

**Building technology markets in Latin America —
from technology insight to technology foresight**

**Presentation
of the Director-General of the
United Nations Industrial Development Organization
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Mr. President
Excellencies
Ladies and Gentlemen

Despite the immediate prospect of a year of painful adjustment to external shocks, we should miss the fact that the 1990s have been mostly good years for Latin America's economies — especially the first half of the decade, and particularly in comparison to the 'lost decade' that went before.

It seemed that we had finally found the holy grail of economic policy — a combination of sustained growth, low inflation and financial stability, whose benefits even the poorer sections of society shared. The neo-liberal consensus, trickle-down economics and the prescriptions of the Bretton Woods institutions had apparently won the day. Agreed, the 1998-1999 financial crisis will still take a toll. But the macroeconomic stabilization, pro-market policies, trade liberalization, supply-side reforms and the investments during the 1990s will also ensure that Latin America's economies are well-placed to benefit from future recovery in world demand, beginning in the 2000 with better-than 3 per cent annual growth.

But that, unfortunately is not the whole story — neither for Latin America, nor for other developing economies. For it is becoming increasingly clear that while macroeconomic stability is, at this point, beyond dispute, we have to have something more. Controlling money supply, inflation, public spending and current account deficits are, and will remain, the prerequisites of development, but they are an incomplete recipe. What is more, they expose underlying problems rather than solve them.

One key problem is the theme of my address this morning —

the exposure of small and medium-sized enterprises to not just national but to global market forces, and the role of industrial technology research institutions in helping them survive that exposure.

The problem is a *policy* issue because it calls for micro-economic policies as a necessary adjunct to macroeconomic policy.

It is an *economic* issue because without innovation-based modernization, industrial SMEs are subject to exporting low-technology, low value manufactured goods and importing high-technology, high value goods and services.

It is a *business* issue for research institutions because SMEs' technology needs constitute a business opportunity with vast potential.

It is a *social* issue because SMEs everywhere are the real source of net gains in employment, and therefore the most effective instrument for combatting and alleviating poverty.

And it is a *technology* issue because it concerns the nature and levels of technology required by SMEs, and the delivery support required from the national innovation system.

The seriousness of the problem varies from economy to economy. But in the worst cases, when structural adjustment is limited only to macroeconomic measures (i.e. without industrial modernization), it can even be a straightforward recipe for permanent *under-development* — exporting minimally processed raw materials and low-technology goods at ever lower prices, with corresponding difficulties in acquiring modern technology and related services. Such a 'vicious circle' can only be broken through a concerted national effort to upgrade existing technologies and to master advanced technology. SMEs must be the focus of that an effort. The challenge for the national innovation system, the

industrial technology research institutions (ITRIs) in particular, I suggest, is to design the strategy, convince the policy makers and transform themselves as the main instrument of SME innovation-based upgrading.

This will call for their better understanding of both the role and types of innovation required by SMEs, and the nature and life-cycle of SMEs themselves.

Ladies and Gentlemen,

The virtues of small and medium-sized enterprises (SMEs) are a favourite topic at international gatherings. They are said to be:

- the core of economic growth and development
 - the source of entrepreneurship
 - creators of new jobs
 - the means for income opportunities for poor people
 - suppliers of large firms
- and
- developers of new products for market niches.

But are they really like that? Is this a reality for the majority of developing country SMEs? I believe not. And if not, what can be done about it? Two answers I would like to share with you this morning concern the role of research institutions and a market mechanism that will enable industrial research institutions to operate more efficiently.

What developing country SMEs are certainly not, and what I suggest should be of fundamental concern for a summit concerned with redefining the role and revitalizing industrial technology institutions, is a ready market for technology upgrading services.

They should be, they could be, but they are not.

And the fact that they are not a market for research services should be of concern, not only for the industrial technology institutions themselves. It should also concern policy makers and, by extension, multilateral organizations like my own, the United Nations Industrial Development Organization.

Weak SME demand for technology not only undermines measures to make technology institutions demand oriented. It also puts SMEs themselves at serious risk. SMEs have to adapt to the new conditions of globalization, and to changes in technology itself. If they don't, competition will sooner or later kill them. When they do, they can produce the niche items I mentioned, and they can do it as efficiently as large firms. And as sub-contractors they can supply larger firms with the quality and reliability levels those firms demand.

But for this to happen, SMEs have to continuously innovate, to continuously learn how to improve their products and processes. The present reality, unfortunately is that most SMEs are not able to learn, not able to adapt, and not able to innovate even in an incremental way, to say nothing of their need for strategic innovation.

This distinction between incremental and strategic innovation, by the way, is important — for SMEs, for policy makers and for research institutions. We use the term “incremental innovation” to refer to short-term gains in productivity, quality and profitability. These are important both in their own right, and because they develop the culture of innovation and change. They are achieved through *technology insight* on the part of entrepreneurs and SME

managers, and through techniques such as total quality management, energy auditing and human resources empowerment. But they do not ultimately ensure the enterprise's sustainable competitiveness and ecological responsibility.

Incremental innovation is primarily concerned with operational efficiency — the application of quality standards, process optimization with respect to raw materials and energy, and end-of-pipe technology to comply with environmental regulations. The resulting product changes are frequently cosmetic, exemplified by new packaging, new shapes, colours and flavours etc.

“Strategic innovation” in contrast is concerned with market differentiation, with repositioning the enterprise in the supply chain, and with development of completely new products and combinations of processes. It is built, of course, on research and development. But it includes also an understanding of business opportunities and the threats presented by technological and market discontinuities, and by suppliers' and clients' own development. The techniques for identifying these opportunities, threats and discontinuities — more generally referred to as *technology foresight* — is, of course, beyond the scope of most SMEs. But it is not beyond the scope of research institutions, and, I will suggest, is a ‘public good’ that is a very proper concern of policy makers.

Innovation capability in both senses (incremental and strategic) is therefore also one way to understand SMEs' progressive interaction with technology. Setting up industrial SMEs calls for investment in plant and equipment and hiring of personnel. Technology is embodied in both. There follows an incubation period when the technology is ‘learned’ — a make or break period where

failure to learn properly is a major cause of early failure of the SME as a whole. For the survivors, there follows typically a period of incremental innovation resulting in small changes to the process and the product. In the best cases, quality and productivity levels rise to the national norm and the business is judged viable.

But even if the business is viable at that point, an SME's long-term survival is still not guaranteed. There is always the possibility that another firm would come along with a better technology and take the market. One feature of globalization is that it multiplies the chances of that happening by a hundred or a thousand fold. Trade liberalization creates competitors exponentially in a radius of thousands of kilometres. Production globalization changes the competitors' economies of scale and scope. Technological change enables and promotes head-on collisions between competitors' strategic innovations and the tradition-bound SME's inaction or its concentration on modest incremental improvements.

We therefore remind ourselves of these two different aspects of innovation because SMEs need both of them. And, because many fail on both counts, they need strong support from research institutions. The questions for research institutions therefore are whether they are properly structured to assist SMEs with both types of innovation, and whether they adequately promote and otherwise market such services.

So, let us ask ourselves why SMEs fail to innovate or do it poorly. The main handicaps preventing SME innovation are lack of knowledge, poor access to information and deficits of technical skills for continuous innovation. But these gaps are only part of the problem. They also suffer from:

- lack of a functioning technology market mechanism giving them ready access to the national innovation system.
- lack of technology management capability.
(This includes their inability to diagnose (or have diagnosed for them) their critical technologies, to define their technological needs in programme and project terms so that institutions can offer matching services, and to acquire and absorb the new technology — all as a core capability.)
And they suffer from:
- weak links with technology centres and other supporting services ,
as well as
- lack of access to the finance needed to develop and implement technological innovation.

All four elements — especially technology management capability for entrepreneurs and a market mechanism for SME technology upgrading — should, I suggest, be priority matters for this summit, and subsequently also for policy makers' attention.

Policy makers have two reasons to be concerned.

- First, many industrial technology research institutions are either still in the public domain, or, if privatized, still depend extensively on public funding.
- Secondly, when SMEs fail economically they also fail socially — fail in their social role of generating incomes and employment, employment in rural areas in particular.

The policy issue is always, can they be saved or enhanced by government intervention? Even if they can be saved, should they be

saved at public expense? And, if it is accepted that at least some should be saved, what sort of intervention is appropriate, in particular what sort of technological support is called for, from research institutions in particular?

Ladies and Gentlemen,

This is not the place to debate the merits of unfettered market forces versus varying degrees of public sector intervention and provision of support services as a “public good”. It is a fact, however, that developing country SMEs occupy a different position to their counterparts in industrialized countries. This alone may justify a divergent developing country policy approach.

But it is also a fact that the track record of programmes to support SMEs, in industrialized as well as developing countries, is not totally persuasive. Many programmes are not very efficient, and have limited impact. The potential beneficiaries often remain unaware of their existence, and those that know about such programmes find them unhelpful because they are not adapted to SMEs’ conditions.

Recent analysis of how SMEs progress, particularly the progress differences between SMEs in developed and developing countries, shows that:

- Their rates of entry and their demise are of the same order, about 10 per cent. This means that 10 per cent of the stock of SMEs in any one year will be new, 10 per cent will be leaving the market.
- However the “turbulence” (the algebraic sum of SMEs’ entries and exits) is much greater in developing countries — some 50 per cent higher in developing countries. This means

that developing countries are much more vibrant than we thought.

But we may also ask ourselves, in that case, do we actually need *incubators* to nurture infant companies? Do we really need to spend scarce resources on nurturing firms that would spring to life spontaneously anyway?

Continuing the analysis:

- After entry, the lifetime of some firms is quite short — 25 per cent will disappear in the first year, another 15 per in the second, and so on. Half of this year's new SMEs will not make it to five years.

Again there is a question: would it not be more efficient to withhold public support until SMEs have proven their virility by surviving four or five years on their own?

- Even when they survive, SMEs in developing countries play a quite different role in the division of labour than in industrialized countries.
 - In industrialized countries, SMEs complement rather than compete with large firms. They do produce for the niche markets, and make customized products in small specialized batches.
 - But developing country SMEs rarely develop niche production. They try instead to compete with large enterprises in standardized mass production products like shoes, garments, fruit and food products.
 - Similarly, it is the industrialized country SME that works as a supplier and sub-contractor to large firms. In developing countries, in contrast, the supplier and sub-contractor structures are very *under-developed*.
 - The reasons for all this are of direct concern to Research

institutions and to policy makers.

- Most SMEs in developing countries are set up where the entry barriers are low.
- Their founders have neither capital nor special skills.
- They take up a limited range of activities that produce low value-added, low-quality products for low-income end users.
- And, since there are many entrants, their markets are saturated, prices are low and tend downwards. This is what economists call supply-push dynamics of informal enterprises.
- How SMEs survive in developing countries is also relevant, given that they try to compete with large firms.
 - Whereas labour productivity in industrialized country SMEs is 70 to 80 per cent of the productivity of large firms, in Latin American countries it is of the order to 20 to 30 per cent.
 - In addition, CEPAL data shows this already large productivity gap to be increasing: productivity in micro and small-scale enterprises is lower than 26 years ago, whereas economic reforms have seen a steady increase in the labour productivity of medium- and large-scale firms.
- A final point of comparison is that the job creation effect of SMEs in developing countries is much more sensitive to cyclic activity than in industrialized ones. That is to say: developing country SMEs create much more employment during boom periods, and shed correspondingly more during recessions, than their industrialized counterparts.

Ladies and Gentlemen,

If I may sum up so far, the disturbing reality is that the vast majority of SMEs in developing countries actually contribute little to economic growth, very little to export and almost nothing to technological development. They are “employers of the last resort, operating at the margins of a modern division of labour.”

This is despite the efforts of well-intentioned policy makers. But please do not misunderstand me. As some of you know, as a former policy maker myself I reject absolutely the “economicist” expectation that industrialization will somehow automatically solve social problems. We do have to incorporate the social consequences as part of the design framework of economic policies, but we have to do it realistically and not fall between two or three stools.

SME support programmes can have social aims — such as providing income for subsistence farmers, poor women and school dropouts, or slowing urban migration. They can have economic aims, such as building national competitiveness. Or they can have environmental aims. The experience of my organization is that when it comes to industrial development, the best programmes are those that recognize all three dimensions — the three ‘e’s of economic competitiveness, employment generation and environmental friendliness.

My broad proposal is therefore that, alongside any set of pure poverty alleviation measures such as provision of micro-finance, we develop another set of ‘economic-employment-environment’ strategies and policies. Drawing on Argentinian and other successful developing country experience, they could address five issues:

- (1) Design specific financial-, technical- and legal support for creation and incubation of advanced technology-based SMEs

— for example, exploiting technologies adapted or developed in national or regional academic and research institutions.

(2) Develop new approaches to SME incubation, such as one-time capitalization and establishment of commercial technology incubation centres in research institutions — institutions like Fundación Chile that have successfully acquired, adapted and developed technology for onward sale (with technical assistance) to new or already established SMEs.

(3) Promote national markets for technology upgrading services featuring, for example:

- Technology diffusion schemes available to assist individual SMEs and export-oriented SME clusters to —
 - upgrade their product quality, consistency and reliability,
 - enhance their labour- and capital productivity, and make more productive use of energy and scarce raw materials,
 - adopt quick-response strategies for order handling
 - introduce new technologies and techniques through technology adaption in order to extend ranges of products and services,
 and to
 - improve product design and presentation.
- Technology management training schemes to promote entrepreneurial and management capability to, for example, —
 - Diagnose critical technologies
 - Research, select, acquire and adapt technologies
 - Re-engineer company operations in response to technological changes introduced
 and to
 - Upgrade the human skills called for by the technological changes.

(4) Reset priorities of development banks to include venture capital for strategic innovation, and provide fiscal and other incentives for recognized in-house or sponsored strategic innovation programmes such as —

- Establishment of specialized laboratory facilities
 - R&D projects
 - Technology acquisition and development
 - Pilot plant operations
- and
- Market testing.

and

(5) Organize government-sponsored national or regional technology foresight exercises in areas of strategic interest and with the combined involvement of the public, private and academic sectors.

(Technology foresight, it may be noted, has been basic source of private sector innovation in Japan for decades. The 1990s saw it develop also in Australia, Europe and the United States. Developing countries interest, in Asia and to some extent in Latin America, is more recent.)

The immediate role of research institutions in this context can be three-fold:

- Firstly, to promote and develop the national market for innovation services to SMEs through their own efforts;
- Secondly, to propose a coherent SME-oriented innovation strategy that responds to national opportunities and mobilizes the support of the rest of the national innovation system and of policy makers.
- Thirdly, to develop a technology foresight capability to train practitioners in procedures and methodologies, propose and

advise governments and industry on the scope and strategy of technology foresight exercises, and provide foresight management services as appropriate.

A key decision for policy makers is the extent and nature of their intervention. Identifying gaps in the national innovation system is the first step to closing them — with market-oriented mechanisms as far as possible. Interventions should be nearly always ‘horizontal’, i.e. involving no government judgement concerning the validity of technology choices made by the private sector. The private sector should always be required to share the costs, e.g. with 50:50 matching grants in any Technology Diffusion scheme. Where interventions have to be ‘vertical’ e.g. long-term specialization in a particular area of technology, they should be supported by broad consensus within the national innovation system, by the findings of technology foresight exercises, and by the public at large.

Ladies and Gentlemen,

I hope I have been able to convince you, or at least raise some issues that you can focus on in the coming discussions. My Organization regards the technological development of the small and medium-scale sector in developing countries as a crucial issue for the future economic development of those countries, especially here in Latin America. SMEs will not achieve such development without considerable external help. It is therefore a major business challenge for research institutions and a policy challenge for governments.

I thank you for your attention.