medium enterprises for them to become competitive suppliers to transnational corporations and thereby to create productive employment and eventually reduce poverty. The tangible impact achieved in this Partnership Programme, which was born only a year ago, will be demonstrated. But this will also be taken as a point of departure for discussing broader issues which I will outline later on.

Talking about impact, let me refer you to the documentation which has been distributed[2]. It was John Kenneth Galbraith (and as an eminent economist, he should really know) who once said: "If you don't count it, it doesn't count." From the very beginning, we have thus made sure that the impact of the Programme is carefully monitored and counted at the level of each participating enterprise as a basis for future evaluations and lessons to be learned. (For those of you who prefer movies, there is also a video showing outside this hall which was produced by the Government of India and which provides a more illustrative account of the Programme's achievements. We also provide, in the same information corner, a demonstration of our new Partnership website.)

Conceptually speaking, we have to ask ourselves one obvious question: In the most generic sense possible, what is it that constitutes a partnership? I submit that any partnership has three defining characteristics and three preconditions for its effective functioning. The defining elements are:

1. To agree on joint objectives;

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[2] UNIDO, Impact of the Partnership Programme - Phase I, 1999. A summary of this document is appended to this volume as Annex 4.

2. To engage in a collaborative relationship towards achieving these objectives with clearly delineated roles for each partner; and
3. To share responsibility and accountability for the outcome.

These are necessary conditions, but they are certainly not enough for the success of a partnership. The further preconditions for a partnership to actually work would appear to be:

1. To consider it as an instrument, a modality - often time-bound - and not as an end in itself;
2. To ensure that clear-cut benefits are generated by the partnership which exceed its costs; and
3. To share the resulting value-added in a manner perceived as being fair by all partners.

Indeed, I hope and strongly believe myself that the UNIDO Partnership Programme, as applied in India, does actually meet all of these criteria. We will let the Partners - all of whom are represented here on the panel - speak for themselves.

Let me now briefly refer you to the sub-title of the theme of Panel 4. It reads: "A New Approach to Promoting Small and Medium Enterprises". An intense debate is ongoing in the development community on best practices and on lessons learned in promoting SMEs. A new sobriety is gaining ground in assessing the widespread failures of the past, of trying to protect SMEs rather than exposing them to competition, of trying to build up huge and centralized state capacities to support SMEs rather than creating a decentralized network of service providers. Some of the best practice principles identified for instance by the Donor Committee for Small Enterprise Development (of which UNIDO is an active member) are:

- First, to work with groups of SMEs to ensure a joint learning process and experience-sharing for the targeted industry as a whole as well as greater cost-effectiveness for development agencies (this point was brought home convincingly yesterday in Panel 2);
- Second, to insist on at least partial cost recovery for services provided;
- Third, to involve the private sector directly as provider of services; and
- Fourth, to design a framework for performance and impact measurement.

These are all principles that we are embracing in this Partnership Programme. At the same time we realize, of course, that working with multi-disciplinary partners representing wide-ranging agendas is a challenging undertaking. The language we speak is not always the same; procedures often differ; sometimes the very concept of time - in particular response time - is more than just a nuance apart. But this is clearly a joint learning process, and the rewards are immense. (Business partners can be quite impatient but this impatience can at the same time be a good indicator pointing to processes that we in the UN may have to speed up a bit.)

What matters, again, is that we share the same objectives. It was the Secretary-General - no, not of the United Nations, but of the International Chamber of Commerce - who recently wrote: "Creation of small and medium-sized businesses will be the most effective way to spread genuine wealth, as opposed to handouts." This, in a nutshell, is also the philosophy of UNIDO. And we want to demonstrate in this Panel how UNIDO with its partners is responding to the needs of SMEs in a quickly globalizing market with a Programme that is technically sound, economically viable, institutionally sustainable and - as a model - replicable in different country and sector contexts. In this regard I would like to inform you that UNIDO has reached a framework agreement with Monsanto, one of the world's leading life-science

companies, to implement a similar partnership programme in Russia in the area of food processing industries.

We also want to develop a model that helps developing countries to add value to their resources, to diversify and deepen their industrial structure. Because, at the end of the day, while it is true that "industry matters" for economic growth (as shown in the first Panel) it is equally true that the structure of industry matters significantly in determining the capacity, the potential for becoming a high growth achiever.

A final remark on providing new role models for technical cooperation. During Panel 2, Hubert Schmitz talked yesterday about the courage to experiment and about testing new role models as being a foremost task of UNIDO and of multilateral organizations in general, for that matter. I fully subscribe to this view. It is indeed a key task of international development agencies to launch catalytic projects which can induce broader social learning.

With these introductory remarks, I would like to conclude, Mr. President.

Thank you very much for your attention.

Keynote Speech

Ajit Kumar[1]

Mr. President,

At the outset, I would like to congratulate the Director-General of UNIDO for his remarkable initiative in organising the Forum on Sustainable Industrial Development during the current Conference. It provides a platform to share experiences and perceptions and to evolve new strategies for sustainable industrial development in the new millennium.

The Fourth Panel is aimed at debating the growing cooperation and concrete partnerships between the United Nations system, the corporate world, and civil society organisations including research institutions, in order to meet more effectively the challenges of globalization. It is in sequence of the earlier three panels in which we heard eminent economists, scholars, academicians and experts. Since we did not get a chance to interact with the speakers of the first panel, I feel that it is relevant and important for me to make a few observations on how India perceives and views the currently unfolding process of globalization.

The most remarkable change being ushered in through the process of rapid globalization is the integration of world markets. This, we are told, would offer abundant opportunities to share markets, capital, technology and knowledge in a mutually beneficial manner which could then lead to a more humane and efficient economic order. At the same time, there is a growing realization that this process can lead to, and has indeed led to, aberrations, as manifest in some of the crises experienced in some emerging economies. To meet these emerging changes, it is necessary for cooperation between the developed and developing countries to be durable and to be based on complementarity and commonality. There is, therefore, a need that the socio-economic concerns arising out of the process of globalization and economic reforms to be addressed urgently and effectively, and for this reason each nation must pave its own path based on its real concerns and priorities.

The new millennium will see trade barriers, investment barriers, subsidies, etc., crumbling. The hallmark of industry would be international competitiveness and efficiency. In the cross-border movement of

[1] Secretary, Department of Industrial Policy and Promotion, Ministry of Industry, India; Chairman of Foreign Investment Board and Foreign Investment Implementation Authority, India.

technology and capital inherent to the process of globalization, the developing world must gain in commensurate measure for its resources, which are mainly its natural and human endowment. An area of concern is the process of shift of manufacturing bases stemming out of the concerns of environment and pollution. Equity would, therefore, demand that the process of transfer of capital and technology to the emerging economies must not only arise out of considerations of cheap and abundant labour, but also that such a transfer results in viable and sustainable production and fair access to international markets.

Another issue of relevance is that the overall flow of capital worldwide indicates that the sizeable chunk of capital movement takes place between the developed countries themselves, and a smaller share comes to the developing economies. The World Bank Global Finance Report of 1999 shows a decline in flows to developing countries from international capital markets, from a level of US$ 136 billion in 1997 to US$ 72 billion in 1998, coupled with a decline in overall world trade growth by 4.6 % in 1998. Low income economies were thus double hit. Global arrangements must encourage industrial production in areas where agriculture is the mainstay, so that the share of industry and services gradually increases in the overall GDP of these countries. I am expressing these views in the context of the theories of agglomeration, labour skills, technology, research and development, innovation, etc., propounded by the speakers of the first panel on Monday.

In India, a radical and sustained change in policy took place in 1991 with a concerted move towards decontrol, liberalization and globalization. So far, fortunately, in the last eight years, India's economic performance has been steady despite global turmoil. This has been possible by virtue of strong macroeconomic fundamentals, monetary discipline, deregulation and de-licensing in industry and trade, a liberal policy towards foreign direct investment and portfolio investment, a pragmatic approach to capital convertibility and a firm control on short term external borrowing. Foreign direct investment has been flowing in, though not in the quantum that is commensurate with the size of the Indian economy. There are various reasons which could be usefully analysed. Such an analysis would be relevant as an input to the formulation of innovative strategies by UNIDO for carving out an effective role for itself as a catalyst and promoter.

Coming to the specific UNIDO project currently under implementation in India in the automobile components sector, it would be relevant to mention that the Indian automobile industry is one of the important segments of industrial activity, being the 12th largest industry in the country. It contributes 4.4% to GDP, employs half a million people directly and about 10 million indirectly, and produces 3 million two-wheelers, 400,000 passenger cars and 300,000 commercial vehicles. It has significant forward linkages and, as is inherent in this industry, has a large multiplier effect. The combined turnover of the industry is estimated at US$ 10 billion. There are hardly any major international players who are not already present in India in the automobile sector, and many of them are also seen entering the auto component industry. Yet, however, the auto component industry with its wide base and large number of players, needs improvement in terms of technology, quality, productivity and marketing. It is here that the UNIDO partnership programme is playing a crucial role.

This innovative partnership programme which commenced in November 1998 involves close cooperation with its partners to identify key problem areas in the auto component supply industry with a view to ensuring participation in the global economy by Indian auto component SMEs with a firm linkage to the sub-contracting networks of MNCs. Target beneficiaries include Tier-2 automotive component suppliers

in India, institutional capacity building in Automotive Component Manufacturers Association to support delivery of technical services to its members and non-members, similar support to Automotive Research Association of India for improving capabilities for testing and calibration, and involvement of a multi-national corporation in the automotive sector to provide access to a reliable supply chain of quality components. The first phase of the programme has covered the Pune-Mumbai belt of Western India. Twenty enterprises are currently covered under this programme and some of them who have done well have already found exposure to international opportunities at the recently held Equip Auto Fair at Paris. The project is being implemented with an outlay of US$ 300,000, with the Government of India providing US$ 100,000 from the special purpose contribution to the IDF India towards the project, and UNIDO, FIAT and others sharing equally in the balance amount.

The overall impact assessment of the programme from the participating companies' point of view has been very positive. Substantial improvements have been reported in productivity, i.e. optimization of shop floor layouts and working space, efficient utilization of available resources, reduction in operational waste, improvement in product quality and process productivity, etc. Once this programme is successfully implemented, we are sure and confident that this model could be replicated in other sectors in India, as well as in other countries. We feel that this is an ideal programme since it addresses not only best practices but also creates relationships with vehicle manufacturers and Tier-1 suppliers.

This initiative of UNIDO thus addresses the concerns of globalization, namely need-based technology transfer and transfer of skills, while at the same time providing access to global markets through participation of MNCs for an effective build up of supply chains. It is a novel initiative based on mutuality and complementarity, and we therefore feel that this initiative of UNIDO would address one of the foremost requirements of the developing world in the process of globalization, namely to make them equal partners and to provide a system of mutual benefit and complementarity.

So far so good. But there are clouds of concern looming on the horizon. We are conscious of the fact that the WTO regime, as it unfolds in its totality, would have far-reaching implications for industry as a whole and for the automotive sector in particular. These may be categorised as:

- Increased competition from imports;
- Elimination of localisation policies;
- Conformity with bound tariff rates;
- Uniform treatment of imported and domestic products; and
- The policy of reservation of the production of certain items only for the small scale industries will not provide protection from imports, which could be produced by large firms abroad. To survive, SSI units would need to become part of international supply chain and move towards ancillarization.

The policy responses of the developing countries would, therefore, have to be turned to enhance competitiveness, especially of the SMEs, by providing not only an appropriate policy environment which would, inter alia, promote technology development and investment but also provide greater strengths for market access to international markets. Initiatives would therefore need to be taken not only at the national level but also through the aegis of multilateral organisations, mainly under the UN system such as UNIDO. It is, therefore, not only beneficial but also opportune that the UNIDO Public Private Partnership Programme has been initiated in collaboration with the Government of India, FIAT, the Automotive

Component Manufacturers Association (ACMA), the Automotive Research Association of India (ARAI), the European Institute for Management (INSEAD of France), and the Prince of Wales Business Leaders Forum (PWBLF).

The role of UNDO in evolving this new partnership programme is crucial to bring together the various interests for improving the capabilities of domestic SMEs. This will help them integrate into the international supply chain on the basis of their commercial strength rather than the current policy requirement of domestic content. The initiative of UNIDO has created for it a position of an unbiased intermediary and ensured that concerns about the commercial objectives of the international firms in the partnership do not cloud the issues of development. This could prove to be a particularly important role for the UNIDO in similar initiatives that it may undertake in future. In the Indian context, the MNC may have been persuaded to participate, inter alia, by the policy requirement for increased domestic content. Once the success of this experiment is established, it should be possible to replicate it without policy compulsion. This is all the more useful as such policies would soon be rendered WTO-incompatible.

I used the word "sustainable" twice in the first sentence, and all of you have heard this word many times during the current conference and will hear it again and again in the remaining two days of the conference. It is imperative to appraise the project from the angle of sustainability during the implementation stage, but, more important, perhaps six months or a year after it is completed and has been functioning. Perhaps an independent agency could be assigned this task of appraisal. This would lend more credibility to UNIDO's efforts both in the public eye as well as among the donors. In the present project, from the Government side we are expecting placement of commercial orders with the participating companies by FIAT. To us this would be a clear indication of the success of the project.

Let me thank you all for giving me this opportunity to share my thoughts and to add to the inputs available with UNIDO for chartering their future programmes and projects.

Thank you very much.

Keynote Speech

Mauro Pasquero[1]

Mr President,
Distinguished delegates,
Ladies and Gentlemen,

I am very pleased to be here to present our remarks on behalf of FIAT about this programme that we have carried out with UNIDO in India. First I have to spend a few moments introducing the FIAT group and give you a statement regarding the mission of the FIAT Group. FIAT is a diversified automotive group engaged in manufacturing activities and services, which, drawing on a shared wealth of knowhow and expertise accumulated over a century of activity, creates increasing value for the stockholders. This goal is achieved by attaining and maintaining competitive excellence and customer satisfaction, and by involving the men and women who work for and with the company and enhancing their professional skills.

FIAT operates in different sectors of activity. The most important of these is the automotive sector, and the group produces automobiles under the brands of FIAT Auto, Lancia, Alfa Romeo and Ferrari. It also produces commercial vehicles under the brand of IVECO, which produces light, medium and heavy trucks, and in a joint venture with Renault called Iris Bus, buses as well. In addition, it produces agricultural and construction machinery under the brand New Holland, and since the acquisition of Case in the US under the brand of CNH (Case New Holland). The company also produces metallurgical products under the brand of Teksid, which is very well known and widely spread in the world. Then the group produces components through the subsidiary company Magnetti Marelli, which is particularly involved in this UNIDO programme. Finally in the automotive sector we manufacture production systems under the brand of Comau. Outside the automotive sector FIAT is involved in aviation through Fiat Avio, in rolling stock and railway systems through Fiat Ferroviaria, in publications and communications through our newspaper La Stampa, and in insurance through our insurance company Toro, which operates mainly in Italy.

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[1] Senior Vice President, International Affairs, FIAT S.p.A., Italy. No formal paper was submitted. The text presented here is based on a transcript of the presentation..

The global turnover of the FIAT Group in 1998 was Euro 42.5 billion in the automotive core business and Euro 5.1 billion in other operations, amounting to a total turnover of almost Euro 46 billion after miscellaneous adjustments.

We have a global strategy based on the fact that European markets are mature and will not show a significant growth in the next few years. Practically speaking, the growth of the European market from 1999 to 2003 is expected to be weak. External and internal sources tell us that we can expect a small decrease in the cars sector in western Europe, a stable market in the trucks sector and a declining market in the tractors sector. The same situation is expected to prevail on the other side of the Atlantic Ocean in North America, where we likewise have a mature market for our businesses. The expectation for the markets in both the USA and Canada is also very weak. We expect a decline in the cars market, a stable market for trucks, and a significant decline in the tractors market. These trends are presented in Table1.

Table 1
Projected Growth in European and North American Automotive Markets, 1999-2003
(% per year)

Product	Europe	USA	Canada
Cars	-0.20	-2.10	-0.40
Trucks	0.00	-0.10	-0.10
Tractors	-2.10	-4.00	-4.00

Sources: DRI World Car & Truck Forecast Conference, October 1999, IVECO, Case New Holland

Therefore, if we want to maintain our position and expand our business, we are obliged to expand our operations into the emerging markets and to globalize our enterprise and activity. In this context, we have identified certain priority countries, where globalization is being carried out at a rapid pace and where, therefore, we are implementing all of our core businesses. In other countries we are involved in only selected sectors in order to take advantage of the specific opportunities provided by these sectors.

In the priority countries we have:

- A direct industrial presence;
- A high local content;
- Development integrated with components; and
- Advanced technological processes and updated products suitable for the local environment.

In the other countries we have:

- A direct or indirect industrial presence;
- A commercial presence if justified by local opportunities;
- A local content based on the prevailing industrial strategy;
- Development related to the available business opportunities; and
- Processes and products commensurate with our industrial presence and the local market.

The criteria we have selected to define the priority countries and distinguish them from other countries comprise:

1. Countries where core businesses can operate in an environment with a high development potential:
   - Economic growth potential;
   - Present/potential motorization level;
   - Acceptable political/economic country risk; and
   - Relatively weak competitive environment.
2. Countries which are members of a free-trade zone.
3. Countries which implement a very favourable industrial policy:
   - High custom duties for CBU/CKD;
   - Incentives; and
   - Presence of a suppliers' network.

According to these criteria we have selected seven priority countries for the development of our businesses: Argentina, Brazil, India, China, Poland, Turkey, and Russia. In each of these countries the development potential is really very high, many are members of a free trade zone, and the industrial policy is supported by the local government, as shown in Table 2.

Table 2
Selection of Priority Countries Based on Established Criteria

	Development Potential	Free-trade Zone	Industrial Policy
Argentina	◆	◆	◆
Brazil	◆	◆	◆
India	◆	●	◆
China	◆	●	◆
Poland	◆	◆	◆
Turkey	◆	◆	●
Russia	◆	●	◆

Country/Criteria coherence: ◆ = high; ● = medium/low

Looking at the development potential in Table 3, you will see that our expectation from 1999 to 2003 is very high for China and India, more moderate for Poland and Turkey, and somewhat lower for Russia and Argentina. In all cases, however, we are talking about big countries with very huge populations and a developed car market.

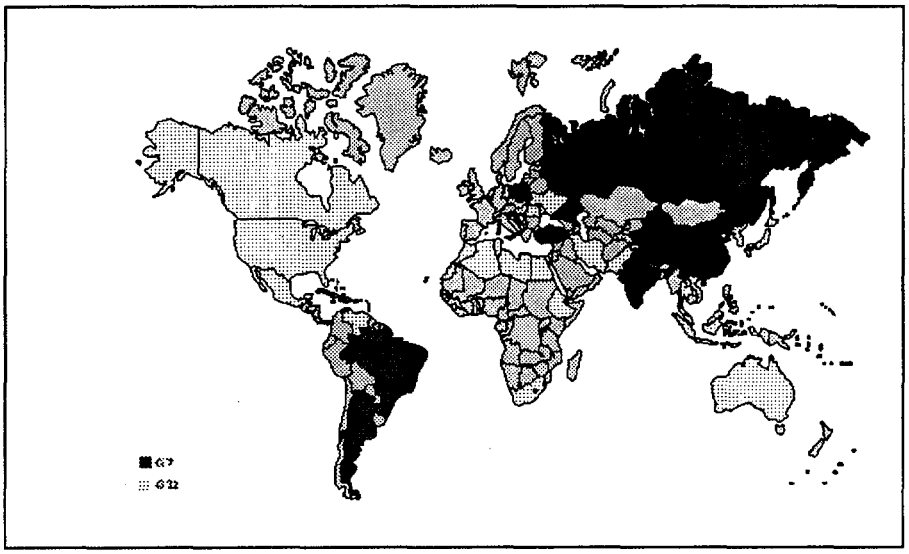
Table 3:
Market Potential for Priority Countries

	Development Potential			Free-Trade Zone	Industrial Policy	
	Average GDP Growth 1999-2003 (%)	Population in Millions 1999-2003	Cars per 1,000 Inhabitants 1999-2003		Custom Duties CBU[1] Suppliers	Suppliers' Network Potential
Argentina	2.3	36.6 - 38.4	165-190	Yes	33%	> 50%
Brazil	2.7	162 - 168	104-147	Yes	35%	> 50%
China	7.3	1,266 - 1,300	3.6-6.2	No	80% only under licence	> 50%
India	6.2	987 - 1,047	4.5-6.1	No	103% only under licence	> 50%
Poland	4.4	38.7 - 38.9	227-274	Yes	15% EU[2] - 35% outside EU	> 50%
Russia	2.4	146 - 145	129-167	No	30%	> 50%
Turkey	3.6	64.4 - 68.1	51-74	Yes	0% EU[2] - 15% outside EU	> 50%

Sources: EIU, DRI
Notes: 1 No customs duties for CKD except for India (40%) and China (25%); 2 No custom duty as from 2002 and up to 42,000 units in 1999.

Looking to the world map in Figure 1, the red area shows the countries in which FIAT is carrying out its globalization strategy. In the countries coloured yellow we have some specific investments here and there. In total, we cover a good part of the world.

Figure 1
FIAT Group Globalization



Coming back to the priority countries, FIAT has a comprehensive presence in Argentina, Brazil, Poland, Turkey and India, as shown in Table 4. In Brazil and Poland our insurance company Toro is also active. In Russia we are at the beginning, and in China we are expanding very rapidly.

Table 4
FIAT Group Presence in Priority Countries

	FIAT Auto	IVECO	Case New Holland	Magneti Marelli	Teksid	Comau	FIAT Avio	FIAT Ferrov.	Toro
Argentina	■	■	■	■	■	■			
Brazil	■	■	■	■	■	■			■
China	■	■	◆	■	■				
India	■	■	■	■	■	■			
Poland	■	■	■	■	■	■			■
Russia	■	■							
Turkey	■	■	■	■	■	■			

Notes: ■ Industrial presence; ◆ New initiative.

Let me turn now to Magneti Marelli, our captive components manufacturer. The company produces dashboard instruments, electronic fuel injection systems, alternators and starters, air conditioning systems, fuel supply systems, headlights and fog lights, rearview mirrors and exhaust systems. We have a substantial worldwide production and our ranking as a manufacturer of these products in Europe is very high. We are the second or third largest producers of all of these products except exhaust systems, where we rank fourth. The regional distribution of our sales is well balanced: 40% in Italy, 34% in the rest of Europe, and 26% in the rest of the world. Our target is one-third each and we are moving towards this target little by little. Furthermore, the FIAT group accounts for less than 40% of Magneti Marelli's sales, with other manufacturers accounting for more than 60%. Thus, Magneti Marelli is a captive supplier only in the sense that it is controlled by FIAT; its customers are other manufacturers throughout the world.

Magneti Marelli also has a wide international presence. Outside western Europe it is present in the USA, Mexico, Argentina, Brazil, Turkey, India, China, Poland and South Africa. We want to develop this presence abroad even further.

Having said that, we have signed the cooperation agreement with UNIDO in order to improve the Indian capability of producing components and integrate the local production with our production, in particular of cars. The main areas of cooperation under this agreement included an assessment of the Indian automotive component sector, the development of a competitive network of potential automotive component suppliers in India through a multi-disciplinary research team, the identification of the problems facing the

component sector as a first step towards developing responses to cope with them, and the formulation and endorsement of a set of international norms and standards related to the automotive component sector. This is intended to serve as a basis for the formulation and implementation of a sector- or industry-wide technical cooperation programme with the government of India to enhance the industrial competitiveness of the automotive component manufacturing sector as a whole.

At the end of the first stage of this programme, I can say that we are very satisfied with the results. The situation is improving very much. I do agree with what has been said by the Secretary of Industry of India, and will leave it to Mr. Brouquil from Magneti Marelli to give some more specific remarks on the activities we have carried out and the results we have achieved.

Thank you very much.

Paper 1
Assessment of the UNIDO Partnership Programme
The Prince of Wales Business Leaders Forum

Robert Davies[1]

Ladies and Gentlemen,

We have been very pleased to be part of this partnership initiative because we felt it might demonstrate something which, if brought to scale, could make a real impact. We felt that with markets opening up in the global economy and globalization amongst companies advancing at the pace which we heard from FIAT, it seemed absolutely critical to demonstrate that business could operate in an economically sustainable way to satisfy its own shareholders while at the same time delivering to the countries concerned, as was very vividly described by the State Secretary at the outset. We also felt that it is critical to demonstrate to a very sceptical public, whether it's the young people who have got into their heads a deep hostility to business and the market as we are seeing on our TV screens literally as we speak, or to the many other consumers around the world who find themselves sceptical of the role of business, that business, by going about its core operations, can also deliver social and human development, and can operate in a responsible way that is sensitive to the needs of development.

That was really the founding principle of our organization, and I think that what it is doing in practice is to try to build awareness that this social dimension of business must go hand in hand with the economic dimension. We work on the ground in about 30 countries around the world, including India where we have been active for about nine years, but also in Russia and Latin America and South East Asia and parts of Africa, to build the capacity for partnerships. This is really why working with UNIDO is so critically important. We don't want to wake up one day and find small examples of excellence in Pune or Bangalore or Delhi or wherever, in an ocean of low standards and mediocrity. It is critical that this is taken to scale, and it is only through working with some of the inter-governmental organizations that this can happen.

We have been working with the inter-governmental organizations for some while. The other thing that they bring, and there is a common agenda here, is the understanding that it is critical to have a drive for

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[1] Chief Executive, Prince of Wales Business Leaders Forum, United Kingdom. No formal paper was submitted. The text presented here is based on a transcript of the presentation..

standards - labour standards, ethics, action on corruption, a level playing field, quality, good environmental practices and sound human rights practices - as a backcloth to public-private partnership initiatives. Without a basis of such standards, public-private partnerships will not deliver development of any degree, but with those basic standards along the lines promoted by Kofi Annan through the global compact he announced at Davos earlier this year, public-private partnerships can begin to make a real difference. So there is a common agenda.

The other aspect of the common agenda is creating awareness that value can be added by public-private partnerships. I think that one of the most exciting things I've heard in the last few hours that I've been in Vienna was a private comment made to me by the State Secretary before he appeared on the panel this morning. I think I will mention this private comment because he said to me that he was very sceptical at the start about what this initiative with UNIDO was achieving. He sent some people to look at it on the ground and to talk to the companies concerned and hear for himself that his staff were seeing a real difference was being made. That is what changing awareness is about, and I think that we could all well do with visiting examples of good practice.

The first phase of the programme has in our view been an undoubted success. It's early to judge, of course, but significant technical and economic improvements have been demonstrated in the documentation circulated for this Panel.[2] I think the exciting thing about this documentation is that there are individual profiles of the companies concerned, and one can how the programme has improved everything, from a reduction in absenteeism to a rise in productivity. The before and the after is very visible, and this is not some public relations gloss. The individual companies are measuring improvement that has resulted from this process, and I therefore think that the strategic significance of this first partnership is absolutely immense. The key thing is, of course, how far this can be scaled up not just in India but within the UNIDO network more widely.

In commenting on this programme we can draw from experience of a number of partnerships that we are engaged in. These include the World Bank and the Business Partnerships for Development (BPD) programme, and we are also working with UNAIDS in a major partnership to tackle that problem. If anyone here is from southern Africa or Southeast Asia or South Asia, you'll be acutely aware that this has become a major issue, not just for the public sector but also for business in those countries. Yesterday we were talking about South Africa where 25%, one in four, of the workforce is at risk of AIDS through HIV. This poses a significant challenge for business that can only be tackled through public-private-civil society partnerships. We are also involved with the World Health Organization in partnerships for health promotion, leveraging some excellent workplace practices to improve the health of the workforce which can then be spread much, much more widely. In addition, we are participating in a sector initiative around the world, including India, with the hotel and tourism sector called the International Hotels Environment Initiative, which is focussing on promoting environmental standards. If your hotel here in Vienna asks you to hang your towel on the rail rather than throwing it on the floor, or to re-use the soap, or whatever, that's all commonplace now. Eight years ago, however, that was not good practice, but that programme is now accepted around the world.

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[2] UNIDO, Impact of the Partnership Programme - Phase I, 1999. A summary of this document is appended to this volume as Annex 4.

I think that all of these partnerships, including the UNIDO partnership, illustrate a number of success factors which must be addressed if they are to be taken to scale. I would just draw out five observations that we saw from working on the ground with the programme in India, as well as from the other programmes:

The first thing is that it is critical that awareness must be spread, that public-private partnerships can deliver something new and something additional, and that this goes beyond philanthropy to mainstream business practices - that there is a formidable potential for improved human resource development. If you look at how companies are increasing their investment in training, there is immense spin-off for development through increased human resource development. Then we hope as a second stage this human resource development will go beyond the forward and backward linkages of the supply chains, but will also support capacity building in the education and training sector as a whole to build skills for tomorrow. That has an enormous impact on development at a country level as well as at a strict corporate enterprise level. I would just say that raising these core business practices to global competitive standards and sharing that know-how up and down the supply chains and more widely in the community isn't a side-element of development - it's absolutely the heart of development. This is where the private sector can be a motor for development if it is linked to programmes that ensure that there is maximum spin-off of these developmental factors.

Secondly, it is not unsurprising that partnership is a very unfamiliar approach in our experience everywhere in the world. We are all defensive, as countries, as people, and as professionals. It is easier to work on our own or with our own organizations than to work with others. Organizational culture is very often itself an impediment, and therefore it is critical that partnership skills are built across the system, and certainly we are working with the UN system on this.

Thirdly, it is very important that we develop brokers on the ground - build institutions, individuals, colleges, civil society organizations, associations - who can help broker these types of partnerships and build the skills. If I may say so, I would also hope that UNIDO looks at building partnership as a core competence of all UNIDO staff right across the board.

Fourthly it is important that there are incentives built to make partnerships work at all levels, including the government, the fiscal level, and with the media.

Fifthly, and lastly, a new mind-set is required to tackle economic development and the poverty agenda in the 21st century. This requires us to acquire values that enable us to work across sectors.

I would say in conclusion that in a world in which traditional authority and professional status are being challenged at all levels, it is critical that business, UN agencies, civil society organizations and others develop the leadership skills and the values that demonstrate partnership, and that show that development objectives and the alleviation of poverty can be addressed through responsible enterprise development.

Thank you.

Paper 2
Assessment of the UNIDO Partnership Programme
Automotive Component Manufacturers Association of India

Dinesh Munot[1]

It is my privilege and honour to address this august audience today and I am grateful to UNIDO for inviting me today to share ACMA's experience with the UNIDO Partnership Programme.

Let me over the next few minutes, briefly present the ACMA perspective on the Indian automotive component industry, its needs and challenges, and how the UNIDO Partnership Programme has assisted this particular industry in meeting some of these challenges.

Let me take a few minutes to speak about ACMA and its activities.

ACMA is the chief spokesman of the Indian auto-component industry. It is a not-for-profit organisation promoted, funded and managed by the industry. ACMA represents more than 385 member companies which together account for more than 85% of the total auto component production and sales to the vehicle manufacturers in the country, and also more than US $ 350 million worth of exports. Our members provide direct employment for more than 250,000 persons.

ACMA's active involvement in trade promotion, technology upgrading, quality development, exports and data warehousing makes it a vital catalyst for the industry's development. ACMA publishes, on an annual basis, all the data and statistics on the Indian automotive industry. This data is considered as the only authentic database on the Indian automotive industry today. ACMA is also represented on a number of Government panels and committees through which it helps in the formulation of automotive policies in the country.

Over the years, ACMA has effectively networked with similar counterpart organizations in more than 10 countries for a regular exchange of information and cooperation in trade and technology.

Turning now to the vital statistics of the auto-component industry in India.

Turnover	US$ 3 billion
Investment	US$ 2 billion
Exports	US$ 350 million

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[1] Immediate Past President, Automotive Component Manufacturers Association of India, New Delhi, India.

The exports are mainly to the USA and European markets which account for more than 50% of India's exports of automotive components.

Now I would like to touch briefly upon the current scenario in the automotive component industry, which necessitated a programme of this nature by UNIDO.

Historically, the Indian component industry has operated in a rather protected environment. This protected environment, coupled with the low purchasing power of the Indian consumer, had over the years resulted in the stagnation of the Indian automotive industry and its technology levels. The only quantum jump in technology we made was in the 1980s, when Japanese vehicle manufacturers were allowed to set up manufacturing joint ventures in India. Throughout this development process, the component industry received support in terms of localization laws, which enabled the automotive industry to develop a very wide capability, enabling India to achieve up to 90% localization levels for the Japanese vehicles. However, after that there was no further technology infusion till the liberalization in the 1990s.

The current phase of liberalization and development in the auto component industry has brought in a new and unprecedented set of challenges for the automotive component industry. The levels of technology, quality and productivity now prevalent in India, although fast improving, are still significantly below those achieved in the developed countries. There is an urgent need for the Indian industry to leapfrog at least 10 years over a short period of time in order to evolve into a globally competitive and sustainable industry of world class standards. The advent of the WTO has hastened up the process of trade liberalization, thus further telescoping the time available for making this transformation.

Furthermore, today's global component supply chain is based on a tiered structure, which does not yet exist in India. It is a major challenge for our industry to restructure itself into a tiered system in a very short time. If these changes do not happen in our industry, there will be widespread pain and damage to industry, so carefully nurtured over the past 5 decades - and employment levels in many small and medium enterprises would suffer.

It is against this backdrop that this UNIDO Programme was conceived.

The idea of a Partnership initiative was brought by UNIDO to ACMA about one year ago. Together, in partnership with the Ministry of Industry, under your leadership Mr. Kumar, and through joint consultations between ACMA and our other distinguished Partners, this Programme was concretized in the month of January 1999.

The objective of the Programme, for ACMA is to strengthen the manufacturing processes and internal systems of firms and to improve their quality and productivity through shop floor intervention by international experts, so that they could develop the necessary capabilities to be able to supply to the global vehicle manufacturers or large Tier-1 companies who ahve already set up their bases in India. Our vision is to see as many Indian component manufacturers as possible integrating into the global supply chain.

We in ACMA considered this as the most direct and practical approach. Our belief was strengthened by the success of a similar project undertaken in the UK, where the Society of Motor Manfacturers and

Traders (SMMT) and the Department of Trade and Industry (DTI) have been operating an "Industry Forum" on the same lines for many years.

Until now, there has been more than nine months of intense activity during which four internationally acclaimed technical experts put in 10 work days for each participating company. The results for the different areas of evaluation that have been measured by UNIDO and the feedback received from the companies indicates that most of the firms participating in the Programme have been able to make very visible and significant improvements in their shop-floor productivity as well as the quality of their products. Some companies were able to achieve dramatic improvements of up to a 60% increase in productivity, and up to a 40% saving in space, as a result of reorganization and streamlining of the manufacturing process. In addition, many companies have benefited in the area of financial management through use of advanced financial tools developed by UNIDO.

Some of the small scale industries that were selected to participate in this demonstration phase and which took full advantage of this opportunity have demonstrated that they can completely transform the work place through changes in such areas such as housekeeping, material handling, improved lay-out and reduced setting time. However, the most important achievement which was noticed was in the motivation of the entire workforce. Some of the small companies have already become the star attraction where many other small companies around them and their customers visiting these enterprises learn at first hand about their experiences, and are now trying to emulate best practices in their own way.

Surprisingly, the turnover of employees from such small companies to big companies has almost come to a halt and every employee is proud of their involvement and achievements.

The very successful implementation of the demonstration phase of the project in the Western Region of India has also made it quite clear that this approach is sustainable and can be effectively replicated anywhere in the world.

For future programmes we not only expect that the present group of companies would continue to receive follow-up support, but also that new groups of companies, small as well as larger ones, will be selected for a nationwide project. ACMA is very keen to involve some of the larger units in India (small by international standards), who can emerge as true global suppliers given the support of an innovative project like the Partnership Programme.

In conclusion, I would once again like to thank UNIDO for giving ACMA this opportunity, and all of you for your patient attention.

Thank you.

Paper 3
Assessment of the UNIDO Partnership Programme
Automotive Research Association of India

M. S. Ogale[1]

Excellencies,
Distinguished Guests,
Distinguished Participants,
Ladies and Gentlemen,

It is a matter of great privilege for me to be with you here today in this important gathering. I have the honour to convey this sentiment on behalf of the Director of ARAI, Mr. Balraj Bhanot, who unfortunately is unable to be with us today owing to prior commitments. He has nevertheless requested me to thank UNIDO and particularly Mr. Wilfried Luetkenhorst for inviting us today to share the ARAI experience with the UNIDO Partnership Programme with our distinguished guests.

Allow me to briefly provide you with an overview of the activities of ARAI - the Automotive Research Association of India.

ARAI is a cooperative industrial research body formed in 1966 by automotive manufacturers, component manufacturers and the Ministry of Industry of the Government of India. Located in Pune, in the western part of India, it provides a range of services to vehicle and automotive component manufacturers. These services include product design and development; automotive equipment and ancillary evaluation; mandatory and developmental testing for emissions and components; standardization and dissemination of technical information, and export homologation trials.

Almost all the vehicle manufacturers and major Tier-1 companies are members of the Institute. ARAI has helped a host of Multinational Corporations such as Peugeot, FIAT, General Motors, Ford, Hyundai, Volvo, Mitsubishi in meeting their indigenization plans with respect to components.

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[1] Assistant Director, Automotive Research Association of India, Pune, India.

ARAI also provides assistance to small and medium enterprises and multinational corporations in the field of export homologation testing and standards harmonization. For export homologation, ARAI has a series of Memoranda of Understanding with internationally acclaimed certification bodies.

In the automotive component sector, our Institute has been particularly active in providing qualification tests to manufacturers of:

- Body panels;
- Plastic components;
- Brake system elements;
- Suspension aggregates;
- Engine components;
- Material property evaluations; and
- Seats and restraint system components.

ARAI intends to continue its work as a nodal agency for research and development, product improvement, testing and homologation of automotive component systems and sub-systems in India. At the same time it would like to enter new fields of research in order to better cater to the needs of the domestic and foreign companies operating in this industry.

UNIDO approached us approximately a year ago to assess our interest in taking an active role in the UNIDO Partnership Programme. Our concurrence to be part of the Programme was conveyed immediately.

During our first meeting with the UNIDO team, we indicated our requirements in terms of modernization and expansion of our facilities and equipment as well as training for our technical staff on advanced engineering, testing, calibration and certification services. This with the aim to improve our service delivery time, meet our customers' expectation and in the near future be ready to assist enterprises to obtain mandatory quality certification on a range of automotive components. In this regard I would like to mention that India is soon going to introduce a mandatory quality certification scheme for safety related auto components. This will be overseen by ARAI. Automotive component manufacturers would have to approach ARAI at the product development stage for quality assurance and type approval of their components. In this respect ARAI would also provide the necessary technical advice.

However through joint consultations between the Programme Partners and under the leadership of the Ministry of Industry, the focus of the first phase of this Programme became that of enhancing the performance of Indian SMEs to transform them into globally competitive suppliers. It is against this background that ARAI's technical and in-kind contribution, unique and complementary to the successful implementation of the programme, was formulated.

In brief the support provided by ARAI to the Programme and the 20 selected enterprises can be summarized as below:

- The association of junior as well as senior executives of ARAI with UNIDO experts during their shop-floor interventions with a view to provide technical inputs in the area of testing, calibration, homologation, validation and design;
- The provision of information on relevant regulations;

- The conduct of quality property tests on samples manufactured by the participating companies and prompt delivery of results; and
- Logistic support and access to technical/administrative facilities.

From ARAI's point of view, our association with the Programme has been beneficial from two perspectives. First of all we had the opportunity to make the services of ARAI known directly to the managerial and technical staff of the participating companies. On two occasions, tours to the ARAI facilities were organized.

Secondly, our staff had the opportunity to interact directly with the enterprise managers and workers during the shop-floor interventions. This has been an extremely rewarding experience as it was a unique occasion to be exposed to the realities of day-to-day production and the quality challenges met by the enterprises.

In addition to the above, together with UNIDO we have initiated steps to explore the opportunities of forging partnerships with specialized European control and research laboratories with a view to address the product-specific institutional capacity building requirements of ARAI. We hope that in the next phase of the Programme, ARAI can benefit from this type of endeavours as well as focused institutional capacity building interventions.

In conclusion, I am thankful to everybody at UNIDO and the distinguished Partners for their interactions with ARAI during this Programme.

Thank you.

Paper 4
Assessment of the UNIDO Partnership Programme Magneti Marelli

Jean-Pierre Brouquil[1]

Mr. Chairman,
Ladies and Gentlemen,

First of all I would like to briefly recall the figures of Magneti Marelli. It is one of the leaders in terms of automotive components systems with a sales figure of US$4.2 billion and 29,500 staff throughout 52 production sites in the world. As a top-ranking supplier MM is now in a system positioning approach in order to lengthen the value chain which requires externalizing basic technologies and close interdependence with the intermeshed industrial fabric. One could believe that global sourcing is a solution, but this is not yet the case. MM must rely on local resources when creating new sites. That problem is ever more acute especially in the context of an emerging economy, which has a weaker industrial fabric and often highly protective customs barriers. It is in this particular context that MM has applied different methods during its multiple establishment exercises, which apply specifically to the context of such countries as Poland, Turkey, South America, China and more recently India.

The solutions adopted include the re-introduction of basic technologies that are not available locally, the training of a local supplier base, and the import of components, which is always very costly. The partnership with UNIDO is a new approach in the context of establishing a business in a newly emerging economy to develop the chain of value along the same lines as for other sites. FIAT, and thus MM as the prime equipment supplier, need to develop their local establishment together with the home-grown industrial fabric as just explained by Mr. Pasquero. Magnetti Marelli is one of the links in the chain of suppliers and thus became part of this partnership in order to explore promising new methods.

One could wonder, of course, about the essential aspect in such a form of partnership. To what extent has the Programme actually responded to the expectations of MM, and what do we expect in the future? After

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[1] Director, International Business Development, Magneti Marelli. No formal paper was submitted. This statement was presented in French. The English text presented here is based on a transcript of the official simultaneous interpretations.

less than a year of participation in this partnership, we can already assess the benefits of such a programme. These may be summarized as follows:

- Enhanced knowledge of Indian institutions;
- Better understanding of existing manufacturing structures;
- Identification of equipment suppliers, both competing and complementary;
- Identification of the requirements of the market in terms of technologies and of products; and
- Better understanding of local cost structures.

Our expectations from the Partnership Programme were the sustainability of a culture of excellence in the automotive component industry of India, which will provide our business with a pool of upcoming qualified suppliers that we absolutely require to produce modern vehicles that are top-notch in terms of quality and that are competitive. In addition, we also expected a streamlining of administrative measures at the national level, with the local authorities being made aware of the complex administrative and fiscal aspects that affect our activities.

As a representative of a transnational corporation in this partnership I must take a step back and analyse the particular interest of such an exercise well beyond the mere context of the corporation that I represent. Of course, the whole system of such a partnership provides for more rapid access and a mastery of the local industrial structure and how it is organized. It also opens the door for local industry players, and makes it much easier for us foreigners to gain access, which is extremely important. Furthermore, we get the support of Programme partners to understand the complex nature of local industry in terms of the complementary nature of skills and thus a multi-angle approach to problem areas. In addition, the Programme expands the impact of all of our activities by bringing in other transnational corporations. It can expand local business potential for businesses in the local area and therefore creates a maximum volume of investment required for a new technologies. It gives an aura of neutrality in whatever we do. Finally, we can share the costs and don't have to pay for the whole cost of the exercise.

We can ask which approach is more effective in upgrading SMEs: The private sector working on its own to develop a captive supplier base, or the approach represented by the Partnership Programme. Naturally, the net result speaks for the programme via partnership. Let us first look at the strong points of the Partnership Programme. These include:

- The whole assessment process is shortened, because we get a better understanding of the industrial fabric and we master the environment; and
- We are able to identify available resources and skills, and how the networks intermesh; then we can capture the interest of participating businesses on a scale beyond the grasp of one single transnational corporation in terms of markets and technology.

By contrast, the captive approach involving company-specific action has many weaknesses:

- It requires the transnational corporation to identify a roster of motivated local businesses, despite the limited capacity of the transnational corporation for such a basic core activity;
- It requires time to bring the supplier firms up to the required standard;
- It requires the attachment of multi-disciplinary experts to provide the necessary training; and
- It necessitates the obtaining of support services for seeking joint-venture partners and new markets.

Finally, I would like to mention some points that contribute to the sustainability of the programme. I have not put them in any particular hierarchy, but they are based on the experience that we have acquired from the Programme:

- First of all there is the social aspect, in terms of public health and safety as well as ethics, which enhances staff motivation - evidence of this can be found in the fact that a 25-30% reduction was achieved in absenteeism;
- The compliance with consistent international industrial standards consistency with clients, be they local or exported;
- Effective compliance with existing regulations, including environmental regulations and regulations for the protection of industrial property, which leads to total quality enhancement, not just an improvement in product quality;
- Networking between local institutions and international bodies to prevent local institutions acting in an isolated fashion; and
- A reconsideration of fiscal and tax systems to establish consistency between a competitive structure and the structure of businesses - in this connection I would note that even small businesses are sometimes forced to break up as an effect of taxation.

Finally, I would like to agree with the point made by Hubert Schmitz yesterday that we should not confine the partnership to production but rather expand it throughout the chain. This is the major mission of this Partnership Programme for the next phases to come.

Thank you.

Paper 5
Assessment of the UNIDO Partnership Programme European Institute of Management (INSEAD)

Shantanu Bhattacharya[1]

Mr. Chairman,
Good morning,

It is a pleasure to be here and participate in this forum on sustainable industrial development. My name is Shantanu Bhattacharya, and I am a faculty member at INSEAD. Let me begin by sharing with you a few thoughts about INSEAD. INSEAD was created initially as a European institute for management education on the model of the US business schools. In September 1959 the first 52 MBA participants arrived from 14 countries, immediately establishing the multicultural diversity now intrinsic in all our programmes. Since then, the institute has grown to become one of the world's most international business schools. Every year, faculty members teach more than 600 MBAs, 5,000 executives and 40 PhDs from over 70 countries. A global perspective and multicultural diversity permeate every aspect of our research and programmes.

Our mission is to educate the world's business leaders by achieving intellectual influence and translating it into relevant learning for all business communities in the world. In our usage of pedagogy, we have been very successful by a constant renewal of teaching activities and constant testing of new teaching methods. As a research institution, we also build intellectual capital by emphasizing investment in faculty and research to expand the frontiers of knowledge and understanding. INSEAD will take its model of management education one step further by becoming the first international business school to set up a permanent, full-fledged campus in Asia. INSEAD chose to expand into Asia because it has already established itself in the region as a leader in research and teaching through the activities of its Euro-Asia Centre, founded in 1980.

When the UNIDO group approached us last year to see if we were interested in participating in a programme of this nature, we were extremely excited at this opportunity, and agreed to participate enthusiastically. The reasons behind our enthusiasm were threefold. First, it enabled us to demonstrate our desire to participate in active socially responsible research. A number of our traditional research projects deal with issues that concern the private sector and the objectives of the firms therein. This project

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[1] Assistant Professor of Operations Management, European Institute of Management (INSEAD), Fontainebleu, France.

gave us the opportunity to work with UNIDO and the other participating organizations on a project that was to be implemented across an industry sector, and hence would impact a larger set of firms. Second, as a teaching institution, developing new pedagogical material is always of great interest to our students, and this project presented us with a new environment to base our teaching material on. Third, we are a very active research institution, and the project promised to be an excellent background to implement research results on supply chain management, and also pose other questions relating to supply chains in developing countries.

In all these three areas, we have been extremely happy with our participation in this programme. In the course of this programme, we had the chance of helping develop some educational material for the participating firms, and also visit them along with the industry experts. Based on our observations in these firms and our collected data, we are currently in the process of writing three case reports to summarize the existing operations, identify areas for improvement at the company level, sector level, and then industry level, and identifying best practices for suppliers in developing countries who intend to work with multinational firms. Some of our observations in the study so far have shown that multinational firms can gain a lot by working with local suppliers and investing in their technical development, when local firms do not have adequate resources to invest in their upgrading. Part of the existing literature and also our own research work demonstrates the benefits to multinational corporations by investing in local suppliers for long term development.

Let me now say a few words to describe the changes that this Partnership Programme has achieved with respect to the participating firms. The changes that have been implemented at the shop-floor level and at the strategic level can be divided into three kinds. Firstly, there are short term improvement actions, whose effects can be observed immediately; secondly, there are medium term actions, on which planning can be started immediately, but some more detailed cost-benefit analysis has to be done before the advantage of these initiatives can be observed. Finally, long term actions have to be analysed in much more detail, and for these actions a substantial investment may be required. Many of the changes that have been observed under the aegis of this Programme so far have been short term in nature owing to the time constraints for carrying out the improvements, but significantly, many have also been more medium term in nature.

One of the challenges for this Programme is to highlight the requirements of continuous improvement for successful operations in the long run. One cannot understate the impact of long term changes, as these changes are what causes enduring advantages in a hyper competitive environment. It is indeed difficult to recommend a one-size-fits-all approach to all firms in this industry to manage a change process like this. As we observed in the participating firms, different firms have chosen to prioritize their action plans differently, depending on their size, the particular part of the industry that they operate in, and their vision of the environment in the future. We feel that this is a good model to recommend not only to other firms in this sector, but also in other industries.

To conclude, INSEAD would like to thank you for the chance to participate in this programme. We appreciate the efforts made by UNIDO and the other participating organizations in this project, and we also sincerely hope that the project enables us to develop a good blueprint for implementation in other similar projects in the future.

Thank you.

Concluding Session

Integration, Agglomeration and Interaction in World Industry
Drawing Some Lessons

Message
from H. E. Dr. Atef Ebeid
Prime Minister of the Arab Republic of Egypt

Distinguished guests,
Ladies and Gentlemen,

It gives me a great pleasure to address your Conference held at the right time and choosing the right subject. Globalization is becoming a fact, and hence reminding us to join forces for a better world. A world that is more competitive, and more efficient.

The world of tomorrow should allow for higher rates of growth, sustainable development and better distribution of income. This is not going to happen unless we work harder and cooperate with all the countries around the world.

We in the developing world realize that life in this world is going to require different values and different behaviour. First, we have to work harder and learn faster. We have to put more resources in human resource development and in the search for knowledge. Second, we have to trust the intentions of the developed world. Developed countries are eager to grow and prosper. This is a good thing for them and it could also be good for us. Third, we have to strengthen our relations with international organizations. Specifically I am speaking about our relations with UNIDO. We care very much about the development of the industrial sector. This development is quite related to modernization, and modernization should be know-how driven.

Our relations with UNIDO will contribute to the modernization of this society. UNIDO is there to stay, but we want it stronger, to be so we have to support its initiatives and enlarge its resources. Then at the end we will benefit from its diversified services.

I do thank you and I wish you a very successful conference and look forward to your recommendations.

Concluding Statement: Integration, Agglomeration and Interaction in World Industry Drawing Some Lessons

Carlos Magariños[1]

Mr President,

I would like to start my comments in this Panel 5 by expressing my gratitude to the Prime Minister of Egypt for the message he sent us. When I had the opportunity to visit his country a few weeks ago, we discussed the General Conference and this Forum and he was very interested in participating and knowing about our deliberations and debates. He wanted to be present during our conversations, and that is why I would like to express my gratitude to him and his government, and his delegation here, for making this effort to share with us this exercise of reflection.

I would like to express my gratitude to all the panellists and moderators who helped us to reflect on industry and the process of industrialization during the past two days. As I said at the beginning, I think that the exercise we developed was rather ambitious and rather risky, but worthwhile on the eve of the new millennium. We all acknowledge there have been many changes in the way the productive systems have adapted themselves to the possibilities and challenges of the process of international economic integration, especially in the past 25 years. I think it was therefore necessary to reintroduce substantive matters about industry and industrial development in our discussions, as was discussed many times by the policy-making organs of UNIDO.

I will try to be very brief today. I know everybody is tired after four substantive panels discussing industry, so I will try not to repeat what has already been said but to draw some thoughts from each of our panels during the past two days.

The first panel, Panel 1, which we listened to on Monday afternoon, was probably the least practical in terms of the analysis of the participation of the private sector and the new approaches of industry and industrial development. It was nevertheless very useful to assess the question that I think is on the mind

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[1] Director-General, UNIDO.

of many people - academicians, businesspeople, and other actors in our societies - which is the fact that the role or relevance of industry appears to be fading away in some countries from the traditional role as the engine or locomotive of growth.

By using two different approaches, the New Economic Geography and the New Growth Theory, and also by drawing lessons from classical theory, I think that Panel 1 was able to clarify the role and potential of industry in the framework of the new international economic system. I think that it was made clear that there are new forces such as spatial agglomeration driving the way in which industry is being developed between and within countries, and it was also made clear that the process of agglomeration poses a problem that one may be able to solve if one looks more closely for solutions like the mobilization of information.

You may recall that in my opening speech I talked about the need to mobilize information, knowledge, technology and skills in order to reconnect the population of the world with the process of globalization. Well, one of the main thoughts I would like to draw from Panel 1 is precisely this one. We are confronting a process of agglomeration, the process of industrial development all around the world is getting new partners from the developing countries. The participation of the developing countries in the total manufacturing value added is increasing, but at the same time this process is proceeding in waves rather than in a smooth flow all around the world.

There are some countries entering the process of industrial production. Those countries are generating around them possibilities for their neighbouring countries and their regions. This situation has very much to do with the need to mobilize information to adjust the possibility of the countries to be closer than before to their potential supplier networks. If you want to enlarge the possibility of suppliers in South America, in Asia or in Africa to take part in the supplier networks in Europe or the USA, you cannot change geography but you can change the way in which they are connected through the flow of information in the process of production. I think this was an important conclusion drawn by Panel 1.

I also think that Panel 1 was very clear in establishing the fact that we cannot think any more in terms of industrial policies within national boundaries as we did before. To be effective nowadays, we have to be conscious, willing and brave enough in political terms to acknowledge that in this inter-connected world we should develop new mechanisms to work for the promotion of industry. The mobilization of information, skills, technology and knowledge requires more modern tools than the ones that we developed before. I don't think that we will be able to proceed by utilizing the traditional interventionist systems as we used before. I think that we need to develop new tools, and I did suggest during my opening speech the possibility of reopening the discussion by thinking of the development of a foresight mechanism. I also did mention also that we are going to launch such a mechanism during the next week in a meeting we are having in Trieste, taking the Latin American region as a test case.

I think Panel 1 also provided an empirical answer to the question about what foreign direct investment (FDI) really means for the transfer of technology, and this answer was both encouraging and policy-relevant. There is a spill-over of technology to domestic firms through FDI, and domestic skill-formation and upgrading appear to be a sure way of making the best of FDI as a carrier of new technology. Formation of skills in the industrial labour force works indirectly to increase productivity, and I noted that this is precisely the way in which we can contribute to improve the living conditions of the people.

At the more general level, Panel 1 showed that on an international scale technological change and a rising demand for skilled labour go hand in hand. This complementarity between technological change and higher skill requirements is an empirical fact. It stems from the overwhelming dominance of the developed countries, and it is the way their production of new technology takes place that lowers the demand for unskilled labour in industrial production throughout the world. The policy consequences of this development are striking both for the developing and the developed countries. First, given that developed countries are the main source of new technology, which happens to be skill-based, there is an added need for developing countries to upgrade skills to improve conditions for technology absorption. Second, the problem faced by the unskilled portion of the labour force in the developed countries must be termed as mainly home-made. It occurs because of the nature of technological change, and cannot be blamed on import competition from developing countries. This is a good argument that we have to take into account to draw conclusions that could affect our policy proposals.

In summary, Panel 1 hinted at least at some major results of evidence-based economic analysis of industrial development, and I think we can safely say that industry is by nature the best reservoir of increasing returns to scale. It is much needed, and therefore wanted, for growth. However, it needs some special support measures to be attracted and promoted. Among these measures must be some that help countries to overcome the forces of adverse comparative advantage and of industrial agglomeration in core countries. This could include the promotion and establishment of "soft infrastructure", an infrastructure that can help countries to cope with the information flows necessary to get involved in the development of international suppliers networks and with some of the measures that support the build-up of agglomerative forces in the developing countries themselves. Other such measures have to address the key factors underlying industrial growth - technology and its transfer, foreign capital flows and the build-up of a domestic skill base - and in doing so to heed the interaction between these factors.

We may also conclude that because agglomeration derives in part from the immobility of information, anything that propagates information works not only against agglomeration but also for the spread of industry. Logically, therefore, UNIDO must work for the dissemination of information or the establishment of a new type of infrastructure that we could call "soft infrastructure".

With the ground laid by this theoretical analysis we were able to move on to Panel 2. This was focussed on how globalization affects the process of upgrading and innovation that developing and transition economies need to master in order to achieve sustainable growth. It showed that the globalization of production systems brings both opportunities and dangers - opportunities in the form of expanded markets and hence potential access to information, capital and knowledge, and a broadening of the scope for networking. Dangers in the form of a variety of risks and costs arising from market volatility, and from a possible marginalization due to the agglomerative nature of industry discussed in Panel 1.

The panel argued that the important issue for developing countries and transition economies was whether to take a low growth path or a high sustainable growth path involving an upgrading of their activities. Clearly, the latter was the one that should be preferred by all of us.

I have the impression that Panel 2 succeeded in underlining that entrepreneurship development is the key to technological and skill upgrading in countries at all stages of development, but in particular for those at the earliest stages. As entrepreneurial skills and capabilities develop, proactive FDI policies can be

expected to gain in effectiveness with a view to establishing export platforms and supply-chain integration, especially in the case of mid-size, mid-income countries. In this context good governance may not be sufficient to attract investment, but lack of good governance, including transparency, the rule of law and adequate framework conditions will certainly lead to failure in attracting FDI.

We could say from a policy perspective that the conceptual framework considered by Panel 2 raised many interesting questions complementing the conclusions of Panel 1, in the sense that the framework links the reach of developing country industrialization to the size of the economy. It suggested that only large economies have a chance for global reach; mid-size, mid-income economies can establish regional production platforms and integrate local suppliers into global production systems; and that poor and small economies should aim at an industrial base catering to domestic needs. Countries of all sizes would have to develop policies to endogenize certain key exogenous drivers appropriate to their objectives and framework conditions.

I would like to stress that the importance of the analysis done by Panel 2, and link it to my initial remarks on Monday morning. I do believe that the key issue is to see how, through the provision of global public goods, international organizations and national institutions could help to build up a stronger private sector able to develop new entrepreneurs and new enterprises that will help developing economies to cope with the challenges posed by globalization.

The deliberations of Panel 2 suggested a number of points relevant for UNIDO's research and technical cooperation agenda, and for adapting its mandate to the challenges currently faced by developing countries and economies in transition. These include the advantages to be gained from a clustering of SMEs at the local level; the opportunities, risks and trade-offs involved in linking with global production and global producer-driven and buyer-driven value chains; and policy options and degrees of policy freedom entailed in pursuing the high road as opposed to a low road of integration with global networks by shifting to higher value-added products and new functions in the global value-chain. Other policy suggestions include strategies to couple integration into global markets with local and regional development, and the identification of best practices, strategies and approaches to reap synergies between private-sector driven responses to the pressure of global competition, and government-led catalytic and enabling actions.

If you allow me, I think at this stage it would be useful to alter a little bit the agenda that we were following in the past two days and move to Panel 4 because it is clear that this last panel we listened this morning is very much linked with the conclusions drawn by Panel 2. In fact, what UNIDO was trying to do was to develop a practical programme under which we can establish some basic understanding to deal with and cope with the challenges posed by the analysis presented in Panel 1 and Panel 2. We were trying, during these two days of the Forum, to decrease the level of abstraction from more abstract, theoretical, analysis in Panel 1 to a more concrete analysis in Panel 2 - I would like to remind you that in Panel 2 as distinguished speakers we had, for example, prominent business leaders from different countries and developing countries such as Brazil, who were trying to address the practical implications of the issues analysed by Panel 2. Immediately after that we had the Panel on the environment, but I would like to proceed now on the conclusions of Panel 4 recently developed here.

I think Panel 4 presented a concrete new approach to technical cooperation. This UNIDO Partnership Programme is in fact a pioneering effort. In a way it is entering into unchartered waters, and it is testing

the validity of a new approach for providing technical cooperation. Its defining element is a multi-dimensional Partnership bringing together actors from government and civil society, from international and domestic industry, and from research institutions.

I would say that I am very happy to be able to work with my colleagues and with the colleagues from the private sector institutions and civil society organizations in trying to break this new ground. It is very difficult for me to think how we are going to continue providing technical cooperation in the long run if we cannot articulate our technical cooperation from the multilateral system with the actions taken by private sector representatives, non-profit organizations, civil society organizations and multinational companies all around the world. I would therefore like to say that I do believe that the exercise we are developing here is extremely relevant to assess the future possibilities of technical cooperation at large, not only technical cooperation from UNIDO.

We need to link our efforts with the sustained processes of private sector investments to be sure that the things we are teaching, the knowledge we are transferring, and the information we are mobilizing to SMEs in developing countries will be able to stay there. Unless the small and medium sized companies in India are able to supply their auto parts to a multinational company like FIAT, which is producing cars there, I am not so sure that all the information we are trying to mobilize there will remain.

And this was my example. Now I am not talking as Director-General of UNIDO; I am trying to transfer part of the experience I gained when I was working as minister for industry in my home country, in Argentina. I remember Mr. Salej, one of our distinguished speakers in Panel 2, the Chairman of the Industrial Association of Minas Gerais from Brazil. He said that sometimes together with foreign investments we lost a complete network of suppliers in our domestic market. That happened also in my country and in many other countries that were coping with the challenge of upgrading and stabilizing their economies. This doesn't mean that we have to establish any sort of restriction. I don't think the restrictions will work. I think, as I said before, we need to develop new tools, and this interaction between academicians, private sector representatives, civil society organizations, non-profit organizations and multilateral institutions is precisely directed in that way and was designed to address the possibilities of our research conclusions and studies that we tried top present here in Panel 1 and Panel 2.

Finally, I would like to summarize my comments on Panel 3 as well. I think that Panel 3 was a very interesting and useful panel. When we were designing the Forum at the beginning, the issue of the environment was not included in the original agenda. We were working in our traditional way and we prepared a number of panels to assess the relevance of industry in the new international economic system, to assess how globalization affected the systems of production during the past few years, and to demonstrate how we were trying to respond to these developments through the UNIDO Partnership Programme.

Eventually, however, the Board of Directors of UNIDO, which is the gathering of all our Directors of the technical and regional branches, decided to include the issue of environment as a demonstration of the importance we assign to the issue of environment in our daily work. That is why Panel 3 was included. Maybe there was not such a strong connection between Panel 3 and Panel 2 as between Panel 2 and Panel 4, but from my perspective it is extremely important to assess the situation of the environment and its role in the promotion of industrial development.

Panel 3 answered the question whether the environment is a burden or an opportunity. The answer is that it is both, it is a burden and it is an opportunity, and we have to see how we are going to deal with it. Panel 3 suggested the regulatory ladder approach to minimize the burden rather than impose still more regulations. I think this is extremely valid. The panel also suggested that we are moving towards governing without governments, and a hollowing-out of the state. I think this was a very valid observation and will require further exploration as a basis of effective environmental protection. This could easily be seen in the negotiations that are taking place permanently on the different protocols and the agreements to reduce environmental pollution and to control emissions. Those are treaties negotiated by governments that should be implemented by private enterprises, and the enterprises will need changes in the behaviour of the consumers before they are able to implement those agreements. It is therefore clear that we are facing a completely new challenge there, and I don't think that the traditional ways to assess the international agreements and protocols will be useful because we are trying to address a more complex problem, including more dimensions and mores actors, in the implementation of the protocols.

The potential role for UNIDO as a connecting mechanism between the world of industry and the world of environmental protection could include the identification of the business opportunities offered by an environmental clean-up. The case studies showed UNIDO as a broker for international cooperation between the USA and China, and for the international transfer of environmentally cleaner and sound technology and know-how in the area of enzyme manufacturing and membrane filters. One of the panellists, Mr Edwin Barnes of Ghana, described how his government is creating the economic environment that will encourage industry to collect and recycle consumer-generated plastic wastes. This underpins UNIDO's view that there is a whole environmental industry that needs to be developed in many parts of the world to turn waste and pollution into a resource. I think this a very valid and interesting approach.

Panel 3 also posed a very interesting question. Given that environmental deterioration does not respect political boundaries, what new types of international cooperation or partnerships should be developed as the environmental scenario becomes more threatening? Or what types of incentives and enabling legislation would promote the kind of international cooperation in which foreign investment would address both environmental and industrial growth issues?

The last question I would like to mention is this one: What is the relationship between the value of environmental public goods in developed countries and the private costs of pollution control and reduction? Are they different to the relationships in developing countries having both high pollution levels and high compliance costs? Many of these questions have to be included into our research programme. As I said before: I don't think that we need to introduce any change in our priorities; I think UNIDO should strengthen its contacts with research institutions, as the ones who were present during the presentations in the past two days.

Looking back at the Forum as a whole, I think I could say that we have heard during the Forum that the forces of industrial agglomeration tend to increase - at least up to a certain point - inequalities in economic development, both between and within countries. We have also learned that competition is more and more driven by non-price factors such as product quality, delivery speed, design factors, product-related services, etc. The integration of developing countries, and in particular their small and medium enterprises, into global production networks and value chains requires continuous skill upgrading on the one hand and

the build-up of national innovation systems on the other. Supporting small and medium enterprises in improving their performance and competitiveness may indeed be the best long-run investment into poverty alleviation, certainly if we accept the assumption that the integration of the developing countries into the world economy is no longer a matter of debate as such. What can be influenced, however, are the actual terms under which this integration will continue to take place.

I do believe that these main ideas will be very well received by the international community to the extent that we can articulate a positive message, and in the sense that these conclusions or ideas would help in the continuous need of the developing countries to pursue economic reforms. Let me just emphasize what I have already said during my presentation on Monday morning. I believe that both the first generation of reforms, those related to the need to introduce sound macroeconomic systems, and the second generation of reforms, those known by their accent on institutional reforms, are extremely necessary for developing countries to cope with the challenges of globalization. But I do believe that it is time now, after 50 years of discussion whether to finance or adjust an economy to let it grow, to think of how we are going to work to help to connect the population of the developing countries and the world at large with the process of globalization. We have seen, for example, all this debate regarding the new trade round, the so-called Millennium Round, during these days in Seattle. I think it is a pity that the situation is evolving like this, but it is a demonstration of how important it is to start to thinking very hard on how to connect populations with the process of globalization. This is a new challenge that we have in front of us for the coming years, and new challenges cannot be confronted with old instruments or old methodologies or old tools. We are not going to solve the problems of the future with the tools of the past.

This was precisely what we were trying to do during the past two days with you. We were trying to assess how to develop new tools. In fact, this was what UNIDO has been doing through the past two years of transformation. This was not a transformation just to cut the budget or adjust the number of staff; this was a transformation to try to direct the Organization's services to produce public goods able to help to reconnect the population of the developing countries with the process of globalization. I think the process is potentially beneficial, but we need to assess the difficulties and the problems that the developing countries are facing in moving towards it.

To conclude I would like to say that we do have a proposal regarding this exercise of reflection, and I think that during the last two panels we were able to increase the level of interaction between the audience, the representatives and the panellists. This is one of the most difficult exercises that the UN is trying to do. Yesterday I was talking with a dear friend, Ambassador Posta, former chairman of the IDB and we were recalling how difficult the efforts are, that are being made by all the UN bodies to increase the interaction between the member states and the Secretariat, and between the member states themselves. I think the Forum was a good exercise in that sense with a lot of lessons to learn. I would like to first of all circulate a small enquiry this afternoon or tomorrow morning to receive from the delegations suggestions on how to improve this exercise. How we can make it better, more interactive, and more interesting for you. But I would like to propose the institutionalization of this sort of debate in our Policy-Making Organs. Maybe we can organize one of these Forums annually; certainly we can organize this sort of meetings regionally. We did it this year in three regions - in Asia, Sub-Saharan Africa and the Arab World. One proposal President Bédié gave me yesterday was why not include more private sector representatives in our debates. I think this is a very wise proposal. We have to analyse how we can do that. I also think that the Forums could address particular issues of interest to one or other regions or for our constituency at large. To

increase UNIDO's relevance and practical involvement in the economic agenda, we will need to address real things rather than those we think are irrelevant.

Mr. President, distinguished moderators and panellists. I cannot conclude without expressing my deep gratitude to the staff of UNIDO. They worked very hard during many hours to prepare this Forum in addition to their tasks. I would say they were able to introduce this new topic in their agendas without a decrease in implementation. On the contrary, they have increased their implementation of UNIDO technical cooperation programmes. I am enabled to demonstrate how much the productivity of our staff has increased by doing this sort of things but I hope that in spite of the difficulties of implementing an initiative like this Forum, you could appreciate how important it is to move forward our deliberations and our efforts to achieve practical results. This was the whole purpose of this attempt, and I hope you at least will be able to appreciate how difficult it was for the Secretariat in the midst of the demanding transformation we have introduced in the past two years.

Thank you very much.

ANNEXES

List of Participants

Panel 1

Moderator:

Mr. Ghislain Robyn
Director, Statistics and Information Networks Branch, UNIDO

Panellists

Mr. Ghislain Robyn
Director, Statistics and Information Networks Branch, UNIDO

Ms. Sylvia Delgado
University of Sussex

Professor Yuko Kinoshita
Charles University, Prague

Professor Stephen Machin,
University College London and London School of Economics

Distinguished speakers

Professor Fabrizio Onida
National Institute for Foreign Trade, Rome

Mr. Murtaza Rakhimov,
President, Republic of Bashkortostan, Russian Federation

Panel 2

Moderator:

Mr. Frederic Richard
Director, Industrial Policies and Research Branch, UNIDO

Panellists

Dr. Hubert Schmitz
Fellow, Institute of Development Studies, University of Sussex

Mr. Didier Lombard
Ambassador at Large, Special Representative of the French Government for International Investments

Dr. Claudio Frischtak
Managing Partner, Worldinvest, Brazil

Distinguished speakers

Mr. Péter Hónig
Under Secretary of State of the Ministry of Economic Affairs of the Republic of Hungary

Ms. Maria Elena Cardero Garcia
Director-General, Office for the Coordination of Economic Affairs, Ministry of Foreign Affairs, Mexico

Senator Ombretta Fumagalli Carulli
Republic of Italy

Mr. Bunrou Shiozawa
Director, Technical Cooperation Division, Ministry of International Trade and Industry, Japan

Mr. Stefan Salej
Vice-President, National Confederation of Industry, Brazil and President, Federation of Industries of the State of Minas Gerais, Brazil

Professor Carlo Filippini
Bocconi University, Milan

Panel 3

Moderator:

Mr. Zoltan Csizer
Director, Cleaner Production and Environmental Management Branch, UNIDO

Panellists

Professor Jacquie M. McGlade,
Director, Centre for Coastal and Marine Sciences, Natural Environment Research Council, United Kingdom

Mr. Edward C. Yeh
President, Synder, Inc., USA

Mr. Cahit Gürkök,
Director, Industrial Energy Efficiency Branch, UNIDO

Mr. Edwin Barnes
Chief Director, Ministry of Environment, Ghana

Distinguished speaker

Mr. Yuri Spiridonov,
Head, Republic of Komi, Russian Federation

Panel 4

Moderator:

Mr. Wilfried Lütkenhorst
Director, Private Sector Development Branch, UNIDO

Keynote Speakers

Mr. Ajit Kumar
Secretary, Department of Industrial Policy and Promotion, Ministry of Industry, India

Mr. Mauro Pasquero
Senior Vice President, International Affairs, FIAT S.p.A.., Italy

Panellists

Mr. Robert Davies
Chief Executive, The Prince of Wales Business Leaders Forum, United Kingdom

Mr. Dinesh Munot
Immediate Past President, Automotive Component Manufacturers Association of India

Mr. M. S. Ogale
Assistant Director, Automotive Research Association of India

Mr. Jean-Pierre Brouquil
International Business Development Director, Magneti Marelli

Mr. Shantanu Bhattacharya
Associate Professor, European Institute for Management (INSEAD)

Mr. Yasuo Konishi,
Team Leader, UNIDO Partnership Programme

Concluding Session

Speaker:

Mr. Carlos Magariños
Director-General, UNIDO

List of Abbreviations and Acronyms

The following abbreviations and acronyms are used in this publication:

ACMA	Automotive Component Manufacturers Association of India
AIDS	Acquired Immune Deficiency Syndrome
APEC	Asia-Pacific Economic Cooperation Forum
ARAI	Automotive Research Association of India
BPD	Business Partnership for Development
CDM	Clean Development Mechanism of the Kyoto Protocol
CES	Constant elasticity of substitution
CP	Cleaner production
CRS	Constant returns to scale
DTI	Department of Trade and Industry (UK)
ECOSOC	United Nations Economic and Social Council
EIA	Environmental impact assessment
EMP	Environmental management plan
EPA	Environmental Protection Agency (Ghana)
ESID	Environmentally sustainable industrial development
EU	European Union
EU-TACIS	European Union Technical Assistance to the Commonwealth of Independent States
FDI	Foreign direct investment
GDP	Gross domestic product
GNP	Gross national product
HCPC	Hungarian Cleaner Production Centre
HDPE	High-density polyethylene
HIPCs	Highly indebted poor countries
HIV	Human Immunodeficiency Virus
ICSHT	International Centre for Science and High Technology
ICT	Information and communications technology
ILO	International Labour Organization
INSEAD	European Institute of Management
IRS	Increasing returns to scale

IT	Information technology
ITPO	Investment and Technology promotion Office
JI	Joint Implementation mechanism of the Kyoto Protocol
LDPE	Low-density polyethylene
LLDPE	Linear low-density polyethylene
MNCs	Multinational corporations
MVA	Manufacturing value added
NAFTA	North American Free Trade Area
NGOs	Non-governmental organizations
PVC	Polyvinyl chloride
R&D	Research and development
SBTC	Skill-biased technical change
SMED	Single-minute exchange of die
SMEs	Small and medium-sized enterprises
SMIs	Small and medium-sized industries
SMMT	Society of Motor Manufacturers and Traders (UK)
SOPs	Standard operating procedures
SSIs	Small-scale industries
TFP	Total factor productivity
UK	United Kingdom
UN	United Nations
UNAIDS	Joint United Nations Program on HIV/AIDS
UNCTAD	United Nations Conference on Trade and Development
UNDP-GEF	United Nations Development Programme - Global Environment Facility
UNIDO	United Nations Industrial Development Organization
US/USA	United States of America
WCM	World class manufacturing
WSEMS	Waste Stock Exchange Management System
WTO	World Trade Organization
WWII	World War II

Executive Summary of *Impact of the Partnership Programme: Phase I* [1]

The Partnership Programme in India: Measuring the Impact of Phase One

The Partnership Programme in India provided small and medium enterprises (SMEs) in the automotive-component sector with specific technical assistance delivered by a multidisciplinary team consisting of representatives from all participating Partners. The overall objective of Phase One of the Programme was to develop a sustainable and economically viable model of transferring tools, methodologies and know-how to SMEs. Such transfers are designed to help the recipients take the necessary initiatives to accelerate the process by which they can improve their performance to respond to competitive challenges in ways that would make them viable players in the global market.

Impact Dimensions

The Partnership Programme yielded significant results in three areas:

- Substantial technical improvements (reflected in productivity increases) and heightened awareness resulting from the application of modern manufacturing methods.
- Sound market approaches developed through workshops and seminars and leading to a far-sighted market vision and marketing strategies capable of creating sourcing and joint-venture opportunities.
- An emerging culture of continuous improvement which also fosters collaborative efforts among participating enterprises, such as networks and other mechanisms for information exchange and experience sharing.

I. Productivity Gains and Heightened Awareness

A. Methodology

By all accounts, the collective expert approach to detecting, defining and solving shop-floor problems accelerated the development of a "culture of continuous improvement" in the enterprises receiving

[1] The UNIDO document from which this summary is extracted was distributed to the Delegates of the Forum. The full document also contained profiles of the 20 Indian automotive component manufacturers participating in the Partnership Programme.

assistance. To this end, great emphasis was put on facilitating the recipients' access to modern production and management methods and tools that can have a lasting impact on the way they do business. Technical assistance was delivered to the participating enterprises in three ways: Intensive expert interventions; seminars and workshops; and national and international study tours.

Phase One of the Partnership Programme in India focussed on inducing non-capital changes by using world-class manufacturing (WCM) methods such as single minute exchange of die (SMED), 5S activities (organization, neatness, cleaning, standardization, and discipline), variations of the Kanban system and other recognized methods of generating productivity gains. In some instances, the application of these methods and tools led to immediate and visible changes on the shop floor; other techniques require time to be fully incorporated into the daily operations of an enterprise.

Given that sustainable change can only come about when worker behaviour adjusts to the rationale behind modern production methods, the Partnership Programme formulated two separate sets of impact indicators to measure changes that took place during the course of the Programme: Performance indicators and awareness indicators.

The Programme deployed four international experts: Two specialists in automobile manufacturing; one specialist in plastics; and a fourth expert with extensive experience in rubber and rubber-extrusion products. Each of them was given explicit instructions to define and promote non-capital changes that, in their opinion, would have the greatest impact with respect to improving enterprise competitiveness.

While the implementation of Phase One of the Programme ran for nearly nine months, shop-floor interventions took place over a six-month period, between May and October 1999. Following basic training on modern manufacturing methods in March and initial plant visits in April, shop-floor interventions began in May. Up to ten days of direct expert assistance was delivered in three rounds with a minimum three weeks in between to allow enterprises to assimilate the lessons learned and adapt to them. During these six months, one workshop on lean manufacturing methods and marketing, and three study tours (two national and one international) took place to help solidify the knowledge gained during shop-floor interventions.

Performance Indicators

To measure the quantitative changes resulting from the Programme, the Partners defined eight critical areas where change is important for improving competitiveness (improvements in these areas were measured using 21 variables and 32 sub-variables):

- Shop-floor space utilization and management;
- Time utilization;
- Product quality;
- Worker skills and formation of multiple skills;
- Communication flow;
- Changes in technology and processes;
- Factory environment and safety; and
- Market knowledge.

Awareness Indicators

Secondly, to measure and monitor changing levels of awareness regarding the importance of continuous improvement and strategic planning, the Programme designed a set of "awareness indicators" to discern changes in the mindset of managers and workers. Using 18 variables and 24 sub-variables, variance in awareness with respect to the importance of continuous improvement was measured in four areas:

- Logistics;
- Efficiency in production;
- Quality; and
- Production and process adaptation

Using a single data-collection form, the experts gathered data for the "awareness" indicators at the beginning, in the middle and at the end of the demonstration phase. The resulting data is intended to serve at least three purposes by being used as:

1. A monitoring and planning tool for managers and supervisors;
2. A feedback system allowing workers to see the impact that certain changes have on their daily work.
3. A method by which experts can identify areas where further technical assistance is required.

The Programme has had a notable impact on the performance of the participating enterprises as well as in raising awareness among managers and shop-floor workers regarding the relevance of applying advanced production and management methods in order to ensure continuous improvement.

Wherever possible, the Programme has tracked quantitative changes. In instances where quantitative data was not obtainable, a qualitative description of the impact is provided.

The following section offers a consolidated assessment of the impact that the Programme has had on 20 enterprises that participated in Phase One.

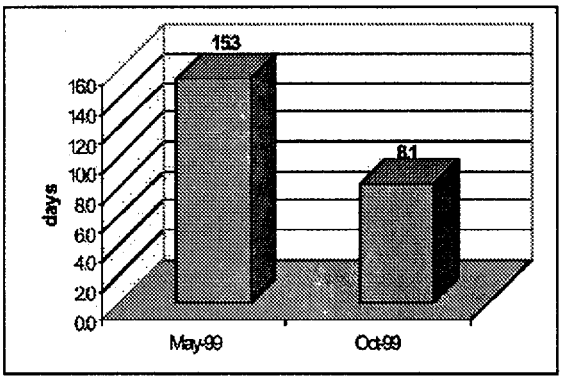
B. Impact Measured by Performance Indicators

As part of performance monitoring, sample data was collected on the impact of the Programme on company turnover. For the six enterprises where such data was tracked, the average increase in turnover was approximately 40% during the six-month period of technical assistance. A summary of technical improvements at shop-floor level is presented below.

Faster and More Efficient Production

The average lead time required for production and completion of goods was reduced by 52%. Thanks in part to the application of WCM methods, machine set-up time dropped, preventive maintenance was introduced and expanded, and reaction to repair needs was improved. This is illustrated in Figure I.

Figure 1:
Through-put time reduced by 52%



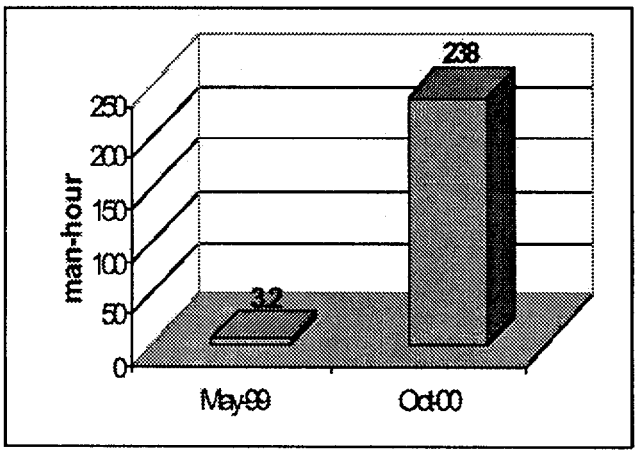
The average time required to complete a single product was reduced from 15.3 to 8.1 days. This productivity improvement is the reflection of measures to upgrade the condition of existing equipment as well as of improvements in the interaction between workers and their equipment.

Investing in People, the Foundation for Continuous Improvement

The rising awareness regarding the correlation between training and productivity improvements helped convince enterprise managers to make a substantial commitment to improving worker skills. This is reflected in the enormous increase in in-plant training.

While there was virtually no training available to shop-floor workers at the beginning of the Programme, after six months, the participating companies were providing their workforce with an average of over 238 hours of training each month, as shown in Figure 2.

Figure 2
Dramatic Increase in Training



Worker Absenteeism Reduced by 39%

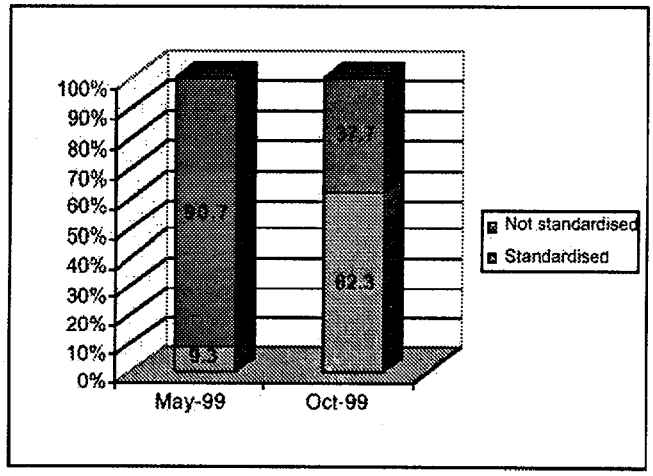
Thanks to improved communication in the factory as well as better safety and working conditions, absenteeism among blue-collar and white-collar employees and contract workers declined substantially. For enterprises operating in rural areas - where many factory workers must also tend to family farms or shops - reducing absenteeism, particularly during the planting and harvesting seasons, is of critical importance. The reduction in absenteeism largely contributed to meeting production schedules and improving productivity.

Quality Improvements through Standard Operating Procedures

The application of standard operating procedures (SOPs) contributed to improving product quality. In a number of enterprises, returns from customers, rework and scrap were reduced through the establishment of quality circles and other mechanisms.

The most dramatic improvements occurred when enterprises introduced SOPs. Prior to participating in the Programme, only 16% of all operating procedures were standardized and documented at shop-floor level. Following the technical interventions of the experts, over 69% of all shop-floor operations were standardized and documented - a 53% improvement. This is illustrated in Figure 3.

Figure 3
Application of standard operation procedures up 53%



Better Space Utilization Boosts Production Capacity

Through 5S campaigns, management and control of stocks, waste and scrap, and by applying single-flow as opposed to batch production methods, participating companies achieved an average 25% increase in production space.

Bridging the Communication Gap between Management and Workforce

Before joining the Programme, plant owners and managers rarely walked onto the shop floor to chat with their workers. The Programme helped sensitize plant managers to the fact that continuous improvement can only be achieved through a close interaction between managers, engineers and shop-floor workers.

Combined with a greater sense of shared responsibility among workers, this realization encouraged managers to call regular meetings both at the shop-floor and the department level. In over half of the cases, managers used shop-floor and department meetings or training as a venue for interacting with the workforce.

Minor Technology Changes

Given the key emphasis put on non-capital changes, very little technological improvement was anticipated for Phase One of the Programme. In a number of cases, quality and productivity improvements were achieved through the replacement of dies or other machining parts, or through modifications of existing equipment. As the Programme enters its second phase and new capital investment is made, an increasing number of technology-driven improvements are expected to take place.

Indian Manufacturers Show Keen Awareness of Domestic Competition

Indian enterprises are keenly aware of competition in the domestic market. The performance index showed very little or no change under the category "market knowledge" as virtually all of the managers responded positively in most market-related performance indicators from the very onset of the Programme.

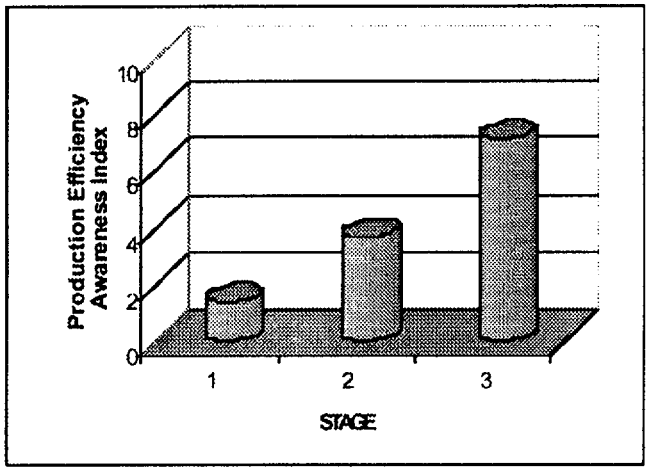
What the indicators did not monitor was whether the same enterprises were aware of trends in foreign markets and even possible threats from foreign competitors, particularly in light of the WTO provisions, which will take effect in 2002. This issue is expected to be taken up more closely in Phase Two of the Partnership Programme.

C. Impact Measured by Awareness Indicators

Sharp Increase in Awareness of Production-Efficiency Issues

"Physical" changes resulting from the application of world-class manufacturing methods and other tools helped raise awareness among workers with respect to the direct correlation between their initiative on the shop floor and productivity improvements. This became a catalyst that helped bring about a change in the workers' mindset. Evidence of this "transformation" is reflected in the awareness indicators, where we find a sharp increase in manager/worker awareness of production-efficiency issues.

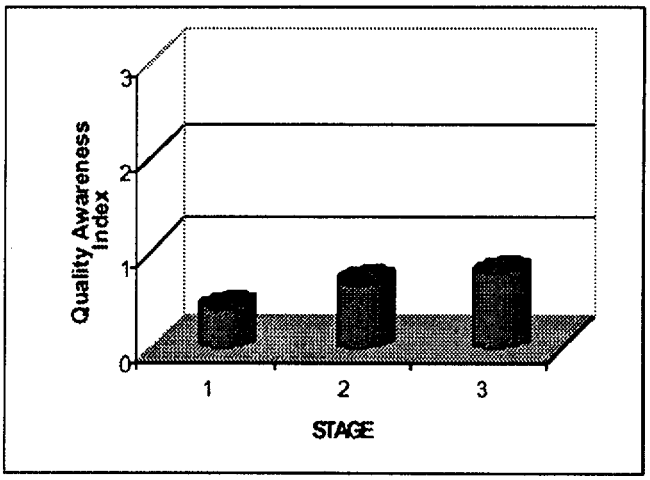
Figure 4
Strong Growth in Production Efficiency Awareness



Linking Quality to Production Efficiency

A "quality plan" and good housekeeping practices - combined with systematic data collection to monitor in-line rejection, customer rejection, rework, scrap, inventory and other production parameters - have helped sensitize managers and shop-floor workers to the linkage between quality and production efficiency. The impact of these activities is shown in Figure 5.

Figure 5
Quality Indicator Grows by 92%

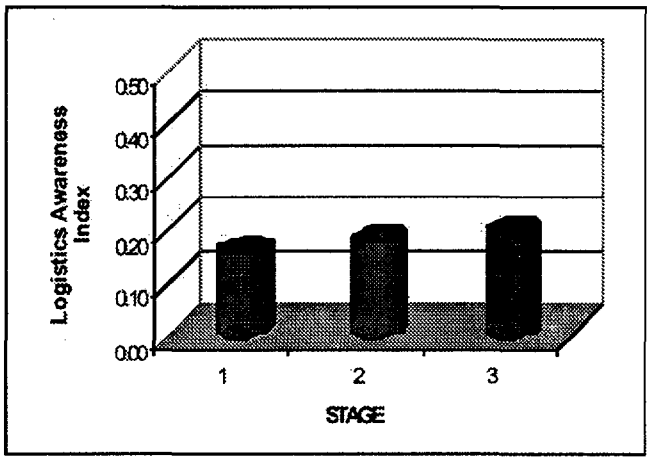


Whether through the introduction of visual checks or the establishment of quality circles, the response of the participating enterprises to the Programme's approach to quality is reflected in the 92% increase in awareness regarding the importance of establishing a quality system.

Improving Logistics

Establishing a flow-control information system, monitoring delivery performance, defining a formal purchasing function, or establishing an emergency plan are some of the activities that helped improve awareness regarding the importance of company logistics and its effect on competitiveness. While awareness of production-efficiency and quality issues is closely linked to physical change on the shop floor, improvements in company logistics are not that visible. This is a partial explanation why the awareness rate has been steady - with modest improvements - throughout the Programme, as shown in Figure 6.

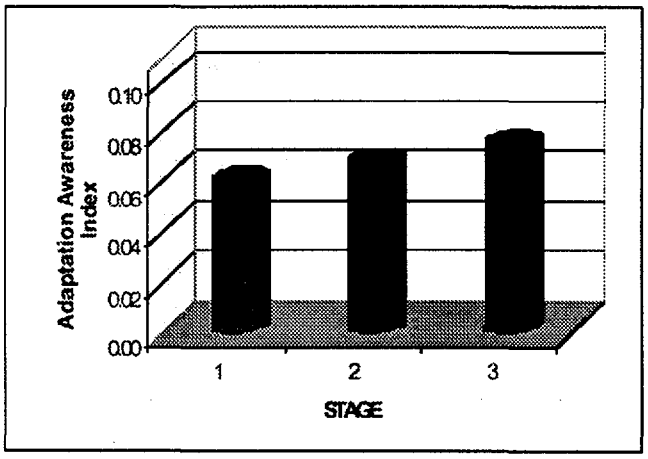
Figure 6
Logistic index improved by 42%



Capability in Product Adaptation Still Lagging

Only a few participating enterprises possessed the necessary expertise to facilitate joint design activity with customers. While most firms had enough engineering capability to make minor product adjustments and adaptations, only a few had a specific function for product design.

Figure 7
Slow move on product adaptation, 25%



Improvements in awareness in this field remained at a low level as shown in Figure 7. This is an area to which Phase Two activities are expected to give a higher priority.

II. Sourcing and Joint Venture Opportunities

From the onset of the Programme, the Partners stressed that participating enterprises must place an adequate emphasis on developing a far-sighted market vision and a sound marketing strategy shared with the workers and accepted by them.

Many enterprises had never been exposed to foreign markets nor were they familiar with the demands of foreign partners. This meant that above and beyond the technical improvements on the shop floor, the need existed for the Programme to sensitize managers to the potential demands of foreign markets and partners.

Through seminars and workshops conducted by the Partners and the Programme experts, the participating enterprises were exposed to concepts related to global sourcing, marketing, accounting and finance, delivery requirements, quality standards, costing, and other aspects. A growing awareness of these issues prompted a number of enterprises to develop marketing material and strategies geared towards meeting the expectations of foreign partners.

Selected enterprises had an opportunity to test their new marketing strategies when they participated in "EquipAuto '99" Paris, one of the leading automotive-component exhibitions in Europe. All seven Indian enterprises which participated in the event identified a number of European companies interested in negotiating sourcing arrangements. In addition, three companies found potential joint-venture partners, European companies interested in having goods manufactured in India.

III. Enterprise Network and Support Group

The success of a demonstration is defined by its catalytic impact. Furthermore, a programme's impact is not sustainable if the beneficiaries do not take the initiative to propagate the lessons learnt both among themselves and to others. If this hypothesis accurately defines the parameters for the long-term success of a programme, then the collective approach at the heart of the Partnership Programme was the necessary prerequisite for this success.

During the first meeting of all participating enterprises, the Partners emphasized the importance of experience sharing. Equally important was that the Programme expected the participants to become a "showcase" for their industry.

Throughout the course of the Programme, the Partners consistently encouraged and reinforced interaction among participating enterprises, but the latter's response was initially less than impressive. It was not before the mid-term review meeting that the situation took a sudden turn for the better. At that meeting, each enterprise manager was asked to make a five-minute presentation of the impact that the Programme had had on the shop-floor activities of his or her company, and of the difficulties faced in implementing

certain recommendations. The "airing out" of issues in public generated a swell of interaction among the enterprises, many citing similar problems and explaining how they went about dealing with them.

Since the mid-term review meeting, an increasing number of enterprise managers met informally, often visiting each other's factory to take a first-hand look at improvements based on technical assistance received under the Programme. These exchanges evolved into a more formalized structure once one entrepreneur took the initiative of establishing a "Partnership Club" for the participating enterprises. The Club is expected to be a forum for the exchange of technical information, and to organize seminars and workshops. Many entrepreneurs see the Club as a means of joining forces to promote a "culture of continuous improvement".

IV. Phase Two Outlook: Emphasis on Building Institutional Capacity

Following the completion of Phase One activities, the Partnership Programme will move to the Southern Region to help propagate the lessons learned so far. The emphasis will be on institutional-capacity building. The Programme will work closely with local institutions, including universities, to build up a cadre of Indian engineers able to provide technical services to SMEs in the automotive-component sector. To meet this objective, a number of mentoring and training activities for local engineers are envisaged. These activities will require the direct involvement of and sponsorship by MNCs operating in India.

The overall objective of the Partnership Programme is to complete the demonstration activities in all the regions where clusters of automotive-component manufacturers are operating. Simultaneously, the Programme will strive to build up a local institutional capacity that can function as an adequate supplier of affordable and reliable technical assistance to SMEs in the automotive-component sector.

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