On Software Export Opportunities for Developing Countries.

(A Few Comments from a Mexican Perspective)*

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Software[1] is critical for developing countries. Not only for its economical importance -- it is becoming a larger segment of a growing expenditure -- but culturally, because it is through software that everyday practices, experiences, values, are incorporated into IT. Thus, if a developing country seriously wants to reap some benefits from the IT revolution, it has to become involved in software production, and export. Otherwise it will let pass a chance to participate in a very dynamic market and, far more significant, will adopt practices, experiences and values that may be alien to its culture and therefore unapplicable or undesirable.

However, it is not easy to develop a local software industry, and less so to compete in international markets. A previous COGIT meeting (1991) addressed some of the issues associated with the development of local software industries, and motivated a fruitful exchange of experiences and ideas. It was clear, then, that although significant differences may exist among developing countries, it was profitable to share experiences and plausible to establish cooperation schemas and devices.

It is with that background in mind that I write this paper. I intend to focus on the factors that may enable a country to develop a software export force. Thus, I will draw on the mexican experience in an attempt to bring forth lessons and questions that may be useful to other countries.

1.- Conditions that enable Software Export

Unlike Chile or India, Mexico has never adopted an explicit committment to software export --and consequently, policy instruments to promote software export specifically have been few and of dubious effect-- nevertheless, local software enterpreneurs have made repeated attempts at exporting software. Results, uneven as they may be, are

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* Presented at the 1993 meeting of UNIDO- Consulting Group in Information Technnologies. Vienna Nov. 1993

[1] I am using the word software in *lato senso*. to denote not only off-the-shelf packages, but also turn-key systems, ad-hoc developments, systems integration, systems design and related services.

valuable in indicating certain conditions and elements that are relevant for successful (and unsuccessful) software export. In addition to that export experience, I think we can profit from the experience we may have as importers of software, there again some conditions and elements may be worth observing. These conditions and elements, I believe, are not all specific to Mexico, thus their discussion may result illuminating.

Conditions can be grouped in three categories: those that have to do with local software market, those that are related to export skills in general, and finally those that have to do with the product itself. I will review each one in turn.

A.- Local Market Conditions

It is unlikely that software of export quality may be produced at all if certain given conditions are not present in the local market where the software is produced. These have to do with a certain level of maturity of the production and commercialization process, and the enterpreneurial and support environments.

Three of these conditions are "enabling conditions": access to good people, efficient links uniersity-industry and stable legal environment.

These enabling conditions are clearly stated but have not allways been easy to achieve.

In fact, legal protection for the software industry is still a much debated and demanded issue in Mexico, even though major legal advances have taken place over the past three years with regards to penal sanctions and more precise characterization of software related misdemeanors.
In essence the problem is two-pronged, on one side there is an economic issue: if piracy is tolerated or stimulated, resources that would have come to the software industry are never received. The second one is cultural, software tends to be ignored in procurement and marketing processes, specially in immature markets, unless specific legal requirements make explicit mention of software.

University-industry links are clearly an advantage in every mayor software export country. We, in Mexico, have had an erratic performance in this area, sometimes very good, sometimes awfull; mainly because instruments for a general (not IT-specific) linking process have been unsuccessfull, but also because of a very strong price-differential between university and industry salaries.

As for access to human resources, the problem is both a problem of opportunity (timely access, easy access) and availability. We have seen in Mexico that although large numbers of specialists are coming out of universities and technical training schools, their training is not allways of the kind needed (for instance, we have been lagging in Data Base experts and Object Oriented methodologies), and worse, even if the experts exist, they may be involved in areas different than the ones they were trained into, either because they couldn't get interesting, stable occupation, or because better working conditions are available in other areas (such as marketing and customer support).

A fourth critical condition is the availability of financing devices. For this I mean not only money, but the requirements and procedures needed for having the money available for major software development or marketing efforts.
Mexico has had some well-intentioned software financing instruments, but unfortunatelly collaterals, commercial banking practices, lack of adecuate venture capital funding have made it very difficult to channel those resources on time and in quantitiy to valuable projects. The problem here, again, is mainly a cultural problem: financial institutions are not used to lending money to companies whose main resource is human capital.

Other local market conditions may be grouped as "market maturity" and they have to do on one hand with the balance of technical and business expertise of the people involved in the software industry and, on the other hand, with the stability of the products and business environment of the software exporter. We have seen, for example, the sad case of a young energetic company that in order to pursue a seemingly atractive foreign market, lost its local demand base before the export promises crystalized into healthy income.
This stability of the export company has been achieved through different devices. It has not allways been the case that stability is accieved through a long local market involvement, on the contrary, some successful exporters achieved stability by joint ventures either with investing partners, users or retailers.

B.- Conditions Associated with Export Specific Expertise

Four conditions appear significant:

First good export skills. Not software-specific skills, but general foreign trading hability.
This is particularly well developed in Canada and Chile. Both countries have added software to a list of products and services that had been sonsidered interesting for the country to export. Thus the software sector benefited from trained functionaries, fairs, directories, financial resources, promotianal materials, etc. that had already been put in place by the exporting country. One should note, though, that even if piggy-backing a national export program may be convenient for software export, software export can still be successful on its own, provided good export skills and resources are put to it, either by a interested groups, or by an individual company.

Second, access to distribution channels. Different channels for different products, and different countries.
Subsidiaries, wholesale retailers, value added retailers, joint ventures, distributors. Experiences here are varied, and unfortunatelly it is still, as far as I can see, more an art than a science.

Third, knowledge of the specific foreign market.

Fourth, general trading conditions.
This last condition is specially relevant to Mexico, due to the signing of NAFTA, and

because of similar agreements, to Chile, Colombia and Venezuela in the immediate future, and possibly to other Latin American countries too.
NAFTA will facilitate joint ventures, and trade, and technology transference, and services. It will also stimulate local investment in modernization in Mexico, and probably reactive measures in Europe and South East Asia. At any rate, IT markets are likely to become beneficiaies of NAFTA and its lateral effects, but in general the availability of Free Trade Agreements or equivalent trade stimulating devices have a significant impact in software esport.

C.- Product Related Conditions

A very significant condition seems to be the hability to forecast technology trends and standards, and develop software products and services on time for new technology vintages. A good example of this hability has been Continental China's "Windows" expertise, or Mexico's opportune entrance in Electronic Mail and Mail servers.

This forecasting hability is certainly dependent on good technical infraestructure, but specific instruments have been devised that seem quite effective. For instance, Singapore has a "Technological Observatory" in Sillicon Valley, where venture capital is constantly poured into new projects. Germany and Italy support cutting edge technology projects at the International Computer Scince Institute in San Francisco, and have resident post-doc students there. Chilean companies have established subsidiary companies (and joint.ventures) in California, etc.

Another product-related condition is the hability to identify a demand and develop or position a product or service that may satisfy that demand.
That was the intention behind the partly successful translation software introduced in the US by the mexican company Finalsoft. Or the more successful story of Action Technologies with its recent Work-Flow management methodologies and software.

Finally, I don't think it can ever be stressed enough, the crucial condition for successful software export is quality. But quality is an ellusive concept, and depending on the kind of software it may mean very different things.

2.- Actions, Actors and Intruments

As could easily be seen in the previous section, a country may have at hand many possible actions and instruments to increase its software esport capabilities. In this section I would like to briefly comment on some that may not have been suggested by the above discusion.

A. Information
On the IT market in general, on other exporters, on their intended markets, on competitors, on competing products, on complementary products, on distribution channels, etc. This is sometimes payed by the government, sometimes by export

associations, ocassionally by individual companies.
All successful country-wide export strategy has had a significant investment on information. Canada, India, Chile and Singapore are, to my knowledge, excellent models to learn from.

B. Contracts
A smple but effective way of facilitating software packaging for export has been developed in Canada. Government developments are subject to what they call a "technology transfer contract", by which a software developing company has access to design and code of a given government development. The software company performs further development and packging (which is in turn made available to the government) and is permited to commercialize this new version. The goverment agency where the original development took place serves as a referecnce account, receives a part of any sale and all updates. The purchasing country may receive fianancial backing of the Canadian export bank, and other price and performance guarantees. The Canadian embassy acts as a liason agent for the developer and the purchasing country.

C. Software Developers (and exporters) Associations.
In Mexico, while the government has had a lukewarm attitude towards software export, the Association of Software Developers (ANIPCO) has been actively negotiating support and developing export skills and experience. The same, or even more aggresive is the case of Chile´s CEES plan, sponsored by a consortium of software developers and in collaboration with the Chilean export promotion agency (ProChile).

Among the instruments promoted in Mexico by ANIPCO, and equivalently in Chile, there are direct subsidies and loans for participation in software fairs, and some financial and commercial advise.

D. A National Software Export Company
An original device proposed by Chile is the creation of a company that would provide:
local support (legal and commercial) for chilean companies abroad.
Monitoring of Chilean performance abroad
Expert networking
Commercial Offices

3. Concluding Remarks

As noted elsewhere, Software is a very stratified industry. Significant differences exist among different kinds of software, thus a successful software export strategy will have to be tailored to the specific software promoted.

Quality is a crucial factor, without good quality software no export is possible. But good software is not a guarantee for success, other factors such as access to distribution channels, marketing support, etc. are needed.

Competitive advantages may indeed exist for developing countries in certain areas of software production and commercialization. Culture-dependent developments (such as management, legal and organizational aspects), cutting-edge technologies (where new products and markets are being created) and labor-intensive developments (where relative cost of human resources is significant) are perhaps the three most evident.

Even if at the moment the size of the software market in less-developed countries is relatively small (most studies put it under 10 % of the world market) it is profitable, not insignificant and growing rapidly. This market has yet to be developed, joint efforts of the kind of those stimulated by UNIDO are to be promoted.

The software industry is changing rapidly. Areas that are culture-sensitive such as education and entretainment are barely starting to grow. These areas are more difficult to conquer, since the market is in a sense having to be invented, but also more open, since fewer products and competitors exist as of now. More importantly, in my opinion, these areas are more relevant to the well-being of developing countries, because the way these areas become informatized will either reinforce or alter established cultural mores. I believe that developing countries should preserve their distinctive mores, and that many of these mores may be valuable to other countries and may become more accessible to them if developing countries are the ones who produce the IT-based versions.