Proceedings of the 3rd WSEAS/IASME International Conference on ENGINEERING EDUCATION, Vouliagmeni, Greece, July 11-13, 2006 (pp43-45)

A model for the growth of Mexican SMEs based on the education of their human capital

DIANA CALVA MENDEZ, ALEJANDRO LANDA QUEZADA, MARIO LEHMAN
División de Investigación y Desarrollo, Sofilab SACV
Lisboa 14-A, Colonia Juárez, Delegación Cuauhtémoc, 06600 México DF
MÉXICO, e-mail: dcalva@sofilab.com

Abstract: -. The current situation of most Small and Medium Enterprises (SMEs) in Mexico does not allow them to perform activities that will lead them to shift from commercial to Technological Based Enterprises (TBEs). This, among other factors is due to the education level of their Human Capital. On the other hand, from a macroeconomic point of view, several authors have stated that human development can lead to economic growth. Here, we introduce a new model for supporting the transition of commercial based to TBEs. The proposed model is based on the macroeconomic one presented by G. Ranis and F. Stewart [3]. In our development, profit must be achieved in SMEs based on investing in Human Capital.

Key-Words: - Small and Medium Enterprises (SMEs), Technological Based Enterprises (TBEs), Mexican enterprises, human capital, training and education, management of technology

1 Introduction

As in many other countries, most enterprises in Mexico are Small and Medium Size (SMEs), 51% of them perform commercial activities 36% provide services and 13% perform manufacturing activities. However, most of the manufacturing activity is related with the assembly of goods that are then shipped to other countries. These activities most SMEs are involved with do not leave space for innovation, creation and manufacturing of goods with a high added value. Therefore do not demand personnel with high technical skills or qualifications, today less than 30% of the people employed by SMEs have a university degree. It can be seen that higher qualifications are found in the services oriented enterprises while the lowest are found in the manufacturing sector [1].

In the last five years, with the participation of China in global economy, Mexico has been loosing its competitive advantage regarding cost of labor. Then, as a consequence, many of the assembly activities have moved over to China. This situation and the fact that every year about two million graduates leave universities and go searching for a job, has led the government to launch technological innovation as the engine of progress and economical growth and it is encouraging SMEs to adopt new strategies, involving technology management and innovation. The situation of most SMEs in Mexico, do not allow them to adopt this new way of seeing businesses due to many factors that go from cultural to economical issues [2]. But mainly, with the fact that they lack of the human capital that will help them, shift from commercial, to Technological Based Enterprises (TBEs).

From a macroeconomic point of view, it has been seen that focusing resources on human development eventually generates economic growth, on a macroeconomic study performed by Gustav Ranis and Frances Stewart [3], they state economical growth has been achieved in countries like Chile and Costa Rica because of the investment on human development [2]. This paper introduces a model for achieving growth in SMEs based on the one mentioned before. There are many other works where the importance of human development for achieving economic growth is mentioned [5-6] From a microeconomic point of view, and taking this into consideration, it can be deduced that if SMEs invest in developing human capital they will more easily adopt strategies that will help them go from the economical activities they currently perform to activities involving innovation, development and manufacturing of products with high added value. It also deals with some of the obstacles and implications the proposed model presents for SMEs.

2 Human capital in Mexican SMEs

SMEs in Mexico generate about 30% of all formal jobs and contribute with 43% of the GNP [1]. As can be seen in Fig. 1, most of them are involved in commercial activities while only 13% perform industrial activities.

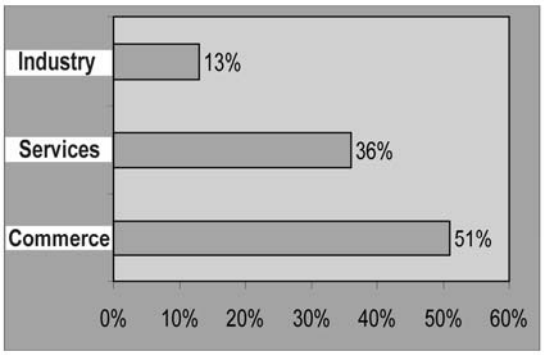

Fig. 1 - Percentage of Mexican SMEs according to their activity.

It is also important to point out that even though Mexico has signed 11 Free Trade Agreements, only 9% of all SMEs export goods or services, while 41% import goods for their local commercialization [4].
These weaknesses of Mexican SMEs have led the government to offer different programs for encouraging these firms to go from commercial based to TBEs, so that they can design and manufacture goods with high added value, suitable for being exported. Many of these programs do not result attractive to most SMEs, because they do not have the Human Capital needed for being involved in management, creation and innovation activities as shown in Fig. 2. It clearly can be seen that in SMEs with manufacturing activities only 7% of their employees have a University degree, while 37.5% only have elementary education (first 6 years of school) [1].

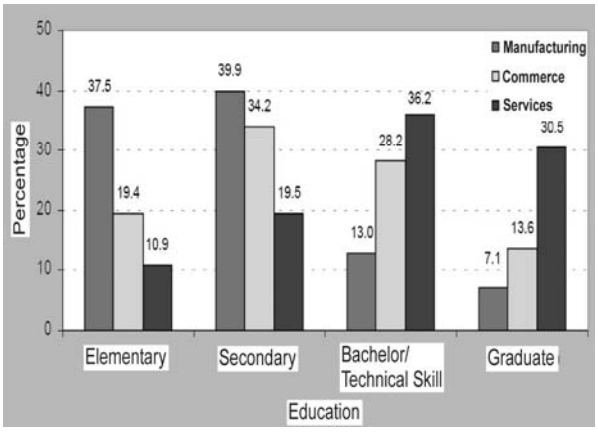

Fig. 2 - Percentage of the degree of education according to Mexican SMEs activities.

In order to drive Mexican SMEs to become TBEs, the development of Human Capital most be encouraged first. Gustav Ranis and Frances Stewart [3] studied from a macroeconomic point of view, economic growth on nations where investment in programs dealing with human development (education, health services) has been significant for several years as is the case of Chile and Costa Rica. Based on this model we propose here an analogue model from a microeconomic point of view, where empowerment of Human Capital in SMEs takes the place of investments directed to human development in a country's economic model.

2.1 Macroeconomic Model, from Human Development to Economic Growth.

Ranis and Stewart state human development and economic growth are linked together and propose a model based on two chains. One running from economic growth to human development (Chain A), as the resources from national income are allocated to activities contributing to human development, while the other runs from human development to economic growth (Chain B), indicating how human development, as well as being an overriding objective, helps increase national income. This model is presented in Fig. 3. The authors analyzed data for the Latin American case to identify the robustness of the two-way connections between human development and economic growth, and to assess the strength of the specific links which make up Chains A and B. They found that as people become healthier, better nourished and more highly educated they contribute more to economic growth [3].

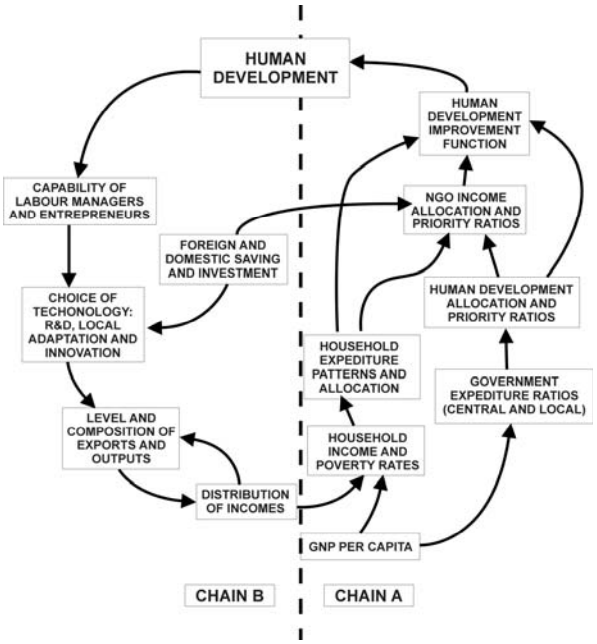

Fig. 3 – Ranis and Stewart model: Human Development and Economic Growth.

2.2 Basing SMEs profit in Human Capital Empowerment

Fig. 4 shows our proposed model for generating profit in SMEs based on investment in Human Capital Empowerment. In this model we suggest SMEs to invest at least 3% of their annual total sales in the development and empowerment of Human Capital. These resources should be distributed in different activities but have to be addressed only to improving Human Capital on the management team as well as on the employees who will be involved in the generation of technology and innovation. Also, they should not only be addressed to obtaining higher education degrees or technical specializations, but also for creating a favorable culture and working methods (managing and creation of teamworks). Once the people involved is educated in working as a team and have the necessary technical knowledge, skills and qualifications, then proper technology and knowledge management will be accomplished. Also better decisions could be taken regarding research and development, as well as in manufacturing, marketing and sales.

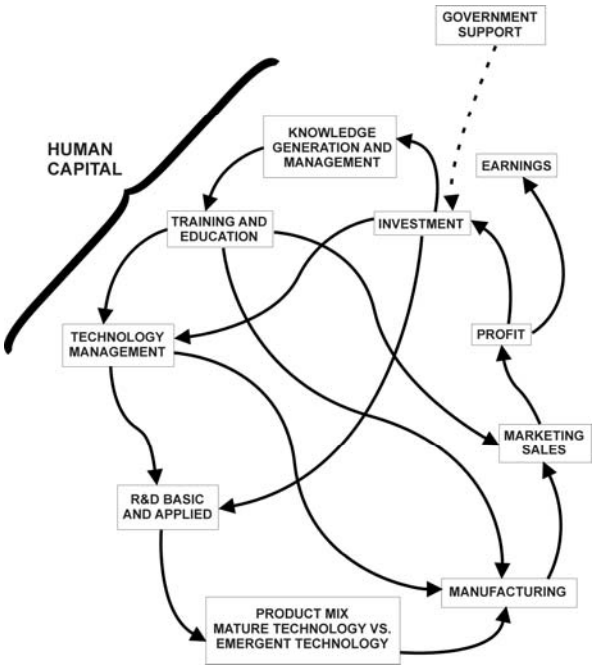

Fig. 4 - An analogue model based on the one proposed by Gustav Ranis and Frances Stewart, for achieving SMEs profit based on investing in Human Capital.

Our experience lead us to come up with the proposed model not only for reducing the gap the personnel involved in research and development had regarding education an technical skills, but also for convincing them and the rest of the organization that for shifting from a commercial to a TBE SME, strong efforts and investment had to be done in promoting the appropriate working culture.

4 Conclusion

It is clear that, to perform innovation activities in order to shift from a commercial based enterprise to a TBE, involves more than just the will of doing it and the proper government support. SMEs must also have the proper Human Capital in order to plan, manage and construct the proper strategy that will lead them to such change. Once the people in a SME willing to go through this change, accomplishes this, it may participate in research and development activities, either by using its own Human Capital, or by collaborating with universities, research centers o other enterprises.

Acknowledgments

This work was supported by Sofilab S. A. de C. V., and partially supported by Consejo Nacional de Ciencia y Tecnología (CONACYT) and Secretaría de Hacienda y Crédito Público (México).

References:

[1]*SME Observatory Mexico*, First Results Report 2002, Mexican Ministry of Economy, March 2003, *in spanish*.

[2]Calva M. Diana, Lehman Mario, "Technology and Innovation in Mexico: a Perspective from Small and Medium-Sized Enterprises (SMEs)", *Proceedings of IEEE International Engineering Management Conference*, Newfoundland (Canada), 2005.

[3] G. Ranis, F. Stewart, "Economic Growth and Human Development in Latin America", *CEPAL Review* **78**, 7-23, 2002.

[4] E. Dussel Peters, "Pequeña y Mediana Empresa en México: condiciones, relevancia en la economía y retos de política", *Revista Economía UNAM* **2**, 64-84 (2004), *in spanish*.

[5] A. Berry, A. (ed.), *Poverty, Economic Reform and Income Distribution in Latin America*, Boulder, Colorado, Lynne Rienner, 1998.

[6] M. Giugale, O. Lafourcade, V. Nguyen, "Mexico A Comprehensive Development Agenda for The New Era", *The World Bank*, Washington, D.C., 12-16, 2001.