

Skills and Employability Department
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Vocational training and productivity

International Labour Office



CINTERFOR

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INTRODUCTION

The connection between skill development and productivity growth is an issue constantly under discussion when analysing competitiveness of countries. The impact of workers' training and educational level on the competitiveness of economies is not only noticed worldwide but also at regional and sub-regional levels.

Recent research conducted by ILO have pointed out the multifaceted aspect of productivity, employment and poverty (World Employment Report 2007, 2005, 2002 as well as the Changing World of Work, 2006). Furthermore, Decent Work in the Americas: An agenda for the Hemisphere has identified vocational training as a specific intervention policy that, among other factors, contributes to improve the conditions of productivity and employment. Furthermore, the main subject to be dealt with during the International Labour Conference in 2008 has been called: *"Skills for improved productivity, employment growth and development"*.

In general, there is wide agreement between the connection of productivity and employment growth both in short and long term. In the same way, those analyses have provided another perspective for public policies and social dialogue that include the objective of maintaining a steady growth in productivity and employment.

These papers have also explained the conditions to create a "virtuous circle" of productivity and employment growth and emphasizes the fact that for most poor workers, more work, unless it is more productive, will not help them to overcome poverty. The development of labour skills and abilities is necessary to foster a joint growth in productivity and employment as well as to efficiently and fairly adopt adjustment processes with the objective of improving productivity. Besides, a safe working environment influences directly on the improvement of indicators that affect productivity growth.

Due to their contribution to the development of skills and competencies, vocational training institutions are a source of comparative advantages to promote the growth in productivity and reflect such growth in more and

better jobs. Other critical factors include social dialogue, macroeconomic policies to increase opportunities of growth that help to overcome poverty, a sustainable business environment and investment in basic education, health and physical infrastructure. A better access to relevant vocational training enables more workers to take advantage of the benefits of technological advance and economic growth and it is an important policy tool to ensure a fair and efficient adjustment process to technological changes.

In Latin America and the Caribbean, institutions specialised in vocational training and skill development have been connected from the beginning to the human factor of the productive equation. Providing qualified and competent staff for the different sectors of the economy has always been their role. More recently, many of them have played a more important role in national agendas of competitiveness and they have diversified their services. Training programmes are increasingly integrating occupational health and safety conditions as a competency to be developed and even as central subjects of complete training programmes.

Although the impact on productivity of this turnabout has not been evaluated, it is clear that the new dynamics in the region would allow a more thorough analysis not only about the new strategic definition of countries regarding their workers' training but also about the way in which public policies have been implemented so as to promote the participation of National Training Institutions in national productivity and competitiveness.

The Technical meeting "The role of vocational training in productivity, employment and development in Latin America and the Caribbean" (Salvador, Bahia, September, 2007) was called with the purpose of analysing experiences of the American region with respect to the connection between ability and skill development and the continuous improvement of productivity and employment.

During this technical meeting a selection of national cases were presented. These emphasised on:

- The description of national policies about the link between vocational training of human resources and the increase in productivity and employment.
- The information and description of experiences that show the relationship among training institutions together with the joint growth in productivity and employment.

- A set of lessons learned, that were useful for action programmes to be taken in the future by ILO and the network of institutions gathered around ILO/Cinterfor.

The following chapters include a selection of the case documents presented by the institutions as well as a programme designed and applied jointly ILO and UNDP.

SENAI from Brazil: It develops its experience with the prospection model of technological and organizational trends that have been implemented in different sectors of the industry in order to facilitate technological advance so that adjustment processes favour a positive transition towards new jobs and a new setting of occupations.

SENA from Colombia: It includes the experience of the National System of Creation and Incubation of Knowledge Enterprises oriented towards the development of the value chain for the creation of new enterprises related to knowledge management and the role assumed by Fondo Emprender in promoting the improvement of productivity and employment. It refers to the way in which these actions are considering the informal economy and SENA's participation in programmes oriented to improve the skills and competencies of such informal economy.

HEART/NTA from Jamaica: As a national institution which has promoted a regional qualification framework that facilitates workers' mobility in CARICOM, its role in training and certifying workers' competencies has been oriented to the economic integration in a competitive subregional vision for CSME (Caribbean Single Market Economy).

SENATI from Peru It is engaged in the development of a technical-level training programme that integrates skills and competencies related to occupational health and safety which may result in the possible effect of improving working conditions and productivity. The document shows the ideas behind and the structure of the programme.

INFOTEP of Dominican Republic. This training institution supports directly other companies of the country with SIMAPRO's methodology which combines the identification of training needs with the implementation of actions to develop skills that may contribute to the improvement of productivity at the level of enterprises. INFOTEP has got a group of company coun-

sellors who have been trained in the methodology and who have highly raised its degree of institutionalisation.

POCET Programme in Honduras: ILO Sub-regional Office for Central America introduced its POCET Programme experience. This programme developed by ILO and UNDP is focused on supporting the struggle against poverty originated from low education and vocational training as well as low labour or productive ability caused by the lack of organization and working opportunities. It seeks to improve life quality of the poorest people in rural areas through an “Education for work” strategy.

This technical meeting was organized by Cinterfor/ILO with the support of the Skills and Employability Department “EMP/SKILLS” and sponsored by the SENAI of Brazil.

With the purpose of activating and managing knowledge applied to vocational training, ILO/Cinterfor has decided to promote the spread of good practices and therefore sharing knowledge regarding the role played by vocational training in the growth of productivity.

SENAI

Institutional environment favorable to technological diffusion

PRESENTATION

The present document is a summary of all trend and prospecting actions that SENAI National Department carried out in the past five years.

The first stage occurred with the development of methodologies that integrate SENAI's Prospecting Model, which counted on the participation of SENAI's Regional Departments and of the main research centers and universities of the country (UFRJ, USP, PUC RIO, FIPE), under the coordination of Unidade de Tendências e Prospecção do SENAI Nacional [National SENAI Prospecting and Trends Unit].

The results generated by the application of the SENAI Prospecting Model in, and until now, eight industrial sectors, enabled us to verify a vast field of applications which revealed unfoldings for the development of technological diffusion actions and modernization actions of SENAI itself. Those actions configure a second stage in SENAI's acting based on prospective studies.

We hope that this document would further contribute towards disseminating and consolidating a prospective vision in the institution.

JOSÉ MANOEL DE AGUIAR MARTINS
SENAI General Director

I. INTRODUCTION

The prospective models -intensively used by large-size companies- and technology's life cycle curve, used mainly by dynamic sectors, are a reasonably recent instrument which application benefits has been reaped by larger size companies and by the public sector of more industrialized countries.

In the new paradigm of the current knowledge society one verifies the intensification of processes such as: (i) innovation and incorporation of new

technologies to productive processes; (ii) economic globalization; and (iii) formation of regional economic blocks; factors that contribute toward the increase of uncertainties involved in the investment decision processes on new technologies of the different economy agents (companies, workers, professional education institutions and government).

In companies, the uncertainties are entailed to the process and timing of adoption of new technologies, reinforced by their technological trajectories and based on learning which involves different professional classes that tend to strongly condition the incorporation patterns of new technologies. This process is even more critical for smaller size companies, for their investment decisions, given their scarce capital resources, will determine its market survival.

For the workers, the uncertainty manifests itself through the risk that the technical progress may promote significant alterations in the professional profile required by the industry and, consequently, in the personal decision regarding further capacity or re-qualification required to keep or improve his “employability” condition from the technical standpoint.

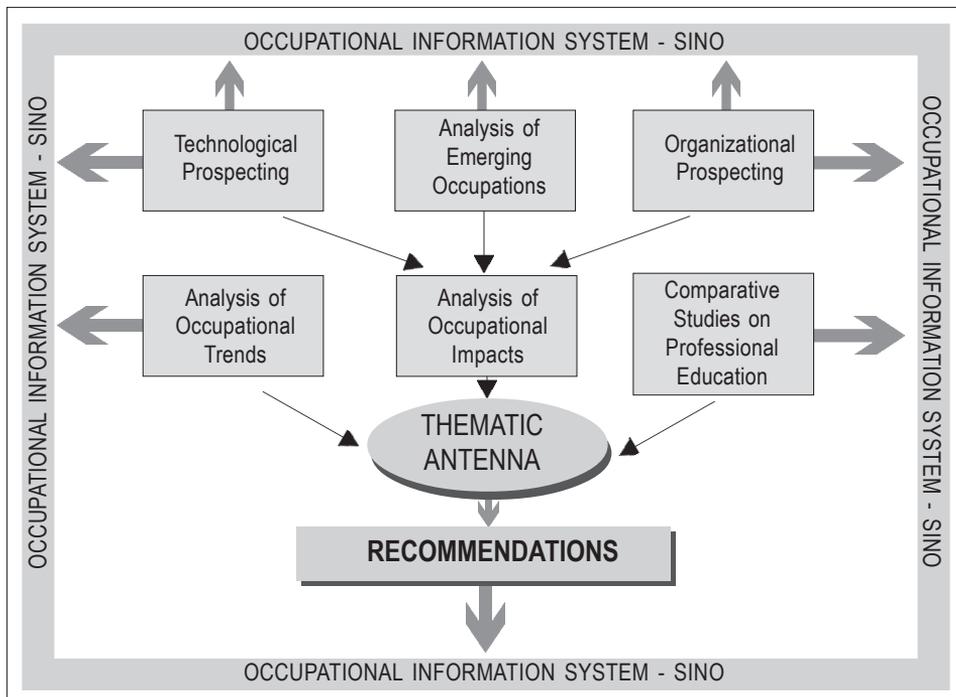
For vocational education institutions, to deal with uncertainty becomes a priority dimension. The risk involved in the investment decision on physical infrastructure and on human resources varies proportionally to how quick the technical progress is incorporated to the productive systems, as well as the adoption of new ways to organize production. In this particular sense, these institutions must be “one step ahead” to be able to respond in due time to company demands and worker demands, and failure as to this provisioning in due time may distance both the local companies’ competitiveness and the “employability” of workers.

For the government, uncertainty manifests itself through the risk of seeing full sectors lose their competitiveness with direct impact upon the local product levels, tax collection, income and jobs.

Thus, in the sense to generate mechanisms that facilitate the decisions of the economic agents, SENAI, conjointly with the main Universities of the Country, developed the SENAI Prospecting Model. The SENAI Prospecting Model enables one to estimate the behavior of the diffusion rates of emerging technologies and the configuration of the organizational formats in the near future, as well as engender estimations of job quantity that will be demanded at every five years. From those technological, organizational, occupational and educational estimations, subsidies are

generated for the development of proactive actions in the fields of professional education and of technical and technological services. The general layout of SENAI's Prospecting Model is revealed below, and then, each of its parts are described:

Figure 1
General Layout of SENAI's Prospecting Model



- **Technological Prospecting:** Purposes to identify Specific Emerging Technologies (TEEs) –characterized by the SENAI Prospecting Model as innovations in development phase, pre-commercial or recently introduced in the market or those with low degree of diffusion despite being known to the market- which will have a diffusion degree of up to 70% of the user market in a time horizon of 5 to 10 years. Analysis of the Conditioning Factors to Technological Diffusion: The

objective of this activity is to identify, as representatives of the productive means and other specialists of the sector, factors that negatively impact the diffusion of the TEEs selected in the technological prospecting.

- **Organizational Prospecting:** Purposes to verify the possible occurrences of certain organizational trends; in the same time horizon defined in the technological prospecting.
- **Analysis of Emerging Occupations:** The study purposes to identify, in certain countries, occupational changes in the studied sectors, classifying them into emerging occupations, undergoing evolution and stable, according to definition of the Bureau of Labor Statistics (BLS) of the United States.
- **Analysis of Occupational Impacts:** The main objective of this activity is to discuss with companies and universities' representatives, the possible impacts of technological and organizational changes in occupations which were identified in the prospecting activities.
- **Analysis of Occupational Trends:** This methodology purposes to project the demand for labor of the national and state labor market, per sector and occupation. Such projection is done based on the building of macroeconomic and sector scenarios. The projections may serve as reference for the adjustment and formulation of professional formation programs by the professional education institutions.
- **Comparative Studies of Vocational Education:** The study aims (through comparative analytical research in countries that are reference in the education of the studied sector) at observing the main changes in the vocational education structure in these countries and check for the possibility of adaptation to the vocational training system offered by SENAI or by other vocational training institutions.
- **Thematic Antenna:** is the final and analytical stage of the SENAI Prospecting Model. In it are discussed all the results obtained in the previous stages. The analysis of those results will enable the generation of Recommendations for the decision-makers of the SENAI System, in regards to the actions of the Professional Education and Technical

and Technological Services, which will enable SENAI to act as a “induction” agent of technological diffusion through actions that would reduce the degree of uncertainty of decision-makers at the TEEs acquisition stage. Monitoring: This activity enables retro-feeding of SENAI’s Prospecting Model. In this phase, it is sought to accompany the occurrence of the results obtained by the prospective studies and occupational trends. These results enable SENAI to develop new actions aiming at providing support to technological diffusion and to modernization of its operational units.

The main results of the SENAI Prospecting Model reside on the technological, organizational, occupation and educational trends analyses related to the economic activity sector where it is applied.

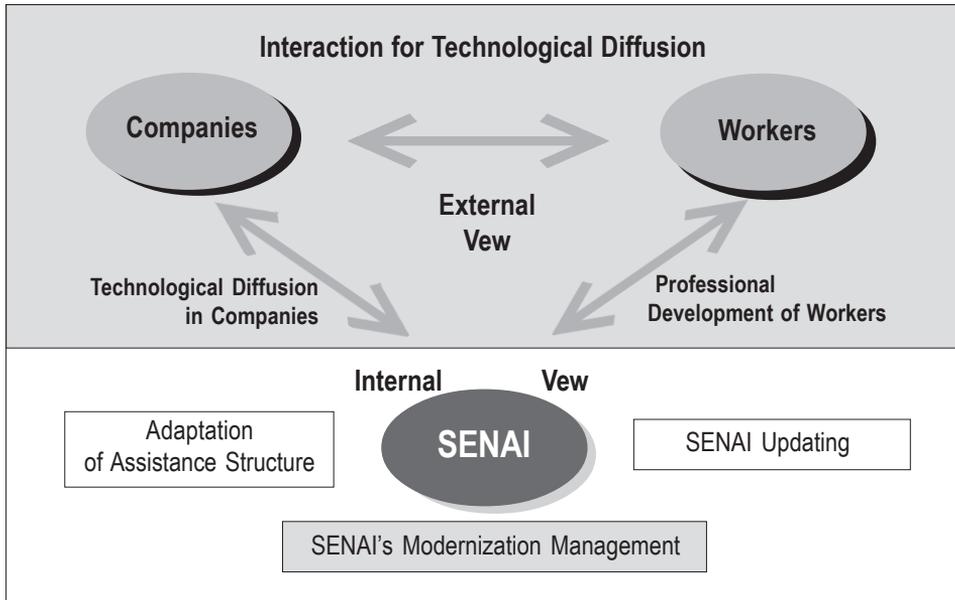
This is the first step in order to reduce the uncertainties of the main economic agents involved in the decision-making processes linked to new technologies. In these decision-making processes there is a strong interdependence in the risks involved amongst those agents, centered in two common difficulties: (a) incomplete information and casual about new technologies (its impacts, use conditions and relative advantages and disadvantages), amongst other characteristics; and (b) absence of an institutional environment that favors the investment decisions through the reduction of risks involved.

Thus, from the main results obtained through the SENAI Prospecting Model actions are developed aiming at forming institutional environment favorable to technological diffusion, in which the professional formation institutions play a central role, according to what is shown below by Figure 2:

From the superior part of Figure 2 above (Interaction for technological diffusion) one comprehends the products developed by SENAI destined to companies and workers and the inferior part (SENAI Modernization Management) and comprehends the products destined to the institution itself (human resources capacity and technological updating).

A brief description of the main results of each one of those topics will be presented in the following section. In item II, a summary of the main results of the SENAI Prospecting Model is presented; the item III deals with Interaction for Technological Diffusion; item IV related to SENAI Modernization Management; and item V will touch on the publications generated by those activities.

Figure 2
Institutional Environment Favorable to Technological Diffusion



II. SENAI PROSPECTING MODEL: RESULTS SYNTHESIS

The new paradigm of the knowledge society and the intense technological innovation process bring an accelerated incorporation of new technologies and organizational formats to productive processes. These factors create an ever more complex operation context to professional formation institutions and technical and technological services provision companies, in which dealing with uncertainty becomes a strategic dimension.

This more complex context derives from a greater mobility of productive capita, of varied and interdependent networks formation of companies located in different regions of the country and even abroad (information technologies and communication technologies facilitate that production decentralization process) and of quick changes in the professional profile of workers. For professional formation institutions those issues render the need to anticipate to technological, organizational and occupational changes im-

perative, so they can better manage their educational and technological processes.

The SENAI Prospecting Model was developed to reach those main objectives and comprises various methodologies, according to what was explained in the previous item. Up until now, the Model was applied in eight (8) industrial sectors, and a ninth sector is in current progress. The sectors are as follows:

- a) Petrochemical;
- b) Textile;
- c) Telecommunications;
- d) Machines and Equipment;
- e) Civil Construction;
- f) Foods (Meats);
- g) Foundry;
- h) Forging;
- i) Shipbuilding and floating structures (in progress).

Below, a summary of the main results reached in each sector is presented, given the proper highlight to: 2006-2010 Economic Scenario; States with the largest employment growth in the Sector - 2006-1020; Participation in the Industrial GDP in 2004; Main Technological Trends; Main Organizational Trends; Main Occupations Trends; Main Educational Trends.

II.a Sector: Petrochemical

Participation of the Sector in the Transformation Industry GDP in 2004:
1%

States with largest employment growth in the Sector - 2006-2010: Rio de Janeiro and Bahia

2006-2010 Economic Scenario

The tax policy will likely not affect Petrobras' investment capacity. Furthermore, the inflation targets will most likely allow an alignment between the internal prices and international prices of oil derivatives during the entire 2006-2010 period. Petrobras will probably implement its pluriannual plan of investments and expand the oil refinement capacity throughout the period, with highlight to the refinement capacity of crude oil. However, in the

short-run, the performance of resins and elastomers production will likely negatively pressure the sector.

Main Technological Trends

- Increase in the importance of management technologies.
- Growth in the use of automation technologies and process controls.
- Growth in the use of technologies that reduce the emission of pollutants -gas and liquid.
- Offer increase of new products based on new polymeric combinations.

Main Organizational Trends

- Approximation between companies from 2nd and 3rd generations.
- Increase of the importance of the Research, Development and Innovation stage of the products.
- The direction of investments is still guided towards the increase of production volume.
- The outsourcing process will tend to grow.

Main Occupation Trends

- Growth of the importance of engineers and environmental technicians.
- Growth of professional specialized in polymers.
- The workers directly involved in the operation of plants will operate full-time as regards detection, diagnosis, actions and accompaniment of action.

Main Educational Trends

- The on the job capacity/enabling will be intensified in companies of the sector and will likely encompass all areas, including R&D.
- Introduction of knowledge related to environmental management and training of technicians.
- Incorporation of related knowledge to management technologies and risk analysis in the training of engineers and technicians.
- Intensification of the knowledge related to polymers materials.

II.b Sector: Textile

Participation of the Sector in the Transformation Industry GDP in 2004: 2%
States with largest employment growth in the Sector - 2006-2010: São Paulo, Santa Catarina, Minas Gerais, Mato Grosso, Bahia, Ceará and Paraíba.

2006-2010 Economic Scenario

Even though the elevation of real income may assure a greater demand for the sector in the period, on the other hand, the keeping of the currency Real valued will tend to reduce its competitiveness. Furthermore, the end of the textile and clothing (ATV) agreement will likely increase the competitiveness of importations, keeping the growth of the sector highly conditioned to the penetration of Chinese products in Brazil.

Main Technological Trends

- Development of new products through new textile fibres.
- Productivity increase through the automation of the spinning and weaving processes.
- Participation increase of “cleaner technologies” in the textile processing segment.
- Use of computer tools in the creation and development stages of confectioned garments.

Main Organizational Trends

- Greater concern with the needs of end clients.
- Offering of greater variety of textile articles.
- Growth of retail companies’ power
- Greater integration among the agents that comprise the productive chain, generating several production and distribution networks.

Main Occupational Trends

- Arising of the Textile Fibres Engineer.
- Growth of Textile Designers importance.
- Reduction of the importance of operational occupations due to the automation process.

Main Educational Trends

- Incorporation of knowledge related to informatics and electronics in the technical and operational education training.

- Increase importance of professionals with holistic vision of the production chain.
- Incorporation of knowledge related to the management and commercialization in the formation of engineers and textile technicians.
- Incorporation of behaviors skills – teamwork and creativity – in the education formation of textile technicians and engineers.

II.c Sector: Machines and Equipment

Participation of the Sector in the Transformation Industry GDP in 2004: 3%
States with largest employment growth in the Sector - 2006-2010: São Paulo, Rio Grande do Sul, Santa Catarina, Paraná and Amazonas

2006-2010 Economic Scenario

The sector will probably continue to present growth in face of the consolidation expectation of economic growth (in case of investment goods), and of the expansion of credit to individuals (in case of durable goods). The reduction possibility of iron and steel commodities prices may benefit producers and machinery and tractor consumers in the coming years.

Main Technological Trends

- Use of information technology in the viability of virtual manufacturing – remotely teleoperating or teleprocessing a certain equipment.
- Increase of product development, using modularization and standardization concepts.
- Increase use of near net shape technologies in which a ever larger number of operations is combined in a single machine.
- Increase use of technologies with high speed cutting concept.
- Increase use of conception technologies and quick prototyping

Main Organizational Trends

- Arising of subsystem assembler companies.
- Dislocation of production process stages (plant manufacturing) to small manufacturers.
- Aggregation by level one companies (manufacturers) of post-sales services.
- Narrowing of relations among the productive chain links and greater integration amongst the various activities of the company.
- Offer increase of services by manufacturing companies.

Main Occupational Trends

- The operational occupations will be more multifunctional with the involvement of these professionals in support functions.
- Arising of Materials Engineer.
- Arising of Automation and Robotics Technician.

Main Educational Trends

- Incorporation of knowledge related to the management of processes in technician training.
- Incorporation of knowledge related to process control technologies in operator training.
- Incorporation of knowledge related to the standards and processes of standardization in the training of engineers and technicians.
- Incorporation of knowledge related to environmental management in the training of engineers, technicians and operators.

II.d. Sector: Telecommunication

Participation of the Sector in the Transformation Industry GDP in 2004:
1%

States with largest employment growth in the Sector - 2006-2010: São Paulo, Rio de Janeiro and Minas Gerais.

2006-2010 Economic Scenario

The improvement of the economic activity will likely bring new perspectives for the demand for data communication. In case of the so-called conventional communication, the perspectives are also favorable, considering the income recovery scenario. It must be observed intensification in the migration process of fixed telephony traffic to mobile in the coming years. Before the increase of competition amongst two services, the use rates are likely to retreat, which may generate an additional stimulus for the demand for conventional calls.

Main Technological Trends.

- Increase of technologies based on convergence of voice, data and multi-media (video) services and the interoperability amongst equipment, networks and software applications.
- Dislocation of the market focus to the flexibility of the passing bandwidth offered, besides the assurance of the service provided quality.

- Growth of xDSL technologies and fiber optics technologies until end users.
- Growth of technologies related to communication safety through the opening of platforms and offering of multi-services in the Telecommunication Networks.

Main Organizational Trends

- Increase of the importance of the specification activities of technical traits and of the service management.
- Increase importance of receptive Call-Centers.
- Increase importance in the development of application software.
- Increase importance of the prototyping, test, validation and homologation activities of system/solution.

Main Occupational Trends

- Arising of the Mobile Telecommunication Systems Engineer.
- Arising of the Mobile Telecommunication Systems Technician.
- Arising of the Microwave Transmissions Technician.
- Increase importance of professionals who harness the systemic view of the productive flow.

Main Educational Trends

- Incorporation of knowledge related to quality control and production management in the formation of operators and technicians.
- Incorporation of knowledge related to the consumer market in the formation of engineers.

II.e. Sector: Civil Construction

Participation of the Sector in the Transformation Industry GDP in 2004:
17%

States with largest employment growth in the Sector - 2006-2010: Many states, but the largest growth is seen in São Paulo

2006-2010 Economic Scenario

In the mid term, the civil construction sector presents favorable expectation, considering the maintenance of the current release of real estate financing. The infrastructure sector only starts to gain weight from 2007 on, after the presidential elections. The functioning of the Private and Public Sectors

Partnerships (PPPs) will only provide relief to the sector after 2010, given the legal obstacles intrinsic to the process.

Main Technological Trends

- Growth of the use of technologies based on subtle industrialization concept.
- Use of Web technologies for project planning stages, managing the execution of the construction work and commercialization of the undertaking.
- Growth in the use of integrated subsystems (bathrooms and ready-doors).
- Growth in the use of technologies for the optimization of the construction stages.

Main Organizational Trends

- Elevated increasing importance of the environmental protection, consumer rights and legislation referring to soil use and occupation.
- Greater approximation and articulation among the links, generating a valued productive chain specific for a certain market niche or type of undertaking.
- Increase importance of the life cycle of the environment built.
- Strong tendency towards outsourcing processes, making service suppliers earn greater importance.
- Growing importance of consultation projects & engineering companies.

Main Occupational Trends

- Increase importance of managerial activities for professionals of the technical area.
- Arising of the job position referent to Productivity Controller in the Constructions Works.
- Arising of the job position referent to Engineering Analyst.
- Arising of the job position referent to Processes Prospecting Engineer.
- Arising of the job position referent to Information Management.

Main Educational Trends

- Incorporation of knowledge related to the management of production in the training of technicians and engineers.
- Incorporation of knowledge related to information technologies in the training of technicians and engineers.
- Incorporation of behavioral skills in the training of operators.

- Incorporation of knowledge about metrology, modulation, rationalized processes and constructive systems in the training of workers, technicians and remaining professionals of the Civil Construction sector.

II.f. Sector: Foods

Participation of the Sector in the Transformation Industry GDP in 2004:
10%

States with largest employment growth in the Sector - 2006-2010: Ceará, Minas Gerais, Rio Grande do Sul, Paraná, Pernambuco, Bahia, Rio Grande do Norte, Santa Catarina, Bahia, Pernambuco and Rio Grande do Norte.

2006-2010 Economic Scenario

This sector will likely be mainly influenced by three factors: a) heating up of the domestic demand; b) maintenance of the competitiveness of the national gross product in the foreign market; and c) world economic growth. It is worth highlighting that the exportations of the sector have been gaining room in a way to represent approximately 40% of the total national production.

Main Technological Trends

- Increase in the development of innovations in the genetics, nutrition and animal health areas.
- Increase use of technologies that enable a strict monitoring of the sanitary requisites and of food safety.
- Increase use of technologies that aid in the increasing expiration date of commercialized products.
- Growth of technologies based on new materials and packaging methods.

Main Organizational Trends

- Increase importance of environmental legislations and inspections in importer countries.
- Diffusion of the certification systems.
- Increase importance of policies related to the control and regulation of genetically modified products.
- Increase importance of traceability systems.

Main Occupational Trends

- Operation of transversal occupations to the sector, such as Biotechnologists, Biotechnology Laboratory Technicians and Logistics Analysts.
- Increase importance of professionals who have knowledge about clean technologies and group vision.
- Increase importance of professionals who study the consumers, their expectations and demands.
- Arising of new related activities to the genetically modified organisms (GMO).

Main Educational Trends

- Incorporation of environmental and social dimensions in the training of all professionals who work in this sector.
- Incorporation of knowledge related to the characteristics of the end consumer in the training of food engineers.
- Incorporation of knowledge related to the certification processes in the technicians' training.
- Incorporation of knowledge related to hygiene, health and safety in the training of operational professionals.

II.g. Sector: Footwear

Participation of the Sector in the Transformation Industry GDP in 2004: 1%
States with largest employment growth in the Sector - 2006-2010: São Paulo, Ceará, Minas Gerais, Bahia and Goiás.

2006-2010 Economic Scenario

Despite of the elevation of real income having assured a larger demand for the sector in the period, the maintenance of the appreciated currency exchange, which reduced the competitiveness in the sector, and also, the negotiations of the Brazilian Government with China and Argentina, may result in a reduction of growth potential.

Main Technological Trends

- Increase of offering of new products incorporated to new materials.
- Increase use of “cleaner technologies” in the gluing and finishing stages.
- Increase use of information technologies in the development, distribution and commercialization stages.
- Increase use of management technologies in production management.

Main Organizational Trends

- Increase importance of labor legislations and inspections in importer countries.
- Increase importance of environmental control Governmental programs.
- More intense use of standardization and certification systems through seals related to quality, respecting the environment and social responsibility actions.
- Larger adoption of lean manufacturing systems by the manufacturers.

Main Occupational Trends

- Increase importance of Fashion Designer.
- Increase importance of professionals with managerial and sales view of the sector.
- Arising of the materials technician function.
- Arising of the materials engineer function.

Main Educational Trends

- Incorporation of knowledge related to supply chain management in the technicians training.
- Incorporation of knowledge related to computer tools for developing and modeling in the training of technicians and fashion designers.
- Incorporation of knowledge related to biomechanics in the training of technicians.
- Incorporation of knowledge related to environmental management including topics about legislation, treatment of wastes, recycling and environmental responsibility in the training of technicians.

II.h. Sector: Foundry

Participation of the Sector in the Transformation Industry GDP in 2004: 1%
States with largest employment growth in the Sector - 2006-2010: Minas Gerais, São Paulo, Pará, Bahia and Maranhão.

2006-2010 Economic Scenario

The possible increase of the real income of workers may provoke an elevation in the consumption of durable and non-durable goods, which, in turn, mainly use copper and aluminum as inputs. The international prices may decline from 2006 on, in face of a possible elevation of the North-American interest rate and of the increase supply of the main producers of non-

ferrous metals. In Brazil, investments for the increase of copper and aluminum production of Companhia Vale do Rio Doce and the investments of Grupo Votorantin (aluminum) will likely assure an expansion scenario towards the production of the sector in the forecasted horizon.

Main Technological Trends

- Increase use of new materials in forged pieces.
- Increase use of cleaner technologies in the molding process.
- Increase use of management technologies related to the certification systems and managerial tools.
- Increase use of technologies for the reuse of foondry rejects.
- Increase use of management and process simulation software.

Main Organizational Trends

- Increase of the importance of environmental legislations and inspection in importer countries.
- Increase importance of the safe-guarding actions of importer countries.
- Growth of Commercialization of products through electronic transactions (Internet, B2C, amongst others).
- Adoption, by forging companies, of production systems based on cells.
- Establishments of environmental seals by the manufacturers of end products.

Main Occupational Trends

- Increase of employment opportunities in the sector for occupations in the environmental area.
- Increase importance of Research and Development Professionals.
- Increase importance of professionals involved with costs management.
- Increase importance of professionals involved with certification and quality systems.

Main Educational Trends

- Incorporation of knowledge related to Brazilian Regulating Standards (NRs) and environmental and quality certifications in the training of technicians and engineers.
- Incorporation of knowledge related to quality and environmental management tools in the training of operators.
- Incorporation of knowledge related to the management of technological innovation in the training of managerial level professionals.

III. INTERACTION FOR TECHNOLOGICAL DIFFUSION

SENAI's actions to assist the creation of a favorable environment for the diffusion process of new technologies are established considering two different levels. One external, in which SENAI acts together with companies and workers through dissemination of technological information, curriculum reformulation and occupational information (Interaction for technological diffusion), and one internal, where SENAI creates a permanent process of modernization management in a way to supply the current demand and prepare itself for that demand that is being stimulated through its diffusion actions (SENAI's Modernization Management).

The operation alongside companies and workers is based on the premise that the diffusion process of new technologies begins with the dissemination of technical and market information, which contributes to reduce the degree of uncertainty in the decision-making process for the purchasing of those technologies. For such, SENAI's National Department created the SENAI Technological Diffusion Project, which organizes a series of activities and elaborates specific documents to operate in technological diffusion processes conjointly with companies and SENAI professors and technicians. In the following lines, we present the diffusion actions for companies, given that the actions for professors and technicians will be presented subsequently, in a specific item.

III.1. Technological Diffusion in Companies

SENAI's Technological Diffusion Project seeks to disseminate to businessmen of specific industrial sectors (and also to professors of SENAI itself, as we will see in the next item) information about Specific Emerging Technologies, prospected by SENAI's Prospecting Model, which will provide greater probability of diffusion in the next 10 years. For the dissemination of that information five supplementary tools were selected: SENAI's Technical Diffusion Workshop; Guided Visit to Technological Fairs; "IN TIME Technological Diffusion"; Technological Diffusion Bulletin; Technical Study about Specific Emerging Technologies. Those tools are detailed below.

III.1.a. SENAI's Technological Diffusion Workshop

It purposes to present the SENAI's Prospecting Model results to the considered sectors and, in a more detailed fashion, supply information about a set of Emerging Technologies prospected by SENAI's Prospecting Model. That information is presented by technicians through panels. Businessmen have their participation guaranteed in those events. During that time, the participating businessmen fill out questionnaires that seek to map their knowledge about Specific Emerging Technologies and identify the technologies that have greater diffusion potential.

III.1.b. Guided Visit to Technology Fairs

Proceeding with the technical information dissemination process, a visit is planned to the main suppliers of the Specific Emerging Technologies. For such, the participants will have to fulfill a script that was established in the end of SENAI's Technological Diffusion Workshop. Furthermore, the visit to the Technological Fairs is one of the tools used by the technological diffusion monitoring methodology used by SENAI. As a supplement of this activity, the participants fill out another questionnaire that -based on the premise that the Technological Fairs may be considered indicators of innovation for industrial sectors- seeks to identify, according to the perception of the participants, new technological trends for the sector considered.

III.1.c. "In Time Technological Diffusion"

This publication is the result, prepared in journalistic language, of workshops and visits to Fairs. It is elaborated by a journalism professional that bears as his/her function, synthesize the information generated during the workshop, and interview the participants seeking their impressions and perceptions about the events. The "In Time Technological Diffusion" is distributed through the Technological Information Nucleuses of Regional Departments to the Operational Units and companies of the sectors considered.

III.1.d. Technological Diffusion Bulletin

The Technological Diffusion Bulletin seeks to increase the dissemination scope of the information about the Specific Emerging Technologies. The Bulletins are released every quarter and its distribution is done through electronic means or in printed form. This letter is sent to a group of interest companies of each Regional Department, as well as to sector professors and

institutions through the Nucleus of Technological Information or SENAI Schools.

III.1.e. Technical Studies about the Specific Emerging Technologies

These studies –developed by universities– purpose to generate more detailed theoretical and empiric information about the purchasing and use of emerging technologies. For such, secondary sources and case studies are used that present real data about the importance of the technologies for the companies which hold them. The study contemplates the following topics:

- **Technical Description**

In this topic, each TEE of each technological segment will have its technical description presented, taking into account: composition or structure of the technology; principle of functioning and functioning; functions and functionality (in case of product technologies); possible new products generated by technology; relative advantages (cost x benefit) in face of the replaced technology (in case there is replacement); list of suppliers, their main characteristics and their national or regional distribution; financing lines for acquisition of TEES.

- **Case Study**

In this topic, it will be presented case studies of companies that use the studies TEES. In this study, the possible real productivity and market gains of the company after the acquisition, use or development must be presented; new products generated from the technology (if any); relative advantages in face of the replaced technology according to the users' perception; the technology transference process and the possible cares observed during the process.

III.1.f. Summary of technological diffusion actions in companies

In 2007, four workshops were set up and five guided visits were made to technological fairs, involving 42 people and 25 lecturers. A summary of the technological diffusion actions in companies, carried out in 2007, is laid out on Table 1.

Table 1. Technological diffusion actions: workshops and fairs (2007)

Events	2007		
	Number of events	Participants	
		Businessmen	Lecturers
SENAI's Technological Diffusion Workshop	4	42	25
Technological fairs	5	42	-

We can have an approximate idea of the effectiveness of those actions processing the evaluation questionnaires that the employees filled out in the end of those events. Considering that questionnaire of related items the “importance to the sector of the approached themes”, “applicability of the themes in their activities” and “adding of new knowledge”, 93% of the businessmen evaluated those activities as excellent or good. That is, those events, in the view of the businessmen, helped the comprehension of the new technologies.

Another questionnaire applied during those activities contributes to the monitoring of the prospected emerging technologies diffusion rates. Considering all the businessmen who filled out that questionnaire, we identified a current diffusion rate of emerging technologies in their companies around 33%. When we asked about the diffusion in the next 5 years, the diffusion rate reached 79%. That trend is precisely the expected rate for the technology diffusion curve, once that the expectation is that those technologies present a lower diffusion rate in the present and more elevated in the future.

Considering the technological diffusion actions, in the prism of the publications that contain more detailed information about the emerging technologies, we reached 23 distinct headings with number of copy published of 11,800, according what is shown on Table 2.

Table 2. Technological Diffusion Actions: publications (2007)

Publications	2007		
	Number of Publications	Copies per Publication	Total
Technological Diffusion Bulletin	13	600	7,800
“In Time” Technological Diffusion	5	600	3,000
Technical Studies	5	200	1,000 *
Total			11,800

* Forecast for 2008.

III.2. Professional Development of Workers

The actions derived from SENAI Prospecting Model directed towards the Professional Development of Workers may be grouped in Curriculum Updating and SENAI's Occupational Information System (SINO)

III.2.a. Curriculum Updating

The actions guided toward the Curriculum Updating are inserted in the assistance of designing new occupational profiles, which occurs under the ambit of the Sector Technical Committees, coordinated by National SENAI's Professional Education Unit. Those committees are consultation forums installed in order to debate about subjects related to education and employment. They comprise professionals from various internal and external segments to SENAI, which practical and theoretical know-how and vision of the future contribute to guide the decision-making process in what regards the professional education actions. The main functions of the committees are:

- Define professional profiles based on competencies, contemplating parameters that enable performance appraisal.
- Permanent updating of professional profiles.
- Supply subsidies for the elaboration of standards for professional certification.

The information generated by the application of the SENAI Prospecting Model to the occupational industrial sector considered, contextualizes a future scenario in which the occupations in question will probably act. That information is fundamental for the fulfillment of a determined stage of the professionals' profile definition methodology based on competencies, which seeks "to identify and diagnosis trends related to the sector, upon the type of necessary academic formation and future perspectives". So, the profiles generated by the committees will be apt to assist not only to the current needs of the industrial demand, but also to those future needs conditioned by the diffusion of new technologies and organizational changes.

That information has already been taken to the Sector Technical Committees, given that eight in the civil construction sector and one in the textile confection sector (Table 3). The occupations which establishment of profiles had the insertion of SENAI's Prospecting Model information were as follows:

Table 3. Sector Technical Committees with the insertion of information of SENAI's Prospecting Model

Sector	Occupations
Civil Construction	Undertaker
	Shapes Carpenter
	Low Voltage Building Installer Electrician
	Building Gas Plumber
	Foreman
	Bricklayer
	Industrial Installer
	Civil Construction Painter
Clothing Confection	Technician in Clothing Confection

The effectiveness of that insertion in the sector technical committees may be verified by the analysis of new performance¹ patterns and competency elements² established for the occupations in focus, according to what is described below.

III.2.b. Curriculum Updating Results

Once the information generated by the SENAI Prospecting Model is related to the possibility of change of activities (tasks) of certain occupations, one may establish as indicator the modifications identified in the performance standards and competency elements that are related to the information generated by SENAI's Prospecting Model. Below, some examples of information use generated by SENAI's Prospecting Model in selected occupations of the civil construction sector are presented.

Occupation: Bricklayer

- Competency element: Carry out structural masonry
- Information generated by SENAI's Prospecting Model: Structure masonry was a Specific Emerging Technology that will have major diffusion probability.

1 Performance standards, according to the established methodology, are actions that together enable the professional to reach a competency element.

2 Competency elements - Are groups of activities that together enable the professional to execute a certain task.

Occupation: Foreman

- Competency Element: Manage work teams; participate in the construction work executive planning
- Information generated by SENAI's Prospecting Model: Increase use trend of management tools in the construction work site; approximation trend amongst the technical and operational levels.

We also asked the technicians responsible for the conception and conduction of the works of the Sector Technical Committees to make an evaluation of the insertion of the prospecting data in the meetings of the Civil Construction Committees. One of the responsible parties informed us that:

"The information supplied constituted a rich source of data that subsidized and provided scientific basis to the developed work with the various National Sector Technical Committees for the elaboration / validation of the following professional profiles: Undertaker, Shapes Carpenter, Low Voltage Building Installer Electrician, Building Gas Plumber, Foreman, Bricklayer, Industrial Installer and Civil Construction Painter. The Committee was constituted by several specialists from the technological area being studied, their components brought forth to the realization of the elaboration / validation work of the professional profiles their technical know-how and their experiences in the job market, which combined and crisscrossed with the research data grant greater scientific validity to the information gathered, for it enabled in certain periods to check the information when doubts arose and in another time, confirm the gathered information." (Responsible 1, Sector Technical Committee).

The other responsible, of whom the evaluation was solicited from, declared:

"The results of the prospecting of the Civil Construction area presented to the Committees in a synthetic form, with the aid of power point slides, soon after the opening of the efforts were part of one of the important stages preconized in SENAI's methodology for the establishment of professional profiles based on competencies, that is, the Input for the profile definition. It was constituted without any doubt, through relevant documented source, drawing the interest and questioning of the participants, beside other sources as the Brazilian Classification of Occupations (CB) and national Classification of Economic Activities (CNAE).

Considering that, it is desirable that the prospecting studies related to professional profiles to be defined by the Sector Technical Committees – national or regional – if any, would be presented to the Committee members, given that

those subsidize the establishment of the Professional Profiles, both as to the Professional Competencies itself and the Qualification Work Context.” (Responsible 2, Sector Technical Committee).

III.2.c. SENAI Occupational Information System

Occupational information system work as an important referential for the elaboration of strategies and actions plans for companies, workers, students, professional formation institutions and governmental bodies be able to face the challenges of an ever more competitive job market. Moreover, the more information is generated in a context that incorporates signs of future job market behavior, the more valuable that information is.

For those reasons, SENAI developed an occupational information system, which services as an efficient indicator of job market trends. It is elaborated through a detailed data survey, made from the Industry Occupational Families, identified in the Brazilian Classification of Occupations from RAIS (Annual Social Information Registration of the Labor and Employment Department) from PNAD (Annual Sampling Survey per Domiciles) and from the occupational trends analyses.

SENAI’s Occupation Information System comprises three Websites, with the following names: *Almanaque de Profissões* [Professions Almanac], *Profissões Industriais* [Industrial Professions] and *Sentinela Ocupacional* [Occupational Sentinel].

The Professions Almanac is destined to the youth. In times of intense job market competition, those who possess greater knowledge about the profession and who present the necessary competencies required by companies have a head start. The choosing of a profession and the first job opportunity are dilemmas faced by our youth. To know more about a given profession and invest on professional formation may be excellent steps for those who want to grow professionally.

SENAI, pondering about aiding young adults through the clarification process about professional careers of the industrial sector, elaborated the Professions Almanac. In it, the young candidate obtains information about the activities performed in the daily routine of the job, what companies expect of a certain type of professional, where the young person may prepare him/herself to exert the professional and what disciplines will be emphasized through the formation program.

The Industrial Professions website contains occupational information for human resource managers of companies, while the Occupational Sentinel website is destined to the professional who is employed or unemployed and suggests some occupational mobility possibilities. The Occupational Sentinel Website is under development.

IV. SENAI MODERNIZATION MANAGEMENT

SENAI's Modernization Management represents SENAI's most effective way to operate towards an Institutional Environment Favorable to Technological Diffusion. It means that SENAI not only induces technological diffusion in companies, but also seeks to adapt itself to that diffusion process.

Thus, SENAI's Modernization Management objective is to render flexible, adapt and permanently update the professional education actions and the technical and technological services actions of SENAI units.

In order to reach that objective it was developed a methodology that considers a set of indicators that take into account the current and future dynamics of the productive system in the inclusiveness area of each SENAI unit. Some types of modernization are defined due to the needs of the Regional Departments and associated to the behavior of those indicators (nine types of modernization were defined). Thus, a unit may not be eligible for any one of the modernization types, at the same time that it may be eligible to more than one. For each type of modernization a technological module is defined and a human resources capacity module is defined as well.

SENAI's Modernization Management methodology is used in SENAI System's Modernization Program for Industrial Competitiveness, which focuses an industrial sector in which SENAI operates. The first stage of that process is substantiated in the elaboration of Regional Updating Plans and of a National Plan.

In order for the Modernization Management methodology to be efficiently applied, a System was deemed necessary.

IV.1. Permanent Modernization Management System

The Permanent Modernization Management System renders viable the application of the modernization management methodology and was organized considering some dimension:

- a) establishment of rules for the elaboration of updating plans, defined by the technical and executive instances and divulged to all the Regional Departments;
- b) definition of indicators and criteria (showing the current and future behavior of demand and supply of each Unit) to be applied to all units, in a way that an alteration in any indicator or criteria may be valid for the group of units;
- c) elaboration of an operational procedure manual containing the procedures for the filling out of questionnaires, as well as the explanations for all the indicators and eligibility criteria of the Units.

A portion of the indicators used in SENAI's Modernization Management is linked to the future behavior of employment in the area which encompasses each unit, obtained through the Analysis of Occupational Trends. The main purpose of the Occupational Trends Analysis is to estimate the qualified labor demand, in a way to anticipate the formation of professional education actions, and technical and technological services actions.

The analysis of the occupational trends uses the input-product method that, in general, consists in calculating the impacts upon the national and state employment per sector, from variations projected of the aggregate demand for various sectors of the Brazilian economy, based on technical coefficients of the input-product matrix. Thus, the projection of jobs for the inclusiveness area of each unit has the methodological support of the input-product matrix of the Brazilian economy.

Another part of the indicators is associated to the effective rate of diffusion of certain technologies, which will be dealt with on item IV.3 (Technological Updating).

The operationalization of the System occurs through a set of tools that assure the choosing of units to be modernized in each type of modernization.

The tools are the following:

- Database: a relational database was structured in which themes are dealt such as Projections of New Jobs, Technological Diffusion, data

about SENAI's Assistance, Competition etc. It also services as reference for the Business Intelligence (BI) platform;

- The Business Intelligence (BI) Tool: a tool supplied by Hyperion is used, which is considered the global leader in Business Performance Management software;
- WEB consultation mechanisms: WEB consultation mechanisms were developed to the DR (validation of inclusiveness areas and choosing of the Units for Modernization), interconnected to databases and to BI tools.

IV.2. Human Resources Capacity

An important contribution by SENAI's Prospecting Model to the capacity of human resources of SENAI is linked to SENAI's Modernization Management. Given that there are other equally important contributions, it was decided to organize a specific item to deal with that team (Item V).

IV.3. Technological Updating

SENAI's Modernization Management encompasses a permanent process of technological updating, characterized by dynamic productive system in the inclusiveness area of each unit.

Until now, the technological updating occurs for the basic and technical professional education action levels and for the technical and technological services actions. According to the need and to the dynamism of the productive system, the modernization may enable expansion, supplementation, replacement and improvement of equipment and facilities. For each type of modernization, technological modules were defined, comprising mature and emerging technologies.

As SENAI's Modernization Management preconizes low investment risk, the demand indicators are very important for the decision of choosing each type of modernization in each unit. One of those indicators refers to the effective rate of diffusion of technologies that comprise each technological module.

In order to calculate the effective rate of diffusion of technologies that comprise each technological module a survey was developed, in a statistically representative sample of companies of the machines and equipment

sector, based on interviews with closed questionnaires. The technological diffusion survey for the Machines and Equipment sector had national inclusiveness with the participation of all SENAI Regional Departments.

IV.4. "IN TIME Modernization"

Seeking to announce all the modernization actions, it was granted a divulging instrument named "*IN TIME Modernization*". Written in journalistic language, that instrument summarizes the actions developed in each stage of the modernization process and links interviews with participants of the process and institution directors. In 2007, three of those publications were elaborated totaling 1,800 copies.

V. HUMAN RESOURCES CAPACITY

Human Resources Capacity linked to Institutional Environment Favorable to Diffusion may be dismantled into four dimensions: SENAI's Modernization Program; SENAI's Technological Diffusion Project; Contribution to the National Capacity Program of Professors; Publications.

V.1.SENAI's Modernization Programme

Under SENAI's Modernization Programme ambit the capacity given to human resources is guided towards the use of technical basis that the referred Program will modernize in each participating unit. In this case, the capacity provides, for each technology, a module that may be dismantled into the following dimensions: leveling; suppliers and technical delivery. According to the technology, the number of hours varies for each component, given that for some technologies the leveling capacity program will not be needed.

V.2. SENAI's Technological Diffusion Project

Under SENAI's Technological Diffusion Project ambit, SENAI's Technological Diffusion Workshop ambit and the ambit of the Guided Visit to Technological Fairs also count on the participation of SENAI technicians and

professors, which represents a very efficient mechanism characterized by updating and dissemination of information about emerging technologies.

In that opportunity some questionnaires are applied, given that one of them purposes to perform a mapping of the know-how of professors about Emerging Technologies and of suggestions about possible updating and capacity strategies. In 2007, the participation of SENAI's professors and technicians in the diffusion activities reached 62 participants, according to what is presented on Table 4 below.

Table 4. Participation of SENAI's professors and technicians in technological diffusion activities

Events	2007	
	Number of Events	Participating Professors
SENAI's Technological Diffusion Workshop	5	62
Technological Fairs 5	62	

V.3. Contribution to the National Programme of Professor Capacity

SENAI National Department's Professional Education Unit develops a National Program of Professor Capacity. The information derived from SENAI's Prospecting Model has also been incorporated to that Program, such as the case of the Program guided towards civil construction professors.

V.4. Access to Publications

All the publications generated by SENAI's Prospecting Model, particularly the Recommendations deriving from the Thematic Antenna (see item 6) are distributed to SENAI's professors and technicians.

In the same manner, the publications generated in SENAI's Technological Diffusion Project are also sent to SENAI's professors and technicians: "*In Time Technological Diffusion*", based on SENAI's Technological Diffusion Workshop, where discussion panels are set up about new technologies and in the Guided Visits to Technological Fairs; *Technological Diffusion Bulletin* and the *Technical Studies about Specific Emerging Technologies*. Furthermore, those publications are available on the UNITEP's website.

VI. PUBLICATIONS

SENAI's Prospecting Model comprises a set of methodologies for prospecting and trend analysis and generates structured and contextualized information to aid the institutional decision-making process. In order to direct and map future trends, studies are carried out according to those methodologies, which give birth to numerous publications.

The studies and main results referent to the SENAI Prospecting Model originate the publications category named Série [Series]. They are:

- Thematic Antenna;
- Technological and Organizational Diffusion;
- Sector Studies;
- Emerging Occupations;
- Technological and Organizational Studies;
- Occupational Studies;
- Occupational Papers;
- Educational Studies;
- Methodological Documents;
- Modernization

The publications that divulge the results of the SENAI Prospecting Model with a defined periodicity are grouped in the category named Periódico [Periodical]: They are:

- Occupational Bulletin;
- Technological Diffusion Bulletin;
- Formal Employment Projections;
- Publications Catalog;

Besides the Series and Periodical categories, the studies that deal with themes that may widen their importance in the future are organized in the Em Tempo [In Time] category, divided up into three parts:

- IN TIME;
- IN TIME Technological Diffusion;
- IN TIME Modernization.

Finally, there is a line of publication editing with other institutions that present affinity with the thematic encompassed in SENAI's Prospecting Model. The publications Em Parceria [In Partnership] are the following:

- SENAI's Prospecting Model - Methodological Document (SENAI/OIT/Cinterfor);
- Brazilian Life Industrial Professions (SENAI/UnB);
- Research and Development at SENAI: Impacts upon Industry and Professional Education (SENAI/OIT/Cinterfor).

In the period between 2003 and 2007, 103 distinct editions have been published, totaling approximately 60 thousand copies. Fifty thousand folders have been published, besides the elaboration of CDs and DVDs about SENAI's Prospecting Model and other themes. That material was first distributed to the Regional Departments and their Units, besides other institutions of the Industry System. Unions, Associations and university specialists directly involved in the prospecting activities also received those publications.

Productivity, entrepreneurship and employment

Juan Camilo Montes Pineda

*“A sound entrepreneurship policy should be underpinned on three pillars:
i) Learning within the frame of Productivity and Entrepreneurial Thinking,
ii) Formal Development of a Supporting Industry, and
iii) Implementation of creative sources for enterprise financing”.*

I. INTRODUCTION

The particular forces of economic globalization and the actual Colombian context demand that existing enterprises increase their productivity and competitiveness hand in hand with the renewal of their productive processes and a revised use of their resources. Taking this into account, it is evident that existing companies cannot offer the number of new jobs that recent graduates (either from Technical, Technological and Academic Training) are requiring. In this sense, employment generation – which is undoubtedly related with massive creation of new enterprises, led by entrepreneurs – becomes an essential tool for society and for strengthening domestic economy.

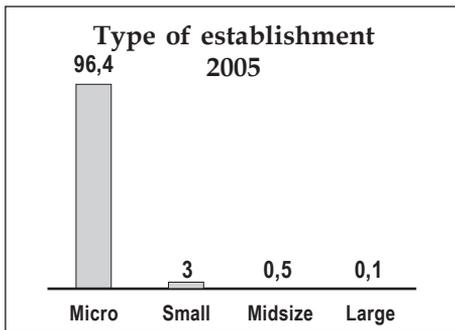
In Colombia, in the year 2000, the national unemployment rate was 20.5%, youth unemployment came close to 45% and rural unemployment amounted to 30%. According to the 2002 World Competitiveness Yearbook, Colombia ranked 47 among 49 countries regarding its image abroad, 44 among 49 in brain drain, and 46 among 49 with respect to unemployment.

Colombia's total population is composed of 50.9 % of women and 49.1% of men. 75% of its population lives in urban areas and 25% in rural areas. According to the last population census, there are 42,090,502 Colombian citizens, of whom 17,333,692 represent the economically active population and close to 5 million belong to the formal economy made up by public and pri-

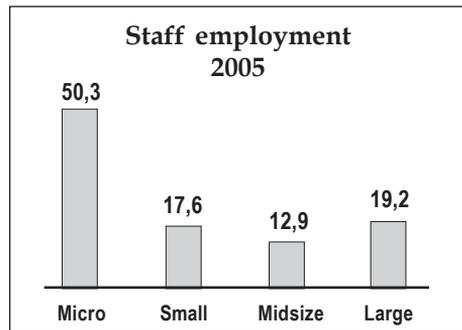
* With the important assistance of staff members of the SENA's Director-General Office: Beatriz Eugenia Mejía Asserías, Jesús Galindo Galindo, Claudia Marcela Farfán, Emperatriz Talero, Carlos Andrés Cruz Gartner; and the very special help of Isabel Cristina Rubiano de la Cruz. More information on: <http://jcmontesp.spaces.live.com>.

vate sectors and the economic solidarity sector. 60% of the economically active population carries out informal activities and the unemployed population accounts for 12.39%.

The 2005 General Census showed that Colombia's business structure is mainly composed by micro, small and medium-sized enterprises, which are the main employment sources. Microenterprises account for 96.4% and small and medium-sized enterprises for 3.5%. Overall, microenterprises and small and medium-sized enterprises (SMEs) generate 81% of Colombia's employment. The most relevant features of microenterprises to be pointed out are: i) their high levels of informality, ii) their low levels of partnership, iii) the narrow markets their products are targeted to, iv) their human resources' low technological and training level, and v) their limited access to the financial sector.



96.4% of establishments are microenterprises and 3.5% are SMEs



Microenterprises and SMEs generate 81% of employment

Source: National Planning Department (DNP). 2005 Economic Census. CDM and DNP – DDE estimates.

In Colombia, we should speed the pace and concentrate major efforts on improving productivity and competitiveness. The 2006 Global Competitiveness Index of the World Economic Forum showed that the country lost seven positions, falling from the 58th to the 65th position in a sample of 124 countries. The last study by the International Labour Organization (ILO) analyzing the world's labour situation indicated that, between 1985 and 2005, Colombian workers' productivity only rose at an annual pace of 0.7%, while Eastern European countries –Poland, Albania, Slovenia, among others – achieved a 4% annual average and China, 5.7%.

In line with this background and in the context of institutional revitalization, SENA is faced with a great challenge: If we train our trainees for

employment, when they find it, it will be in existing microenterprises with high productive deficiencies.

In view of this challenge, SENA must train its trainees for jobs in enterprises that do not yet exist, jobs that will be generated as trainees opt for the creation and establishment of new businesses.

Consequently, SENA (*Servicio Nacional de Aprendizaje*) (Colombia's National Training Service) in the frame of its Strategic Plan "SENA 2002-2006, SENA: A Knowledge Organization", considers Entrepreneurship as a strategic vector in transforming the Institution. "We intend to make entrepreneurs of all trainees", states Darío Montoya Mejía, its General Director.

New enterprises, promoted by entrepreneurs, are mainly micro, small and medium-sized businesses. They will be productive due to the knowledge acquired by their entrepreneurs.

This Entrepreneurship policy is underpinned by three pillars:

1. Vocational training, education and, in general, learning within the frame of productivity and entrepreneurial thinking.
2. Formal development of a Supporting Industry.
3. Implementation of creative sources for enterprise financing.

This paper aims to describe this entrepreneurship policy, its major projects and its main achievements: An entrepreneurship policy inserted in the labour market's productivity and competitiveness.

In Colombia, the evolution during the last five years demonstrates that we are on the right way. During President Uribe's administration, the growth rate climbed from 1.9% in 2002 to 6.8% in 2006, and we have already attained 8% rates in the first semester of this year. Likewise, unemployment declined from 15.6% to 11.4% between 2002 and 2006, and recorded 11.2% during the May-July quarter. On its part, the poverty index dropped from 57% in 2002 to 45% in 2006.

II. FIRST CONSIDERATION: ENTREPRENEURSHIP IS A VALUE CHAIN

The process through which a citizen becomes a businessman must be considered as a Value Chain, which allows entrepreneurs to get ahead naturally through each stage. Those stages are the following:

1. **Sensitization:** To transform one's life project toward entrepreneurship.
2. **Identification:** To identify the degree of readiness of an initiative and its position in the environment (the group team is also identified).
3. **Formulation:** To step up the degree of readiness of the initiative by preparing the business plan.¹
4. **Implementation:** To build up the company's value proposal and to start operating in the natural market.²
5. **Acceleration:** To maximize the company's value added through internationalization and continuing innovation, so as to constantly think the business over.

All actions of an institution wishing to promote entrepreneurship should be analyzed within the frame of this chain. Otherwise, actions would be duplicated and there would be high risks of going out of focus.

III. THREE PILLARS OF ENTREPRENEURSHIP POLICY

A. Vocational training, education and, in general, learning within the frame of productivity and entrepreneurial thinking

It is clear, in the context of the institution's mission –the implementation of vocational training – that it is necessary to put forward programmes and projects that enable SENA to develop enterprising competencies of our trainees.

Therefore, a review of the way in which SENA performs its mission is needed in order to guarantee that vocational training generates productivity factors in our trainees, at least concerning that:

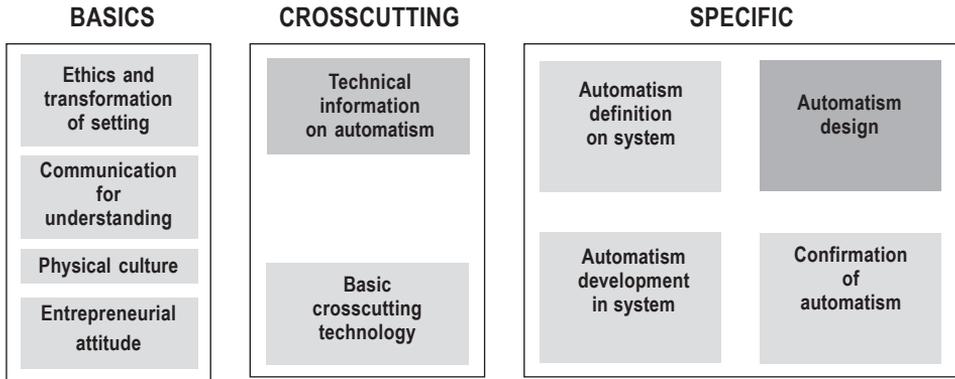
1. All knowledge taught must be useful.
2. Learning should be acquired by means of projects.
3. All trainees must develop Entrepreneurial Thinking.

Knowledge is useful when it has clear objectives and direct application in the performance/jobs of trainees. Consequently, there will be no more modules out of context, and it is necessary to integrate basic modules and some crosscutting modules into specific modules.

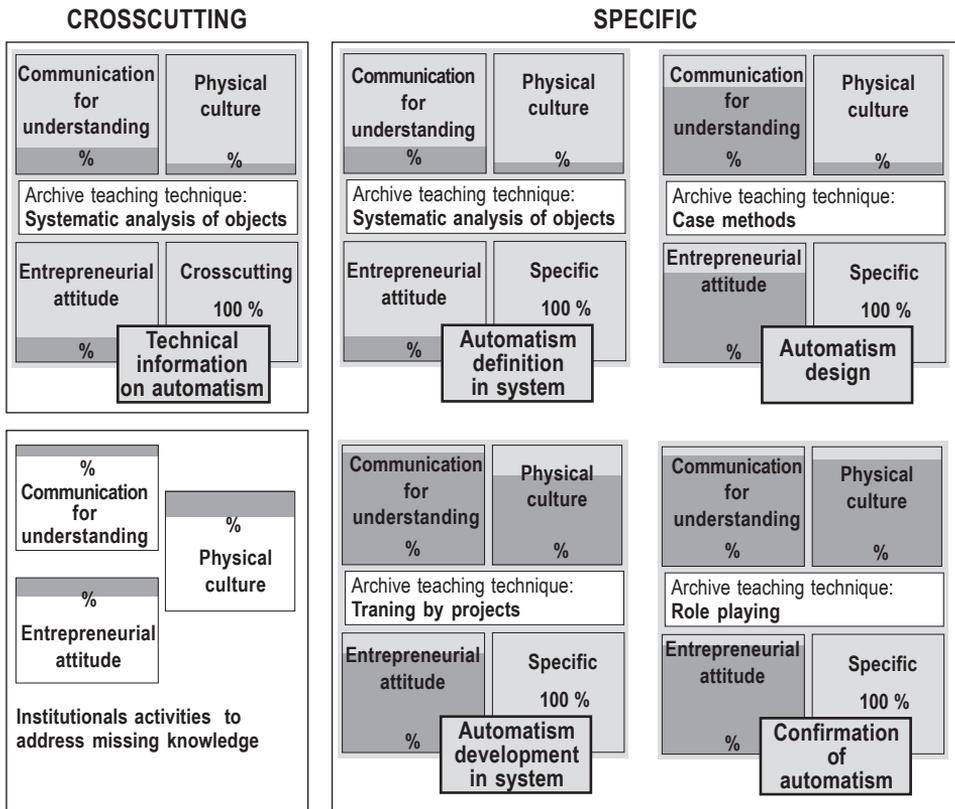
1 Also known as Pre-incubation.

2 An enterprise exists when three elements are present (value proposal): 1. Working team. 2. Products or Services and 3. Customers.

Before:



Now:



Source: SENA – Vocational Training Division.

Learning by Projects

SENA has determined the implementation of project-based training as a pillar of institutional change. It seeks a transition to an educational model and technological management that enables learning development through projects and technological management of them. It is an educational strategy of Integral Vocational Training that enables trainees to acquire a mental structure that helps them to solve real life problems.

As a result, during the 2002 – 2006 period, the following projects are formulated and implemented:

- To revise all training programmes, and orient them towards occupational competency-based training.
- To include the development of entrepreneurship competencies in all diploma training programmes³.
- To design and develop supplementary training concerning targeted entrepreneurship in all SENA's training centres.

ENTREPRENEURSHIP TRAINING PROGRAMME

The Entrepreneurship programme is oriented to interested individuals coming up from information events at the centres. Basic components of this programme are contemplated in circular 02049 of 10 December 2004, as follows:

GROUNDWORK (Sensitization) FOR ENTREPRENEURSHIP

Teaching Module 1: Entrepreneurship Foundations (Maximum duration: 4 hours)

Sensitization is conceived as the first echelon of the value chain for entrepreneurship, where an individual is able to transform his life's project toward new productive alternatives, supplementing his training. For this reason, information and motivation events are complemented with training actions to develop a crosscutting enterprising attitude in each person.

This stage may be conducted through: fora, discussions, Interactive Conferences, Workshops, Business Camps, and Roundtables with Business testimonies, which are the grounds developing enterprising competencies and/or lead to the identification of business initiatives.

- Learning outcome of module: Students question their life's project.

3 Diploma training is oriented to offer a professional degree as Work Technician, Technical Professional or Technologist.

IDENTIFICATION OF BUSINESS INITIATIVES

Teaching Module 2: Entrepreneurial Thinking (Maximum duration: 6 hours)

Teaching Module 3: Identification of Business Initiatives (Maximum duration: 14 hours)

Teaching Strategy: Competency-based training on the basis of the “Entrepreneurial Thinking” Module. This may build up enterprising competencies and help to identify entrepreneurial initiatives.

- Expected outcome: Business Initiatives identified by the programme’s students.

STRUCTURING OF BUSINESS PLANS

Teaching Module 4: Formulation of business plans (Maximum duration: 40 hours)

Teaching Module 5: Business management essentials (Maximum duration: 10 hours)

The objective of these modules is to attain the formulation of business plans identified by students, and to prepare them for starting business activities.

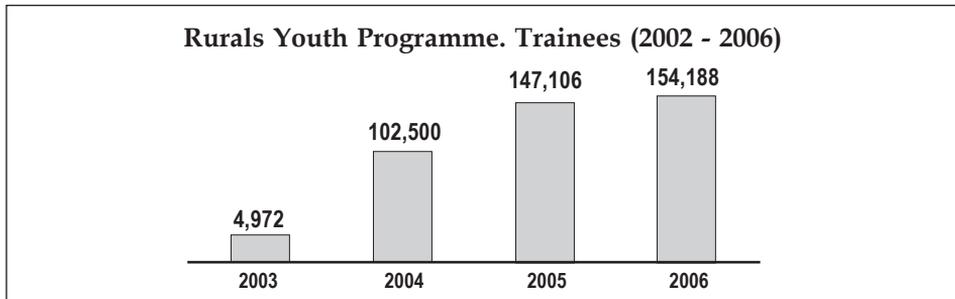
“The Entrepreneurship programme is certified as Approved by students who complete 74 hours corresponding to the programme (Modules 1, 2, 3, 4 and 5)”.

Entrepreneurial Thinking. The profile of SENA’s trainees and graduates is oriented to: a broad development of free thought and critical awareness; constructive and respectful attitude of his own ideas and those of others. Solidarity, which is equivalent to commitment to society’s welfare. Leadership for his community, by applying knowledge and by his ability to step forward to become an entrepreneur, acting in working environments where unexpected situations occur which require solutions, with constant changes. All above-mentioned traits provide the country with human talent to boost the building of an innovative, competitive and highly productive society.

A good example of entrepreneurial thinking development in SENA’s trainees is the **Rural Youth programme**. It is offered in all rural municipalities of Colombia, aiming to train Colombian young peasants.

During the 2002 – 2006 period, SENA taught 408,766 trainees of all the country in the Rural Youth programme.

The target population is rural young people aged from 16 to 25 years, belonging to strata 1 and 2 with Sisben registration. The programme operates through SENA’s Vocational Training Centres, in association with territorial and trade union bodies in order to have a larger degree of coverage and coordination.



Source: Management and Follow-up System of government's targets- www.sigob.gov.co

Training courses are coordinated with local authorities, bearing in mind training needs identified in the regions, local development plans and infrastructure projects demanding human abilities.

All training processes include a technical training component and an entrepreneurship training component. Training materials are used as seed capital. Upon graduation, trainees receive the certification of the approved programme and come up with a business plan prepared by them with their instructors' advice.

CONCERNING THE BUSINESS PLAN

The Business Plan is a tool which allows, by means of a systemic and complete exercise, to document the new enterprise's characteristics. SENA decided to standardize its minimum own content of a business plan for all its programmes. These modules are:

1. **Market Module:** It contains information pertaining to the project's objective, its rationale, background, market research, market strategies and sales projections.
2. **Operation Module:** It includes how the business operates, the purchasing plan, production costs and the infrastructure required by the project.
3. **Organization Module:** It presents the project's organizational strategy, its organizational structure, legal aspects to be complied with and administrative costs.
4. **Finance Module:** It examines the project's income, expenses and working capital, provided by its balance sheets.
5. **Operational Plan Module:** It presents how the entrepreneur will use the resources approved by 'Emprender' Fund and its own resources, by month. This document will detail the periodicity of corresponding disbursements required by the enterprise from the resource manager.

- 6. Impact Module:** It describes the project's effects at economic, social and environmental levels.
- 7. Executive Abstract Module:** It contains the project's main features and the working team which will implement the project.
- 8. Attachments Module:** It enables to attach files supplementing any additional information of the modules offered.

B. Formal development of a supporting industry

With the aim of facilitating the development of the Value Chain of Enterprise Creation from SENA, it is necessary and possible to promote the implementation of a number of instruments ensuring the entrepreneur the needed monitoring and support to become a businessman.

SENA has taken part in some elements of this supporting industry, as follows:

a. Setup of Entrepreneurship Units

To promote entrepreneurship culture in vocational training, it is essential to innovate by means of new learning settings. Thus, taking advantage of the mass of accumulated knowledge due to advanced processes of entrepreneurial development, SENA decided to put into operation entrepreneurship units in its training centres.

Entrepreneurship Units consist of working teams established inside Vocational Training Centres, with teaching staff and professionals skilled in the knowledge and application of topics mainly related with training in: entrepreneurship, business plans, and entrepreneurial advice for enterprise creation and for strengthening micro, small and mid-sized enterprises (MIPYMES, Spanish acronym) and economic solidarity organizations. They are also staffed by professors of technical and technological areas.

Entrepreneurship Units are in charge of coordinating entrepreneurship culture development in training centres and of advancing entrepreneurship among SENA students, identifying entrepreneurial initiatives, guiding the preparation of business projects, and providing advice for the process of establishing and consolidating new enterprises, as well as assisting existing firms, either of private capital or of economic solidarity.

Users of Entrepreneurship Units are: SENA trainees; external entrepreneurs; vulnerable population groups and occupational adaptation programmes; existing enterprises (prioritizing MIPYMES); economic solidarity enterprises; external institutions; teaching staff; trade unions and corporate organizations; business incubators; universities; SENA subordinate units; secondary school students.

Main actions furthered at entrepreneurship units are shown below:

- To contribute to the formulation, implementation and coordination of strategies leading to achieve results for the Entrepreneurship and Enterprising Vector, as well as of other subordinate bodies of the Institution or the Government which may require our services (Law 1014 on Entrepreneurship, Conventions and Alliances).
- To promote entrepreneurship as a crosscutting policy in Vocational Training by means of sensitizing, training, advisory and monitoring actions for student entrepreneurs at the centres and other population groups.
- To encourage the unification of policies, guidelines and strategies at Training Centres, so as to step up entrepreneurship and corporate culture as a strategy for generating regional socioeconomic development.
- To bring about a change in attitude toward entrepreneurship among executives, teaching staff, professionals, trainees, businessmen, as well as SENA's Interest Groups.
- To give advise on the formulation and evaluation of feasible Business Plans of SENA students who will apply to "Emprender" Fund, Banking of Opportunities, and other regional or national financing alternatives.
- To follow up and accompany the implementation of business plans which have obtained resources at "Emprender" Fund, Banking of Opportunities, and other regional, national and international financing sources.
- To facilitate logistics required by Entrepreneurship Units to carry out vector actions (Centre's Vice Director).
- To contribute to corporate reinforcement, by means of training and advisory processes, targeted to the regional identification of clusters, productive chains and mini chains in order to generate business opportunities.

- To build a reservoir of local experiences, including best practices, successful cases and previous learning.
- To coordinate with Training Centres the technology transfer of business incubation projects of 'Emprender' Fund.
- To select projects representing the Training Centre in different events scheduled in the region.
- To support and guide training by Projects.
- To develop an annual entrepreneurship calendar where all activities involving entrepreneurship are planned, taking into account, i.a.: entrepreneurship and creativity week, business rounds, conference cycles with experts, Fora, Fairs to generate business ideas in different sectors including technological areas, and other activities to promote entrepreneurship culture.

The role of members in Entrepreneurship Units will be to jointly facilitate, along with technical professors, the development of entrepreneurial competencies incorporated in technical training and support for training by projects.

Likewise, an annual calendar of support actions to those processes should be scheduled to foster entrepreneurship, such as: Enterprise fairs; Business rounds; Financial rounds; Expert debates; Contests; participation in Videoconferences; Virtual fora; Enterprise tours: Enterprises and trade unions; establishment of a productive projects Bank; Enterprise breakfasts with successful businessmen; motivation for entrepreneurship; Visits and technology transfer of firms supported by 'Emprender' Fund; Visits to *Tecnoparque*, incubators and technological parks in regions where they exist.

It is important to note, that Higher Education Institutions in Colombia have also used this model for their entrepreneurs. In order to facilitate this process, SENA's advisers and instructors transfer the methodologies to university professors. In order to see a full list of entrepreneurship units in Colombia please visit www.fondoemprender.com/unidades.asp.

**CASE: BIBEQ COMPANY,
User of entrepreneurship units**

BIBEQ E.U is a firm supported by 'Emprender' Fund. It offers the Eolic Drying System developed to carry out homogeneous environment-friendly drying. It uses mixed technology with hot and cold air. It received an investment from SENA ('Emprender' Fund) of US\$ 38,187.

Leonardo Becerra, who is the leader entrepreneur, worked in SENA's Entrepreneurship Unit at the Colombian Italian Centre of the Capital District region. "I have found a deep interest to push forward my project and an impressive motivation toward discipline as a necessary element to achieve processes." As entrepreneur, he also assures that "it would be essential to find advisors at Entrepreneurship Units who have had an enterprise or wide experience in corporate development and related topics".



**b. Promoting the implementation and strengthening of
Technologically-based Enterprise Incubators**

Incubators are non-profit organizations of tripartite nature, composed by alliances between public, private and educational sectors. Their partners or promoters are: Training institutes (Technical, Technological and University levels); Public and private enterprises; local governments (Local governments and City Councils); Guilds, Chambers of Commerce and, sometimes, Trade unions. These institutions may be compared with today's entrepreneurship laboratories, inasmuch as their inputs are ideas and knowledge teams, while their products are *profitable enterprises*.

SENA began assisting the creation of business incubators in Colombia in 1999, to fulfil its obligation of assigning 20% of resources in innovation and technological development, in compliance with Law 344 of 1996. Under the frame of the Strategic Plan, it is promoting the establishment of a National System with 40 incubators throughout the country, 35 of which are currently operative.

An enterprise supported by SENA through PARQUESOFT Pereira Incubator. Duto – Iris Project. “And the blind will see”

In 2005, SENA funded –within the National Programme of Support and Strengthening of Business Incubators—the creation of DUTO firm to develop the Iris project.



“Best Social Entrepreneurship Award” Ceremony, and Device prototype.

This project —led by Parque Soft Pereira⁶, and submitted by Parque Soft Quindío to Call No. 021 of 2005 under this programme line: Support for the creation of innovative technologically-based enterprises— ranked first concerning evaluation and obtained SENA’s financing with seed capital for an amount of US\$ 40,000 for the technological development of a system that enables individuals with visual limitations to perceive all types of images, forms, pictures and colours by means of touching , as no other commercial device in the world.

DUTO *Ingeniería* is a Colombian firm which is part of the technology cluster Parquesoft Pereira. Its IRIS project received **The Best Social Entrepreneurship Award**, a distinction to the world’s foremost social entrepreneurship, according to the GLOBAL Talentpreneur Innovation & Collaboration Association.

GLOBAL TIC is a world entrepreneurship competition held in Taipei, Taiwan, from July 23 to 29 at the Chien Tan Youth Activity Centre of that city. This event gathers winners of entrepreneurship competitions from all over the world, such as TIC Americas, TIC Mongolia and TIC Asia, among others. Participating enterprises from United States, Taiwan, Japan, Thailand, Singapore, Mexico, Brazil and Colombia competed for the award in each one of the competition’s eight (8) categories.

At present, DUTO keeps on obtaining business success; it is a runner up out of 22 selected projects from a group of 500 in one of the most important Colombian contests of Business Plans, “VENTURES 2007”.

This experience evidences how the entrepreneurship policy led by the Institute and the Business Incubators that make up the National System of Enterprise Creation and Incubation are driving innovative technologically-based projects with regional, national and international impacts, thus promoting Colombia’s productivity, competitiveness and technological development.

SENA's support to incubators is regulated by AGREEMENT 0010 of 2006 of the National Executive Council and its recipients are Business Incubators of the National System of Enterprise Creation and Incubation (SNCIE, Spanish acronym), where SENA is a special associate partner. Financing within the frame of this programme includes: i) SENA's association to business incubators, ii) projects for setting up Technologically-based Enterprises submitted by Incubators (See chapter "Financing Creative Sources") and iii) strengthening business incubators where SENA is a partner.

CASE: EMBRIONAR

**A firm supported by the programme
of technologically-based incubators**



EMBRIONAR

embrionar@yahoo.es

EMBRIONAR seeks to contribute to define the cattle export profile of the Urabá region, offering the possibility to improve the quality of specimens in the medium term, as well as offering training services in insemination techniques, semen marketing and clinical diagnoses.

Its products and services are, i.a.: i) Fresh and frozen bovine embryos, ii) Marketing of bovine, horse and pork semen, iii) Outreach services through training of middle-level technicians in artificial insemination, iv) Programmes of Artificial Insemination at Fixed Periods (IATF, Spanish acronym), v) Advice to programmes of bovine and horse reproductive biotechnology.

This enterprise, incubated by INCUBAR URABÁ⁷, has been a user of SENA's programme of technologically-based enterprises. Libardo Soto, a leader entrepreneur, said: "I have found very good advice in building the project. The relationship with this Incubator has allowed me to establish diverse relations which have helped the enterprise's operation. Furthermore, the positive relation and constant communication with the incubator has been the backbone of the project". Mr. Soto assures that it was a long process, but he expects to maintain his communication with the Incubator to give it continuity and multiply the good results obtained so far in the project's development.

Strengthening projects of Business Incubators should have into account the following guidelines:

- a. To encourage the development of clusters, productive chains and mini chains.
- b. To implement incubator improvement processes which reinforce incubation models.
- c. To increase regional working interrelations between Enterprise - Academy - Government
- d. To increase cooperation agreements signed by the business incubator with national or international institutions.
- e. To maintain standards defined by the National System of Creation and Incubation of Knowledge Enterprises.
- f. To foster meetings of enterprise incubators organized by SENA.
- g. To encourage certification processes for business incubators in the System.

Projects submitted by incubators within this programme line should deliver the following indicators as results:

- Number of pre-incubated enterprises
- Number of incubated enterprises
- Entrepreneurs involved in pre-incubation and incubation processes.
- Other indicators determined by SENA.

The Business Incubator should transfer outputs and results of the recipient project, through a transfer process, to SENA's Training Centres belonging to the productive chain or cluster related to the project's object. Projects should transfer the outcome of their innovations and they are not required to transfer the corresponding know how.

In August 2002 the National System of Enterprise Creation and Incubation (SNCIE), led by SENA, had six associated incubators in Bogotá, Medellín, Cali, Bucaramanga, Rionegro and Barranquilla. The figure experienced a remarkable increase, since by the end of the following year (2003) the country had 16 new institutions covering the departments of Caldas, Risaralda, Quindío, Cesar, Sucre, Córdoba, Cauca, Tolima, Norte de Santander, Bolívar, Antioquia and Huila, as well as specialized incubators on topics such as the agro industrial sector, software production, economic solidarity enterprises, cultural firms and creative industries.




Incubators Impact in Colombia

35 Incubators created

YEAR	NUMBER OF ENTERPRISES	NUMBER OF EMPLOYMENTS	NATIONAL SALES in Dollars
2003	288	2.783	12.736.000
2004	255	2.289	20.814.000
2005	258	1.829	43.029.500
2006	342	1.871	10.756.500
2007 (*)	89	584	4.561.727
TOTAL	1.232	9.356	91.897.727

(*) 2007 corresponds to the first quarter

Source: SENA – Vocational Training Division.

By October 2004, five new incubators joined SNCIE, expanding its coverage to the regions of Nariño, Boyacá and Meta, a Bi-national Incubator (Colombia-Ecuador) in Ipiales and a Bio-Business Incubator, thus completing 27 enterprise incubators. By year-end 2006, SNCIE aims to have 40 incubators throughout the national territory. SENA (among other governmental institutions) will be a partner in all of them.

From August 2002 up to March 2007, by means of incubators, 1,232 enterprises were established, providing 9,356 jobs and accumulated sales for approximately 91 million dollars.

MULTIPLE ADVANTAGES OF ENTERPRISE INCUBATORS

By Carlos Andrés Cruz Gartner – Industrial Engineer - MBA

Advisor - National System of Enterprise Creation and Incubation (2006)

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Benefits provided by an Enterprise Incubator may vary according to the incubation model (intramural, extramural, technologically-based, focused on a specific sector, etc.), regional dynamics and, in particular, requirements of local entrepreneurs, from very simple needs, such as renting physical space, to needs with greater value added, e.g., contact networks, business strategies and models. The most important “returns” are:

- **Physical facilities:** flexible rents, depending on the amount of space needed, the enterprise's development level or even its turnover.
- **Working environment:** business incubators provide entrepreneurs with individuals who are devoted to push forward their enterprises, experts in different knowledge fields, advisors, contacts with the productive sector and daily interaction and relations. This, generates a good working environment, motivates entrepreneurs and supports them in critical circumstances. In addition, they facilitate communication, teamwork and the establishment of networks.
- **Administrative services:** in general, Incubators take charge of the main administrative support services (cleaning, security, reception, connectivity, cafeteria, remittal of messages, etc.). Therefore, businessmen may devote themselves to two tasks with the greatest impact in business growth: marketing and product development.
- **Network of service providers:** entrepreneurs save time and money (by way of economies of scale) when the incubator offers a reliable network of providers of high quality services.
- **Services for personnel selection and management:** incubators back the enterprise's start-up process, the selection of employees and even of possible partners; they administer flexible wage compensation systems and often take charge of payroll payments, affiliations to social security systems, para-fiscal contributions, etc.
- **Access to capital:** incubators have connections with investors and financial institutions; risk capital and seed capital funds, and provide entrepreneurs with guidance on existing financing sources and mechanisms to have access to them.

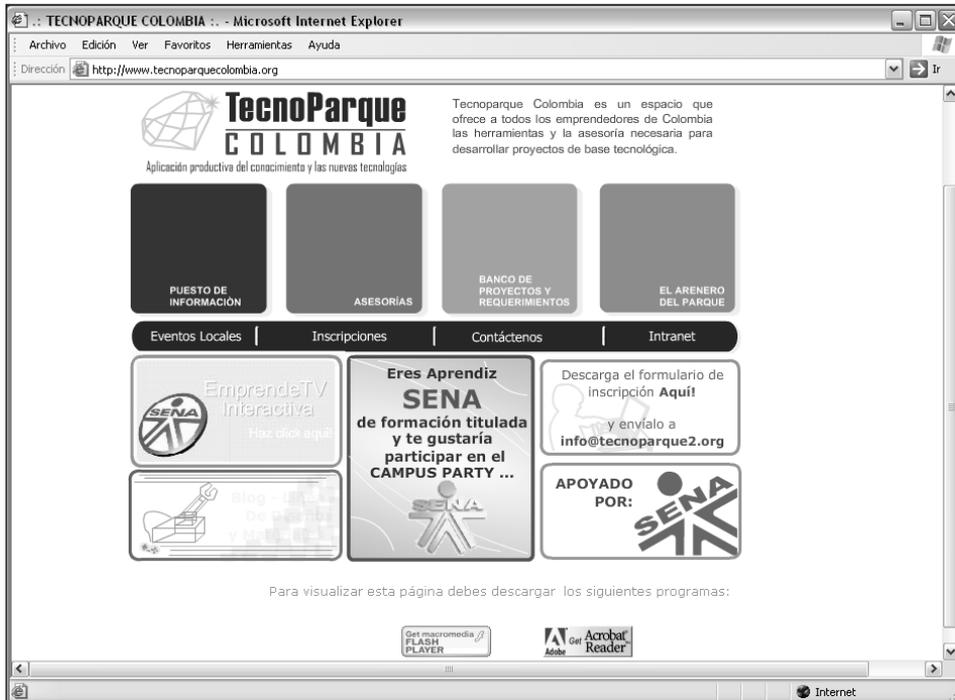
- Only incubators within the National System of Enterprise Creation and Incubation may submit projects to the National Programme of Support and Strengthening of Technologically-based Enterprise Incubators, which grants co-financing resources, non-reimbursable, for up to \$ 100,000.00 (one hundred billion), approximately 280 minimum legal salaries in force.
- **Strategy and analysis of business models:** mentors, the management network and the head of the Incubator should have abilities and experience to examine critically the enterprises' business models. They should also have a strategic partner who helps new enterprises to enter the market in a successful way and, in addition, provide technology and find other strategic allies.
- **Advice, monitoring and technical assistance:** the incubator's management network should include advisors, mentors, consultants and technical experts on different fields, who may back new enterprises so that they act fast and solve their problems. These experts may well be part of the incubator's direct payroll or either work as freelancers.

c. Network of Technical Parks

Since January 2005, SENA has furthered an initiative aiming to “*contribute to technological innovation, entrepreneurial development and entrepreneurship in the country*”, called **TecnoParque Colombia**.

TecnoParque Colombia is conceived as a network that coordinates technological, operative, economic, logistic, human skills, and knowledge resources, from public, private and academic sectors. Its purpose is to promote and motivate young people and general public to become sources of innovative ideas, which will be consolidated into enterprises, contributing to national productivity and competitiveness.

TecnoParque Colombia works in coordination with individuals or public, private or mixed institutions, either national or international, so as to build an administrative, technological, economic, human skills and operative infrastructure, which may be self-owned or a joint or coordinated scheme. It involves:



<http://www.tecnoarquocolombia.org>

- Academic institutions of secondary and higher education or technical and technological training.
- Innovation, research or technological development centres.
- Technological development laboratories.
- Documentation centres, traditional or digital libraries, specialized databases.
- Organizations involved in the promotion and development of entrepreneurship and enterpreneurism: Business incubators, Enterprise accelerators, Entrepreneurship Units, etc.
- Enterprise or productive sectors, including social and State enterprises.
- Trade unions.
- Technical Advisors, Technologists or Professionals, with wide experience or knowledge in working areas of TecnoParque Colombia. Retired personnel are included under this classification.

<p>TecnoParque Colombia is not</p>	<p>TecnoParque Colombia is</p>
<ul style="list-style-type: none"> • An Incubator for Enterprises. • An Enterprise Accelerator. • An Entrepreneurship Unit or Centre. 	<ul style="list-style-type: none"> • It is an echelon in the value chain for the setup of enterprises, previous to the tasks performed by Incubators. • It is considered a provider of entrepreneur teams that identified an innovative idea and realized it into a productive project. • It provides access to databases and tools of consultation of TecnoParque Colombia, to back up the identification of business opportunities for the enterprise community of Incubators or Accelerators.
<ul style="list-style-type: none"> • A Risk Investment Fund. • A co-financing or seed capital Fund. 	<ul style="list-style-type: none"> • It generates new valuable projects with investment feasibility. • It increases the number of projects, with greater certainty, since they will have initial technical validation, thus reducing risks.
<ul style="list-style-type: none"> • A Documentation Centre exclusively. • A Library. 	<ul style="list-style-type: none"> • Within the services portfolio, access is provided to consultation tools and databases, where pertinent data may be compiled to support the operation and management of TecnoParque Colombia, and to benefit exclusively its community of Associates and Recipients. This information is also coordinated with other documentation centres of its associates.
<ul style="list-style-type: none"> • A Park of mechanical or electronic amusements. • An Interactive Park. 	<ul style="list-style-type: none"> • TecnoParque Colombia will have sensitizing and interaction sections in some of the technological fields it promotes, which will be available to students, graduate and visitors. • The objective of these sections is to arouse the visitor's interest in developing product or services alternatives on the basis of technology and which may be self-employment sources for visitors. • Opportunities generated by these sites will help playful learning.

CASE: NATURA SOFTWARE

Entrepreneurs supported by TecnoParque



David Suárez Pinzón belongs to a 5-person team that developed a project called “*Natura Software*”. Its main output is *Agenti*: a system to serve users on line, providing services from 7 a.m. to 12 p.m. through a web page. An *agenti* is a virtual assistant which enables individuals to have access to data from an enterprise, product or service, by using its own words, i.e., using Spanish, English or any other language.

As an entrepreneur supported by Tecnoparque, David reassures: “I have obtained great aid on issues about entrepreneurship, training on how to prepare a business plan, software, and copyrights, among others. It has also assisted us in making business appointments”.

d. Financial Assistance for SENA Trainees

Law 789 of 2002 established, along with ‘*Emprender*’ Fund, financial assistance for SENA trainees. This is a contribution to enable trainees in strata 1 and 2 to pay for their basic expenses, accident insurance, personal protection elements and clothing during the schooling and productive stages of the advanced training programme.

Application requirements for assistance are:

1. To be registered in one (1) of the professional programmes leading to the Learning Contract (Diploma Training with 880 hours or more).
2. To be classified in socioeconomic strata 1 or 2. (This information should be recorded in the Academic Management System, or its alternative, from the moment the applicant registers in the training programme).
3. To be formulating its business plan, as verified by Entrepreneurship and Enterprising Units at each Training Centre.
4. Not to hold a learning contract, nor having held it in a previous training programme.
5. To have completed the first training quarter with good academic performance.

6. Not to be or have been penalized with enrolment rights due to academic or disciplinary sanctions during the quarter immediately previous to selection.
7. Not to have any working ties.
8. Not to be a recipient of the National Vocational Training Fund of the Building Industry (FIC).
9. Not to have been a recipient of financial assistance from SENA in another training programme.

SENA's National Executive Council ruled the amount of financial assistance to be granted, its distribution and the criteria allowing the receipt of grants in order to foster the Trainees' entrepreneurship and entrepreneurism.

Financial assistance is delivered by SENA, in compliance with the public call for students who meet the requirements; it seeks to improve and facilitate their learning process. When applications exceed allocated quotas, assistance will be granted according to the scores obtained by applicants.

Scores take into account:

- If the student is registered at the Centre's entrepreneurship unit: 3 points
- If the student is formulating a project (minimum of 2 completed chapters of the business plan): 5 points
- If the student has a formalized project (with technical approval by the entrepreneurship unit): 10 points.

Nidia Roncancio is a SENA jewellery trainee who received financial assistance. Concerning this programme, she points out: "I have received enormous benefits from financial assistance, since my plans include establishing my enterprise and, thanks to this assistance, I am able to finance many of the costs, inputs and necessary elements for that goal".

e. Activities related with entrepreneurship

In addition to the activities conducted directly by the institution, there are some national-wide projects in which SENA participates:

i) *Jóvenes con Empresa (Youth with Enterprises) Programme*: Promotion of enterprising abilities among Colombian young people.

Jóvenes con Empresa was set up in 2002 due to an initiative of the Enterprise Development Fund of Corona Foundation and the Inter-American Development Bank to create an assistance Programme for the establishment of sustainable and competitive enterprises in our country.

The Programme's general aim is to help reinforce the enterprise structure in Bogotá, Medellín and Cali. The specific objective is to develop a model for the creation of sustainable and competitive enterprises for youth in these three cities. It is intended to establish 350 sustainable and competitive enter-



Image: <http://www.jovenesconempresa.com>

prises by June 2008, by means of training and monitoring to teaching staff and entrepreneurs.

The Programme has three components: first, training, 10,000 entrepreneurs will take part in enterprising workshops, 3,000 will be trained on business ideas, and 1,500 will receive advice to prepare their business plans. The second component will furnish counsel and monitoring during one year for starting up the business. This counsel comprises, among other services, market circuits, contests, in-service training, and financial assistance including business rounds and support by angel investors. Under this component, basic and specialized counsel will be offered on legal, tax, image and brand issues, among others. In addition, the component contemplates tutorials directly with businessmen. The last component will be on information and evaluation of the Programme.

SENA participates by co-financing the programme and has a seat in the Executive Council and in the Departments operating the programme. SENA regional units take part in the Programme's Institutional Network.

ii) *Ventures Contest, Dinero Journal*

VENTURES contest is the most important contest of business plans in the country. It is organized by the *Dinero* Journal, McKinsey consulting firm, Fidubogotá, *Portafolio* newspaper, *Compartamos con Colombia y Ashoka* ('Let us Share with Colombia and Ashoka'). Contest information is available at: www.ventures.com.co



This year the contest will open two categories:

- **General category:** For the participation of natural persons, groups or institutions with projects in any economic field. Business or enterprise ideas for profitable commercial operation with less than 2 years of operation may be registered in this category.
- **Social category:** with two subcategories: a) Third-sector organizations, already established and non-profitable, inasmuch as the idea presented to the contest is focused to its sustainability and to achieve a positive social impact. b) Profitable organizations or institutions, which may support productive processes and their design is targeted to generate important social effects.

Prizes in cash and in kind will be granted to those who meet contest rules and conditions and who are selected as winners by the Jury.

SENA is a strategic partner in this contest, in the frame of a cooperation agreement regulating that the contest provides the Institution with methodologies in the formulation of business plans, marketing strategies, etc. Our trainees are granted a discount in the application fee for the contest.

iii) National Contest of Business Plans, *MinComercio*. 'CREE Y FORMA TU EMPRESA' ('BELIEVE AND ESTABLISH YOUR ENTERPRISE')

The National Government – through de Trade, Industry and Tourism Ministry – launches every year the National Contest of Business Plans and Established Enterprises, COLOMBIAN ENTREPRENEURS “*Cree en Colombia, Crea empresa*” (“Believe in Colombia, Create an enterprise”). Its objective is to provide recognition to the commitment, entrepreneurship and efforts of Colombian entrepreneurs.

The contest is conducted with the assistance of SENA, the Presidential Programme *Colombia Joven*, the Culture Ministry, FOMIPYME, Banking of Opportunities, Junior Chamber of Colombia, IADB'S *Jóvenes con Empresa* Programme, and Ventures Contest of *Dinero* Journal.

Participation is open to persons meeting the following conditions: i) Individuals who prepare a business plan with universities, foundations and/or NGOs holding a CEINFI Professorship agreement, ii) Students who prepare business plans with universities holding agreements with the Virtual Professorship on the Creation of Technologically-Based Enterprises, iii) Business plans developed by SENA's trainees and presented by such institution, and iv) Non-student entrepreneurs preparing their business plans with a foundation or NGO holding an agreement with *Mincomercio*.

Projects completed by SENA's trainees shall be submitted directly by the entrepreneurship unit accompanying the group of entrepreneurs.

The contest is organized into three categories: i) Innovation, ii) Creative and Cultural Industries, and iii) Social /Environmental Impact. Each category will give recognition to three business plans with the highest score, but only the first will receive the award. The second and third positions will obtain honour mentions.



Image: www.senavirtual.edu.co

iv) *Virtual Professorship of Entrepreneurial Thinking*

This professorship helps to develop and acquire basic competencies to become a businessman. The target audience is composed of SENA students, professionals, employees or unemployed, secondary education students and graduates, post-secondary education students, businessmen, public employees in the process of occupational reconversion. This project has resulted in a significant number of initiatives (425).

The professorship is composed of two modules:

- Theory Training Module (3 subjects): Entrepreneurial Attitude (3 blocks), ii) Planning the Enterprise (8 blocks), iii) Enterprise and Management (5 blocks)
- Practical Module for the application of concepts: through the Virtual Incubator, students developed the Business Plan

This project was carried out by SENA and the Technologically-based Enterprise Incubator of Antioquia, with the following indicators: 2,062 students trained in 4 groups, 250 SENA trained advisors. The Virtual Professorship of Business Thinking was transferred to SENA and is operating in our platform at: www.senavirtual.edu.co

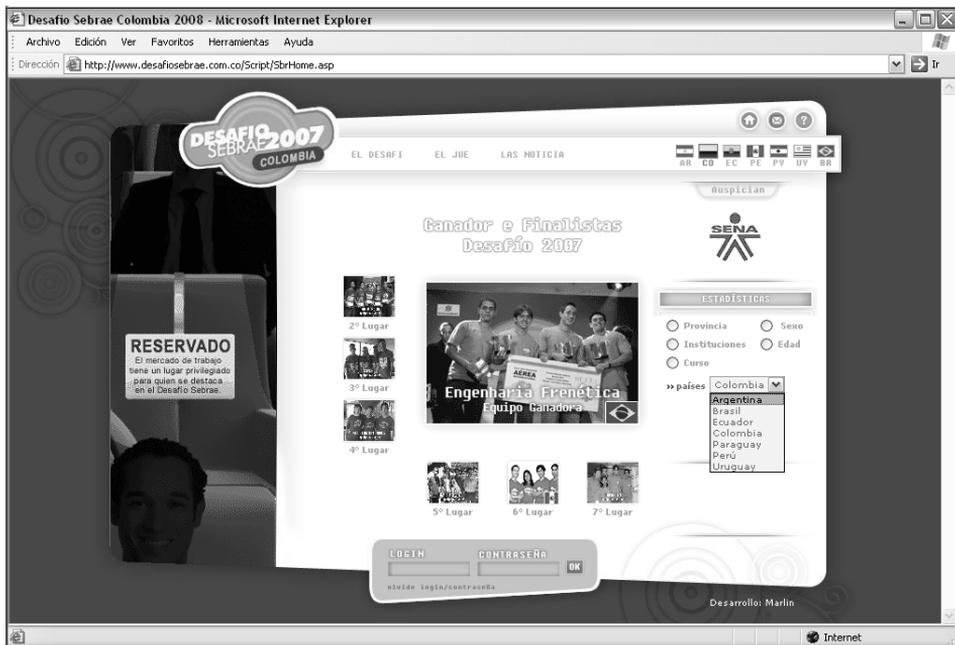


Image: <http://www.desafiosebrae.com.co>

v) SEBRAE Challenge

SEBRAE Challenge is a game of entrepreneurial simulation between undergraduate students in professional, technical and technological careers from any university in Colombia, with official approval.

SENA, ACOPI and CINSET –with the assistance of the Brazilian Support Service to Micro and Small Enterprises (SEBRAE, Portuguese acronym), the Brazilian Embassy to Colombia, the National Education Ministry, ‘La República’ newspaper, Santander Bank and AVIANCA – will conduct, for the fourth consecutive year, the Entrepreneurial Simulation Game, SEBRAE CHALLENGE COLOMBIA 2007.

Students must register in groups of at least 3 persons and a maximum of 5, from the same or different universities, from the same school or of interdisciplinary nature. There is a participation fee. Registration should be made through the web page: www.desafiosebrae.com.co

The game will enable young people to understand and work out efforts implying the management of an enterprise, will live through the experience

of playing a strategic role, make decisions concerning marketing, corporate administration, and financing policies, complying with market terms and taking a number of risks.

The team that best manages the firm will be the winner. The prize will consist of a trip, with all expenses paid, to visit Rio de Janeiro, get to know business and industrial developments, business incubators, as well as to enjoy a tourism agenda.

SENA participates by promoting the game at national level in our videoconference system, by monitoring groups of SENA entrepreneurs through our professors, as well as financing one team for each training centre (115 groups).



Image: <http://www.gemcolombia.org>

vi) Global Entrepreneurship Monitor

Global Entrepreneurship Monitor (GEM) is the world's largest network which monitors enterprising activities, with the participation of over 100 universities and institutions throughout the world.

This global network, with headquarters in London, prepares every year research and reports on entrepreneurship in different countries. In 2006, 6 countries from Latin America participated: Argentina, Brazil, Chile, Colombia, Peru and Uruguay.

GEM began operating in Colombia in 2006, and it consists of a pool of participation universities: Javeriana at Cali, los Andes, ICESI and Universidad del Norte. The objectives of this network are to measure the level of entrepreneurial activity in different countries, to identify determinant factors in the creation of new enterprises and to formulate policies that may boost them.

SENA is now part of GEM Colombia, which will enable us to learn the results of entrepreneurship monitoring in 2006-2007 and to participate in 2007 research.

Some research results in 2006 were:

- Colombia is the second country out of 42 nations where enterprises are set up in largest numbers.
- The establishment rate of new enterprises is generally higher in countries with lower GNP per capita.
- Close to six million Colombians are taking the risk of creating new enterprises.
- One of each Colombian citizen, aged 18 to 64 years old, is actively involved in the process of setting up enterprises.
- 78.4 % of new entrepreneurs are below the age of 44 years.
- 52 % of that population has technical, professional or postgraduate education.

The study's results may be found at: www.gemcolombia.org

vii) Permanent update through SENA's National Videoconference System

The National Videoconference System is an excellent communication tool to exchange information, ideas and advertise activities, plans and programmes. In particular concerning entrepreneurship, SENA permanently conducts videoconferences on the topic. Some of the conferences held last semester were:

- How to obtain bar codes?
- A call to co-finance research, technological development and innovation projects.

- Accounting and finance principles to develop successful business plans.
- Talent and innovation competition of the Americas, organized by the Organization of American States (OAS).
- Best practices in formulating and implementing business plans.
- Videoconference regarding 'Emprender' Fund.
- Best practices of marketing management.
- "Information and Marketing System" (SIMAR).
- Global Entrepreneurship Monitor (GEM).
- Innovation, competitiveness and sustainable growth.

viii) Study of 500 promising products: Undertaken to identify and analyze new export opportunities from Colombia to United States

This study was held with the purpose of identifying and analyzing at least 500 new products with export potential from Colombia to the USA market, in order to take advantage of new business opportunities coming up for Colombia due to the Free Trade Agreement (FTA), thus contributing to build innovation policies in the country and to reinforce regional productivity and competitiveness strategies.

This is a joint effort between the public and private sectors, sponsored by SENA, the National Planning Department, *Seguros Bolívar*, *Colombia Digital*, *Bancoldex* and *Bavaria*. The research was also supported by the Trade, Industry and Tourism Ministry, *Proexport* and *Andi*.

Originally 1,500 products imported by the US were selected, meeting the following requirements:

- To be part of a group of products with greater selling and growth potential.
- Other developing countries are exporting to those markets.
- Colombia is not exporting substantial levels of these products.

Information was examined by guilds, businessmen, sectoral roundtables coordinated by SENA and experts from productive and foreign trade sectors. Besides, this first selection was examined and compared with regional proposals in the internal agenda, the strategic export plan, the stockbreeding export proposition, export and national production registers, as well as national and regional studies of diverse nature.

Finally, exactly 590 new products were selected, with large market potential in the United States: in fact, in 2005 these products were imported for an amount of US\$ 264 billions, and the value is growing at an average of 21% yearly. It is also important to point out that none of these products will be paying tariff duties in USA, immediately after the treaty is approved.

The study includes technical record cards of the products chosen, i.e., information of market profiles in USA, tariff duties, entry districts, freight in different transport means, technical standards and access to information of new related technologies. The above enables to analyze particular competitiveness terms and to get to know possible partners for new investments leading to produce and export those products to North America.

SENA's mission – to train human skills required by the country, to build innovation and technological development processes in enterprises, and to generate new business units – is committed to bring together the results of this study in different institutional management processes.

This study is a first step to visualize opportunities that may allow expanding Colombian sales to the United States. One of the proposed goals is that, during the five years following the FTA implementation, these exports would increase USD 26.500 millions yearly.

The study's results are available in web page www.sena.edu.co, at the Planning and Corporate Relations Division.

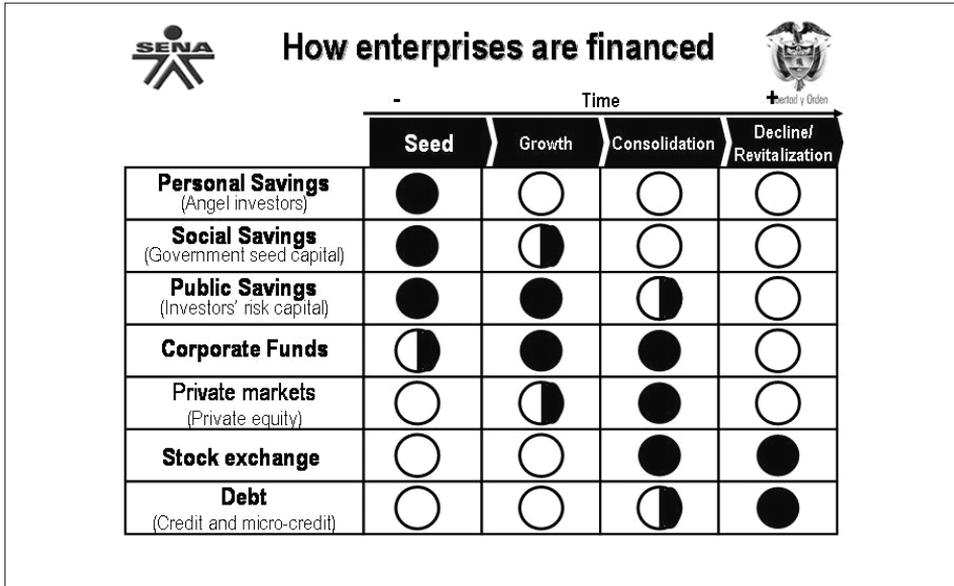
C. Implementation of creative sources for enterprise financing

In Colombia, credit has become the traditional mechanism applied by entrepreneurs at the time of financing their entrepreneurial initiatives. It is no secret to anybody that this mechanism is not available for new entrepreneurs, in particular because they are not qualified borrowers.

Successful societies in the world have understood the need to formally develop new creative financing mechanisms, making available to new entrepreneurs the necessary financial resources to launch the enterprise.

These instruments must be regarded as players that enable to start the value chain of financing for new enterprises, ensuring the entry of resources at the timely moment.

The enterprise financing matrix is shown below, illustrating which is the intensive financing mechanism in each development stage of the enterprise:



In the context of social savings, SENA –as a public institution with the aim to provide vocational training to Colombian people– has put into operation two financing mechanisms for new enterprises arising from its users.

a. Support for the creation of innovative technologically-based enterprises – National Programme of Technologically-based Enterprise Incubators.

The goal is to promote the creation of new enterprises, through the drive and support of qualified and classified projects with a high content of innovation and/or technological development, that may help to strengthen competitiveness strategies in the regions and which are coordinated to productive sectors of strategic development. This support should be understood as assistance, monitoring and financing of specific activities for the formulation, implementation and consolidation of each project to create enterprises, disaggregated according to the features of each project.

Individuals interested in submitting this modality of projects should address themselves to Enterprise Incubators, where SENA is a partner and whenever they are part of the National System of Enterprise Creation and Incubation, led by SENA. This support comprises assistance, monitoring and

financing of specific activities for the formulation, implementation and consolidation of projects to create enterprises, disaggregated according to the characteristics of each initiative.

Projects may only be submitted to SENA through public calls in which these enterprise incubators participate.

SENA's resources – approved by Law 344 of 1996 – fund with non-reimbursable capital up to 50% of the project's total value, which should not exceed the sum equivalent in *pesos* to 246 minimum legal monthly salaries in force.

This programme benefits knowledge groups composed of entrepreneurs from different fields or legal entities – which do not exceed 3 years of its legal status – that submit a business plan for the creation of an enterprise related to technological innovations and knowledge development, and that have clearly presented a business model.

Once projects are presented to Enterprise Incubators, complying with the terms defined in the Call, the National Commission of Innovation and Productive Development Projects will determine their technical feasibility and SENA's National Executive Council shall approve the contract of the project.

Items which may be financed by SENA in this programme include:

- a. Market studies and project potentials
- b. Travel and living expenses for national and international experts, trainer teachers, multipliers (University, Technical, Juridical)
- c. Trainees and/or university students
- d. Advisors
- e. Laboratory and metrology services (rental of research and quality control equipment)
- f. Prototype design
- g. Monitoring in prototype building.
- h. Specialized training corresponding to the project's technology.
- i. Documentation and bibliography exclusively required for the project
- j. Patent registration, Invima registration, ICA permits
- k. Operation licenses
- l. Participation in specialized fairs, as a marketing strategy
- m. Transfer of project results to SENA and external surroundings.
- n. Monitoring by the Incubator

The following budget items will not be funded with resources from SENA or counterparts:

- a. Purchase of land lots, buildings, adjustments of physical infrastructure.
- b. Attendance to seminars or academic training, except those authorized for the development of continuing training projects.
- c. Payment of debts, dividends or capital recovery.
- d. Working capital for regular production.
- e. Investment in other institutions and /or enterprises.
- f. Investment in production plants.
- g. Purchase of shares, options, bonds and other unregistered securities.
- h. Diagnoses and/or sectoral, local, regional, national or technology studies.
- i. Insurance and legalization of contract to be signed.
- j. Payment of royalties and taxes derived from the project's development.
- k. Para-fiscal contributions and contributions to the General Social Security System.
- l. Travel allowances, except in innovation projects of vocational training.

Intellectual property of the outcome of research and technological development shall belong to the entrepreneur. Moral copyrights on generated knowledge and /or technologies, contained in training programmes, teaching aids, models and methodologies, and software development shall be the authors' property. However, due to SENA's co-financing, they will not be able to charge this institution for using those copyrights on elements transferred in working out the project. SENA will use them exclusively for vocational training activities. Calls for different programmes and contracts for projects shall explicitly define modalities and inputs of this transfer of technology and knowledge to SENA.

The Enterprise Incubator should transfer inputs and results of the recipient project, by means of a transfer process, to SENA Training Centres belonging to the productive chain or cluster which are pertinent with the project's objective. Projects should transfer results of their innovations but are not required to transfer their know-how.

b. 'Emprender' Fund

Over 15,000 entrepreneurial initiatives, registered in the information system www.fondoemprender.com evidence the enterprising spirit of Colombian youth who, thanks to SENA's support, have made great efforts to generate business ideas, create, consolidate and strengthen enterprises of diverse nature in all the country.

Projects supported with resources from this Fund reflect the identity of young people with peculiar needs of their region. For that reason, it is not odd to find initiatives from areas such as Alta Guajira, where new entrepreneurs seek out to service wind mills, profiting from the natural competitive edge of eolic energy production; or projects led by indigenous communities in Cauca; innovative ideas of students at the main universities in Bogotá; as well as business ideas to be executed by young people in Caldas, who search for their future in the field of biomedical equipment.

In sum, the web page of 'Emprender' Fund records projects from more than 1,060 Colombian municipalities, which in addition demonstrates that

The screenshot shows the website www.fondoemprender.com in a Microsoft Internet Explorer browser window. The page layout includes:

- Header:** Fondo Emprender logo, SENA logo (SERVICIO NACIONAL DE APRENDIZAJE), and a navigation menu (Archivo, Edición, Ver Favoritos, Herramientas, Ayuda).
- Search and Login:** A search bar with 'Dirección' and 'http://www.fondoemprender.com', and a login section with 'Email:', 'Clave:', and 'Entrar' buttons. A link 'Olvidó su clave?' is also present.
- Main Content Area:**
 - EMPRENDEDORES:** A list of links including '¿Qué es el Fondo Emprender?', '¿Quiénes pueden ser beneficiarios...', '¿CÓMO INSCRIBIR UN PLAN DE NEGOCIO?', 'Marco Legal Vigente', and 'Marco Legal Anterior'.
 - Noticias:** A section for news items, including 'CERTIFICADOS DE IVA E ICA' (Enero 30 de 2008) and 'Instructivo Inicio Ejecución Proyectos Fondo Emprender' (Abril 15 de 2008).
 - Convocatorias:** A section for public bidding notices, including 'RESULTADOS PRIORIZACION CUARTA Y QUINTA CONVOCATORIA' and 'SEXTA CONVOCATORIA PUBLICA'.
- Footer:** A small logo and the text 'Internet'.

Colombian young people are convinced that the establishment of enterprises is, most of all, a significant and responsible life's project and that it contributes to improve their quality of life, as well as their families and their immediate environment.

'Emprender' Fund is a special account appointed to SENA. Its aim is to assign economic resources as non-reimbursable seed capital (previously to the fulfilment of the indicators proposed in the business plan) to finance entrepreneurial projects. Its purpose is to generate enterprises and create direct jobs, proposed by trainees or associations of adult trainees, university students and graduates, who at the moment of registering their business plan meet one of the following requisites:

- SENA students who have completed the schooling stage of a training programme.
- Students or graduates of a SENA course in a special population groups who consider a practical component, and have reached 50% of the programme's duration. In case of graduates, certification should have been obtained within the past 24 months.
- SENA students who have obtained certification of partial completion, with a minimum duration of 440 hours, and its certification had been obtained within the past 24 months.
- Graduates with certification of attendance and approval, issued by SENA and/or an educational institution approved by the State, of one (1) course or programme of integral vocational training, with a minimum duration of 500 hours, who have completed and obtained certification within the past 24 months.
- Students who are taking the last two (2) semesters in a higher education programme.
- Persons who have completed subjects, within the last twelve (12) months, in higher education programme.
- University professionals whose first diploma has been obtained during the past 24 months.

A business plan may be submitted individually or in partnership. In case of partnerships, they should be integrated by at least 51% of trainees; remaining partners may be other beneficiaries mentioned above.

The procedure begins when an entrepreneur proposes his business idea to an Advisor of Entrepreneurship Units. Once the Advisor verifies the ben-

eficiary's qualifications, he starts to advise him on the formulation of a business plan by assigning a code in the system.

As the entrepreneur and the advisors progress in the formulation of the plan, they tick each chapter completed in the system, and once completed, they report to the Chief of the Entrepreneurship Unit to determine a technical approval for the presentation of the plan to a call.

'*Emprender*' Fund will grant resources for up to 100% of the value of the business plan, as follows:

- If the business plan generates up to 5 jobs, the sum of required resources shall not exceed 150 minimum legal monthly salaries in force (SMLMV, Spanish acronym).
- If the business plan generates 6 or more jobs, the sum of required resources shall not exceed 180 SMLMV.

The sum to be financed for each business plan is established according to the minimum legal monthly salaries in force at the date of the call's opening. The number of jobs to be generated must be fixed in compliance with the Operative Manual of '*Emprender*' Fund.

Resources allocated by '*Emprender*' Fund **shall be used for**:

- Financing working capital for the business plan, in the understanding that working capital is the necessary funding for the operation of the enterprise, consisting of money for payment of salaries, inputs for the productive cycle (raw materials, goods being processed), directly contributing to or integrating the production process.
- Acquisition of machinery and equipment, costs generated by the legal status and licenses required by law for the normal operation of the project. Resources may also finance adjustments or remodelling of goods composing the process of technical endowment and which are essential for developing the business plan, as long as the amount does not exceed 20% of the total sum required to '*Emprender*' Fund.

In case that the business plan requires larger financing, the entrepreneur must state in the business plan the financing source of those resources.

'*Emprender*' Fund **will not finance** the following items:

- Purchase of movable goods which are not related with the objective of the business plan.
- Purchase of immovable property.

- Adaptations or remodelling of any type of immovable property, not composing the process of technical endowment and which are not essential for developing the business plan.
- Feasibility studies of projects (consultancies, legal and financial counselling, etc.).
- Acquisition of motor vehicles.
- Payment of liabilities, debts or dividends.
- Capital recovery.
- Purchase of shares, options, bonds and other unregistered securities.
- Payment of royalties, derived taxes, para-fiscal contributions.
- Academic training.
- Payment of rights or registration to participate in national or international commercial events.
- Travel and transportation expenses.
- Purchase of premiums or commercial premises.

Once the evaluation stage is over and business plans are classified as feasible, they will be assigned priority and rank by the National Technical Commission of 'Emprender' Fund, in accordance with the following criteria:

- Number of direct jobs to be generated and maintained, with respect to the amount of resources granted by 'Emprender' Fund.
- Number of direct jobs to be generated for vulnerable population groups, vis-à-vis total direct jobs.
- Number of direct jobs to be generated for population aged between 18 and 24 years.
- Project's activities that take place in areas where the Human Development index, or its alternative, is the lowest.
- Project's activities that take place in priority sectors of the National Development Plan and/or regional plans.

SENA convenes national and local public calls for 'Emprender' Fund. Once open, chiefs of entrepreneurship units formalize business plans to be submitted to those calls, then pass them on for the evaluation stage (conducted by the Fund's management) and approval by SENA's National Executive Council.

Entrepreneurship units should be in charge of monitoring during the implementation stage of the business plan. In case the Fund allocates resources to the business plan, it should also conduct technical-operative moni-



www.fondoemprender.com
fondoemprender@sena.edu.co

2005 - 2006
3 Convocatorias Nacionales
7 Convocatorias Locales
USD \$25 Millones
926 Proyectos
4908 Emprendedores
198 Municipios
28 Departamentos
Empleos proyectados: 5.584
Ventas proyectadas: USD \$181 Mill

  **Fondo Emprender**
¡Por un país de propietarios!

Source: Vocational Training Division. Cut up to July 2007.

toring during the first year of implementation -or its extension if any- of business plans endorsed by them, with the aid of the pertinent information system or any means considered necessary, so as to guarantee the observance of the management indicators established in the business plan approved by SENA's National Executive Council.

'Emprender' Fund's challenges are: permanent search of new financing sources; permanent training of advisors in entrepreneurship units; timely response to applications by entrepreneurs; positioning in the market of the supported enterprises; promotion of entrepreneurship, innovation and technological development in a world of constant changes.

To secure the correct use of resources and the sustainability of the supported enterprises, 'Emprender' Fund, through the Project Auditing office, conducts a permanent follow-up of the business plan indicators:

- 1. Control of Management Indicators and Results.** Management indicators and results are considered those within reach of the performance of the Entrepreneur or Entrepreneurs, on the basis of the allocated resources. The fulfilment level of management indicators and results will permit SENA's National Executive Council to decide whether resources are to be returned or not. This group of indicators include:
 - Employment Generation Management.
 - Budget Performance Results.
 - Marketing Management.
 - Results when using resources for the municipality approved.
- 2. Monitoring Indicators of Business Effectiveness.** Business Effectiveness indicators are considered those which show the operative progress of the new enterprise. They will be monitored by 'Emprender' Fund to ascertain the state of progress of new enterprises, but they will not be

CASE: SNACKTURAL

A firm supported by 'Emprender' Fund

This is a company devoted to the production of healthy Snacks, mainly processed with dehydrated orange rind, mixed with other dehydrated fruits, producing completely natural products addressed to people who like to watch over their eating habits.

Dehydrated orange rind set in motion to this family enterprise. The unique characteristics of this food caught the attention of 'Emprender' Fund, since it provides a healthy and 100% natural snack.

Leticia Mejia and her sister were in charge of putting this project forward. One of them is a SENA specialist in food processing, and therefore held wider knowledge of the issue. In accordance with her experience, Leticia tells that initially she thought there were too many requirements. Yet, after working for some time, she realized it was necessary to work under those parameters to be able to become a good manager of her enterprise and be demanding with all the activities carried out.

This business plan was submitted to SENA's Colombian Italian Centre in Bogotá, where the entrepreneurs developed high quality standards, which enabled them to have access to resources from 'Emprender' Fund. Currently, their dream is to market and export their product to other countries.



Krumix product
in its commercial packing.

determinant on whether SENA's National Executive Council will require the reimbursement of resources. This group of indicators comprise:

- Sales Monitoring.
- Operation Monitoring.

'Emprender' Fund is mainly financed with income from the learning fee⁴ and financial profits generated by the Fund's resources.

Government bodies in the national territory (mayoralties and local governments) also enter into accession agreements with 'Emprender' Fund, with the purpose to finance feasible business plans that may promote the socio-economic development of the respective regions.

4 In compliance with Law 789 of 2002, in Colombia, enterprises (starting from 15 employees) are required to have a trainee for every 20 workers. If they decide not to have a trainee, they may choose to make a monetary disbursement.



**BANCA DE LAS
OPORTUNIDADES**

c. Banking of Opportunities

Banking of Opportunities is a long-term policy strategy of the National Government, addressed to achieve *access to financial services of all the population of the country*, in particular lower-income groups, so as to reduce poverty, promote social equality and encourage economic development.

Banking of Opportunities consists of an ensemble of instruments designed to facilitate access to credit, savings, payments, handling of remittances and insurance for Colombia's poor population and for those who had no access to these financial services.

There are 3 instruments, as follows:

1. Upgrade of the regulatory framework.
2. Promotion Strategies: Investment Programme 'Banking of Opportunities'.
3. Establishment of the Banking of Opportunities Network.

SENA's role in the frame of Banking of Opportunities includes:

1. **Identification of applicants (Networks of Social Groups):** SENA students in all programmes (Diploma and complementary), as well as citizens who approach our Entrepreneurship Units.
2. **Monitoring to formulate the credit application.** We help to process forms (there is a different form in each bank) and we send those who have technical and financial feasibility.
3. **Monitoring during the credit's duration:** counsel, call centre, visits of specialized trainees and staff and, in particular, provision of supplementary training.
4. **Training of Non-Banking Correspondents.** SENA, through the Financial Services Centre located in Bogotá, is coordinating with the financial sector two specialized training programmes for non-banking correspondents. To date SENA has proposed the following training programmes:
 - Training for owners: Diploma in Non-Banking Correspondents Management (160 hours).

- Training for operators: Its provision is suited to the needs and priorities of each bank (Maximum: 440 hours, ideal: 120 hours).

**RESULTS OF THE ENTREPRENEURSHIP POLICY:
August 2002 – August 2007 period**

Programme's Name	Indicator	Result
Entrepreneurship Training	Trainees	305,731 trainees have taken Entrepreneurship courses (2005 – 2007)
Entrepreneurship Units	Units	115 SENA Units 238 external Units (universities)
	SENA's Advisors	801 Professionals
	Projects	16, 552 business plans
Technologically-based Enterprise Incubators	Incubators	35 Incubators
	Incubated Enterprises	1,232 technologically-based enterprises
	Sales	USD 91,897,727
	Jobs	9,356 (mainly Technicians, Technologists and Professionals).
'Emprender' Fund	Calls	5 National, 10 Local
	Enterprises	926 new enterprises
	Jobs	5,584 jobs generated
	Sales Generated	USD 11,868,525
TecnoPark	Projects	1,132 Entrepreneurial Initiatives
	Entrepreneurs	3,385 associated entrepreneurs
Banking of Opportunities	Projects submitted	9,791 Projects submitted by SENA
	Projects approved	3,186 (since 21 November 2006)
	Associated Banks	27
	Amount of Loans	USD 3,446,803

Source: SENA – Vocational Training Division

IV. ENTREPRENEURSHIP AT SENA, CERTAIN CHALLENGES

After 5 years of implementing this entrepreneurship policy and in view of results, a number of challenges must be addressed by the institution, in order to be able to move beyond the impact obtained.

Some of the challenges are:

- To increase the participation of SENA graduates. Many of our trainees give priority to the search of a learning contract before creating an enterprise.
- To foster interrelations between teachers of technical areas in entrepreneurship processes. These activities are entrusted to entrepreneurship advisors.
- To bring closer to daily vocational training the processes advanced by entrepreneurship units.
- To facilitate the implementation of marketing mechanisms for products developed by trainees.
- To expand the use of Information and Communication Technologies (ICT) among entrepreneurs supported by SENA.
- To actively associate ourselves with the National Competitiveness System and, inside its framework, with the National Competitiveness Commission, that consists of public and private sectors and the civil society. In the context of the new National Development Plan, this system suggests 9 strategies:
 - a. Access to financial services
 - b. Promoting the formalization of entrepreneurial activities
 - c. Fostering the market of non-financial entrepreneurial development services
 - d. Reinforcing the innovation and technology transfer capacity
 - e. Encouraging the use of ICT
 - f. Access to occupational training
 - g. Boosting market access
 - h. Promoting entrepreneurship
 - i. Productive interconnection and business partnership

It is necessary to keep a constant struggle for entrepreneurial productivity and, at the same time, for the generation, formalization and quality of

employment. The generation of new enterprises, with high quality jobs, which offer social security and improve income is necessarily related to successfully leading our society to entrepreneurship.

Global Entrepreneurship Monitor (GEM), the world's largest monitoring network of the largest entrepreneurship activity of the world, of which SENA is part of and where over 100 universities and institutions of the entire world participate in, indicate that Colombia, in 2006: i) was the second country among 42 nations where enterprises set up in largest numbers, ii) close to six million Colombians are taking the risk of creating new enterprises, iii) one of each Colombian Citizen, aged 18 to 64 years old, is actively involved in the process of setting up enterprises, iii) 78.4 % of new entrepreneurs are below the age of 44 years, iv) 52.6% of that population has technical, professional or postgraduate⁵ education.

Therefore, the promotion of Entrepreneurship is totally aligned with SENA's mission and it is an essential aspect of the value proposal as a Vocational Training institution that offers **KNOWLEDE FOR ALL COLOMBIAN CITIZENS.**

5 GEM shows that these are relatively high. 2,7% hold postgraduate studies, 29% completed university studies, 20,9% have done technical studies and 36,4% have finished secondary studies.

Skill Development, Productivity Improvement and the Impact of HEART Trust-NTA in Jamaica

Tom McArdle

1. INTRODUCTION

This paper analyses the relationship between skills and productivity in Jamaica within the context of recent ILO findings of the relationship between skill levels of the workforce, productivity, and employment and job creation. It begins by discussing the sources of a long standing productivity problem in Jamaica and in the Caribbean region, of which low education and skill levels is but one prominent cause among others, and analyses the education and skills problem. The national policy framework for productivity and a variety of institutions and activities are discussed, including the relatively new National Productivity Centre, established with assistance of the ILO. The paper then focuses on Jamaica's national training institution, The HEART Trust-National Training Agency and its role in productivity and competitiveness. This agency has transformed from a traditional state provider of mostly low-level vocational training to the disadvantaged to fill jobs that had not been materialising in the 1980s and 1990s, to a comprehensive workforce development system in an economy that has begun to pick up steam. This workforce development system, serving both young people making the transition from school to work, as well as working adults, is recently

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*** Exchange Rate: JA\$69.00 = US\$1.00.

operating in an environment in which jobs are beginning to grow, and increased demands for specific skill sets are being specified by employers and stakeholders. The agency's role in productivity and competitiveness has been recognized by an increasing number of firms partnering with the organisation to train, upgrade and certify workers. The agency also continues close involvement with government initiatives in poverty alleviation, social protection, tourism promotion, improving early childhood care provisions, and technology.

The paper examines HEART's impact on productivity in Jamaica reviewing the literature and available data on both productivity and HEART activities, and discusses growth potential via proxy variables in the amount of training, expenditures, employment creation and foreign investment. Several cases of successful partnership in productivity enhancing ventures and lessons learned are discussed.

What HEART has done in Jamaica has had a significant impact upon the English speaking Caribbean. Agencies with a similar orientation have emerged in Barbados and in Trinidad and Tobago that together (along with representation from the Organisation of Eastern Caribbean States (OECS) formed the Caribbean Association of National Training Agencies or CANTA. This association has lobbied the Caribbean Community (CARICOM) to adopt over 100 occupational standards that are being used as the basis for a regional qualification framework and mutual recognition that can enable and strengthen the free movement of skilled labour called for by the implementation of the Caribbean Single Market and Economy (CSME). HEART has also been working closely with OECS member countries including St. Lucia, St. Vincent & the Grenadines, and Grenada who are adopting the standards-driven, competency-based model that HEART has promoted in a number of ways in different kinds of institutions and programmes.

2. THE PRODUCTIVITY GAP IN JAMAICA AND THE CARIBBEAN

It has been established that Jamaica, the wider Caribbean region, and the Latin America and Caribbean region in general, suffers from a productivity problem. This is documented fairly extensively by the World Bank for the LAC region and Caribbean (e.g. de Ferranti *et al*, 2003; World Bank 2003, 2005). This analysis attributes the "productivity gap" primarily to the re-

gion's failure to keep pace with adoption of new technologies in its production processes and slow skill upgrading. Issues of weaknesses in basic education systems, the capacity and economic relevance of tertiary education provisions, physical infrastructure and macroeconomic policies and problems are also analyzed as contributing factors.

An extensive analysis of the productivity deficit in Jamaica was conducted by Downs (2003) who also focuses on the educational deficits, but also the labour relations climate, the migration of skilled labour, the regulatory climate, crime, real effective exchange rates and labour costs, and the barriers to doing business as contributing factors. A recent analysis by Blavy of the International Monetary Fund (IMF) (2006) analyses the disparity between relatively high amount of recent investments, including foreign direct investments and the surprisingly low growth in the economy, and shows the contribution of high levels of public debt to the productivity deficit in Jamaica. The work describes high levels of investment in mature and safe industries, but low public investment due to the heavy debt overhang, lack of diversification and growth concentrated in "enclave sectors" (tourism and mining), along with rapid growth of the informal economy. The challenge is how to make investments more productive (see also James *at al* as well).

Using the Penn World Tables (Version 6.2), Jamaica's labour productivity performance (Real GDP per worker) was assessed for the period 1960-2003 by Douglas of the Jamaica Productivity Centre for the National Development Plan's section on the labour market, productivity and competitiveness. For purposes of comparison Barbados, Dominican Republic, Trinidad and Tobago, Canada, United States and Singapore were included in the assessment. The results of the analysis are summarized in Table 1. Douglas found that:

"On average, over the 44 year period, output per Jamaican worker grew at 0.2 % per annum. This is in contrast to average annual growth rates of 4.0, 3.8, 3.5, 2.7, 2.1, 2.0, 1.8, 1.4, and 1.2 % for Malaysia, Ireland, Singapore, Mauritius, Dominican Republic, Trinidad and Tobago, United States, Canada, and Barbados, respectively."

As can be observed from Table 1, Jamaica's best decade in terms of output per worker was the 1960s when annual average growth rates of 2.3 percent was recorded. Over the last 14 years (1990-2003) Jamaica recorded the lowest average labour productivity growth in the group of only 0.04 % per annum. This compares unfavourably to Trinidad and Tobago (4.5 %), Singa-

pore (3.2 %), Canada (1.5 %), the Dominican Republic (2.5 %) and USA (1.7 %).

Labour productivity using the international prices (\$I) for the period 2000 – 2003 averaged \$9,080 per worker for Jamaica, compared with Barbados at \$28,302, Trinidad and Tobago at \$33,768, and the U.S. at \$67,087 (see Table 2). The data show Jamaica continuing on a low productivity growth path since 2000.

Table 1
Annual Average Labour Productivity Growth Rates: Selected Countries

Period	Barbados	Canada	Dominican Republic	Jamaica	Singapore	Trinidad & Tobago	United States
1961-2003	1.2	1.4	2.1	0.2	3.5	2.0	1.8
1961-1969	5.0	2.3	1.2	2.3	3.5	4.0	3.0
1970-1979	1.2	0.9	3.3	-1.2	4.5	2.1	1.1
1980-1989	0.2	1.0	1.3	0.0	3.1	-3.4	1.6
1990-1999	-0.7	1.3	2.6	0.2	4.4	2.0	2.0
2000-2003	-0.16	2.03	2.06	-0.40	-0.05	10.74	0.93
1990-2003	-0.57	1.52	2.45	0.04	3.16	4.53	1.70

Source: Jamaica Productivity Centre.

Table 2
Real GDP Per Worker (International Prices \$I) 2000-2003

Year	Barbados	Canada	Dominican Republic	Ireland	Jamaica	Trinidad & Tobago	United States
2000	\$29,178	\$49,816	\$15,009	\$59,103	\$9,073	\$33,102	\$67,079
2001	\$28,012	\$50,082	\$15,591	\$61,618	\$9,131	\$32,076	\$66,616
2002	\$27,827	\$51,152	\$16,273	\$63,842	\$9,090	\$30,097	\$66,788
2003	\$28,191	\$51,796	\$15,572	\$65,925	\$9,025	\$39,797	\$67,865
Promedio	\$28,302	\$50,712	\$15,611	\$62,622	\$9,080	\$33,768	\$67,087
Cambio	-\$987	\$1,980	\$563	\$6,821	-\$48	\$6,696	\$787
(%)	-0.2	2.0	2.1	4.4	-0.4	10.7	0.9

Source: Compiled from Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.2, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, September 2006.

Average annual labour productivity growth for eight sectors of the economy over the period 1990-2004 is summarized in Table 3 for the sub-periods 1990-1999 and 2000-2004. For the 10-year period 1990-1999, five sectors recorded positive annual average growth in output per worker while four showed decline. For the succeeding five years (2000-2004), average annual growth in labour productivity actually slowed in all sectors relative to the previous period.

Total factor productivity calculations by the Jamaica Productivity Centre covering the period 1973-2005 show that, on average, growth in output is driven largely by growth in capital input (2.67 % per annum), labour input (1.58 % per annum) and TFP (-1.74 % per annum). This negative TFP growth for Jamaica has been observed in several other studies. This could be attributed to several factors including lack of synergies as well as absence of technical progress and innovation.

James, *et al* (2003) studied private and social returns to tertiary education in Jamaica and provide evidence that the productivity problem shows up most clearly in “labour productivity growth that is too low in sectors that use import capacity intensively and *import* productivity growth that is too low in sectors that are capital-intensive.” They cite the need to develop the domestic capital sector, with a particular focus on tertiary education with greater labour market relevance, and they cite the kind of standards-driven and competency based training offered by Jamaica’s HEART Trust-National Training Agency as a part of the solution to increasing productivity.

Table 3
Average Annual Sectoral Labour Productivity Growth Rates (%)

Sectors	1990-1999	2000-2004
Agriculture, Forestry & Fishing	5.49	-3.49
Mining & Quarrying	8.58	2.34
Manufacturing	4.07	3.39
Electricity, Gas & Water	4.02	3.21
Transport, Storage & Communication	1.26	-1.23
Construction & Installation	-4.18	-3.41
Finance, Insurance, Real Estate & Business Services	-0.31	-0.36
Distributive Trades, Hotels & Restaurants	-0.2	-2.46

Source: Calculated by JPC from STATIN Data.

The authors note that the fundamental solution of this problem is the development of the domestic capital sector of Jamaica. The most important segment of this capital sector produces knowledge generally, and tertiary education in particular, with supporting political and social institutions.

Later work by these same authors reinforces the effects of HEART training investments and is discussed below.

The point of this discussion is the idea that while education and skill levels are identified within all the research as a significant factor in the productivity problem facing Jamaica, this is clearly not the only factor. Thus, improving the education and skill levels is not sufficient in and of itself, to correct the productivity problems. Education and skills improvements need to be seen as a necessary but not a sufficient condition to cause productivity improvement.

In particular, the existing research calls attention to the following:

- At the macroeconomic level, the large debt overhang deprives both the public and the private sector of investment capital as government borrowing restricts the amount of credit and maintains high interest rates. This depresses capital investment in machinery, equipment and technology, and contributes to investment in safe but mature sectors with lower risks and lower rewards.
- The impact of high crime on productivity is to increase cost and reduce competitiveness. The estimated cost penalty of crime and additional security measures is two to three percent.
- Jamaica has difficulty achieving productivity growth through acquiring new imported technology. Much of what it imports is replacement, and maintenance of production equipment and technology (both a skills and management issue) appears to be a significant problem. The role of frequent hurricanes in recent years and resultant damages is cited in this area as well.
- The labour relations climate in some sectors appears to work against skills recognition, and repeated calls for productivity-linked compensation schemes have not penetrated into many of the firms.

3. QUALIFICATIONS OF THE WORKFORCE

A primary problem of the Jamaican productivity issue is the weak educational base and low level of formal qualifications (both academic and vocational) among the work force.

While Jamaica has achieved full primary enrolment, it continues to suffer from quality problems at the public primary level. The language barrier presented by the differences between Jamaican *patois* (the language most Jamaicans learn to speak) and Standard English poses an educational challenge not yet overcome, and the consequent weak literacy foundations this establishes appear to undermine the primary education (Education Research Center, 1999).

These problems persist into the secondary system. While coverage is incomplete and approximately 12% of students still exit school after grade nine, of the 88% remaining only 11-12 percent leave school with meaningful academic qualifications. Secondary school achievement in Jamaica is measured using the Caribbean Secondary Education Certificate (CSEC) examinations administered by the regional Caribbean Examination Council (CXC). These are subject-specific exams offered in 35 different subject areas including academic and technical and vocational subjects. Only 77% of grade 11 completers sit one or more exams, while 23% do not sit any exams. Only about 12% of the cohort passes the 3-4 subjects viewed as acceptable; matriculation to tertiary education requires four to five passes including English, mathematics and a science.

An international comparison of the average years of schooling of adults is revealing as shown in Table 4. While Jamaica is only 0.4 years less on average than Barbados, most would agree that the education programme in Barbados is more effective than the Jamaican programme as shown by CSEC results, where Barbados achieves much more favourable results.

Table 4. Average years of schooling of adults

Country	Average Years
Barbados (2000)	8.7
Trinidad and Tobago (2000)	7.8
Jamaica (2001)	8.3
Dominican Republic (2000)	4.9

Source: World Bank, World Development Indicators, 2004, Jamaica Census, 2001.

The data on first time job seekers from 2006 show that 62.4% of first time seekers have no training, and 52% have no academic qualifications (STATIN, 2007).

Data on years of education in Table 5 of the workforce show 7.3% has only a primary or All Age School education, and 91.6% has secondary education, but almost 30% have only lower secondary education (grade 9), and Table 6 shows that almost 70% of all those exposed to lower or upper secondary did not pass any exams.

Table 5
Labour Force, Employment and Unemployment
by Years and Type of Schooling or Education

Level of Education	Years of Schooling	Grade	Labour Force	% Distribution	Employed	Empl. Rate	Unemployed	Unempl. Rate
None	0		3,975	0.3	3,529	88.8	446	11.2
Primary Education	1	1	822	0.1	762	92.7	60	7.3
	2	2	2,475	0.2	2,228	90.0	247	10.0
	3	3	3,948	0.3	3,633	92.0	315	8.0
	4	4	5,781	0.5	5,675	98.2	106	1.8
	5	5	8,800	0.7	8,406	95.5	394	4.5
	6 & Over*	6-9	63,876	5.2	60,379	94.5	3,497	5.5
	Sub-Total		89,677	7.3	84,612	94.4	5,065	5.6
Secondary Education	1	7	20,261	1.7	18,761	92.6	1,500	7.4
	2	8	54,127	4.4	49,429	91.3	4,698	8.7
	3	9	364,401	29.7	331,118	90.9	33,283	9.1
	4	10	71,576	5.8	60,641	84.7	10,935	15.3
	5	11	589,728	48.1	514,581	87.3	75,147	12.7
	6	12	11,477	0.9	10,711	93.3	766	6.7
	7 o más	13	11,006	0.9	10,450	94.9	556	5.1
	Sub-Total		1,122,576	91.6	995,691	88.7	126,885	11.3
Not Stated			13,447	1.1				
April's 2006 L.F. Total			1,225,700					

* "& Over" refers to the grade 7-9 programme in former "All Age Schools".

Source: Data from Labour Force Survey analysed by HEART Trust-NTA.

Table 6
Secondary Education Beneficiaries by Exams Passed

Exam Passed	Secondary Education (Column %)									Total
	ninguno	1 year	2 years	3 years	4 years	5 years	6 years	7 years & over	not stated	
none	99.2	97.4	96.5	95.7	88.7	49.9	13.4		44.5	70.8
CXC basic, JSC 5 SSC, 3 rd JL	0.1	0.5	1.3	1.2	2.1	3.8	6.9			2.4
CXC Gen, GCE 'O' 1-2			0.2	0.2	1.6	6.2	2.6	1.7		3.1
CXC Gen, GCE 'O' 3-4	0.1		0.2	0.2	1.3	8.7	2.9		0.3	4.3
CXC Gen, GCE 'O' 5+			0.2		0.6	6.9	12.9	3.2		3.4
GCE 'A' 1-2, CAPE 1-2						0.2	0.6	4.3		0.2
CAPE/GCE 'A' 3+						0.1	3.9	8.3		0.1
Degree		0.6	1.0	0.5	1.5	11.8	56.1	77.3	3.0	7.2
Other			0.4	0.9	2.0	3.5	0.7	5.2	1.1	2.1
Not stated	0.6	1.6	0.1	1.3	2.3	8.7			51.1	6.3
Total	100	100	100	99.9706	100	100	100	100	100	100
Row %	7.1	1.6	4.3	29.1	5.7	47.2	0.9	0.9	3.1	100.0

Source: Data from Labour Force Survey analysed by HEART Trust-NTA.

The data on training received by the workforce is poses certain problems; even despite the efforts of HEART and the tertiary system. As of 2006, 75.4% of the workforce reports it has received no training, or 945,200 of the total of 1,253,075 members of the workforce (STATIN, 2007). Conversely, 23.2% of the workforce says it has received training. This contrasts to the approximately 42% of the employed workforce who are in what would usually be considered skilled jobs in the labour market data (STATIN, 2007).

Despite HEART itself having trained 338,654 individuals between 1982 and March of 2007 (See Appendix 1), only 290,725 individuals report receiving training in the most recent labour market surveys, including 180,675 who received some kind of vocational or on-the-job training (14.4%) and 110,050 (8.7%) who received professional training, as shown in Table 7. The post secondary and tertiary education and training provisions produced 250,854 semi-skilled and skilled workers, technicians and professionals over the past five years alone (see Table 8). It is likely that a portion of those trained by HEART later went on to pursue a diploma or degree and are therefore reporting at that level, but it still appears that there is a discrepancy between

the numbers reported being formally trained by providers and the number reporting receiving training in the labour force data. Migration may certainly be a factor, with over 20 thousand migrating annually. It may be that individuals do not report earlier training that does not appear to them to be relevant to the job they now hold, or it may be measurement error, or all of these. Nonetheless, this figure of about 75% of the workforce being untrained has persisted for many years.

The steady increase in the output of skilled workers is shown graphically in Figure 1.

Table 7
Labour Force by Training Received (Average 2006)

Vocational without certificate	17,700	1.4%
Vocational with certificate	106,725	8.5%
Professional without Degree or Diploma	5,150	0.4%
Professional with Degree or Diploma	104,900	8.4%
Apprenticeship	1,425	0.1%
On-the-job training	54,825	4.4%
Total Trained	290,725	
None	945,200	75.4%
Not stated	17,150	1.4%
TOTAL	1,253,075	100%

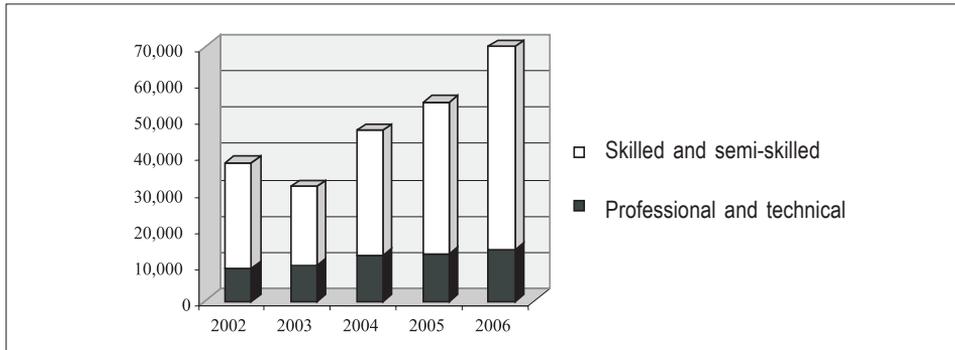
Source: STATIN, 2007.

Table 8
Skilled & Semi Skilled & Professional & Technical Outputs 2002-2006

OUTPUT	2002	2003	2004	2005	2006
Professional & Technical	8,968	9,709	12,623	12,913	14,300
Skilled & Semi Skilled	28,874	21,738	34,267	41,804	55,638
TOTAL	39,844	33,450	48,894	56,722	71,944

Source: Planning Institute of Jamaica, Economic and Social Surveys, 2003-2007.

Figure 1
Output of skilled personnel 2000-2006



Source: ESSJ, 2003, 2005, 2007

Table 9 shows that individuals with **no** training are more likely to be employed than those with vocational training, with or without Vocational certificates, as they occupy low skill positions that persons with more qualifications won't accept. The presence of a pool of trained and certified but unemployed individuals is also a cause for concern; the rate of unemployment of 16.4% for individuals with vocational certification is rather high, higher than the national unemployment average of 10.3% for 2006 (STATIN, 2007).

Table 9
Unemployment by Training Received (Average 2006)

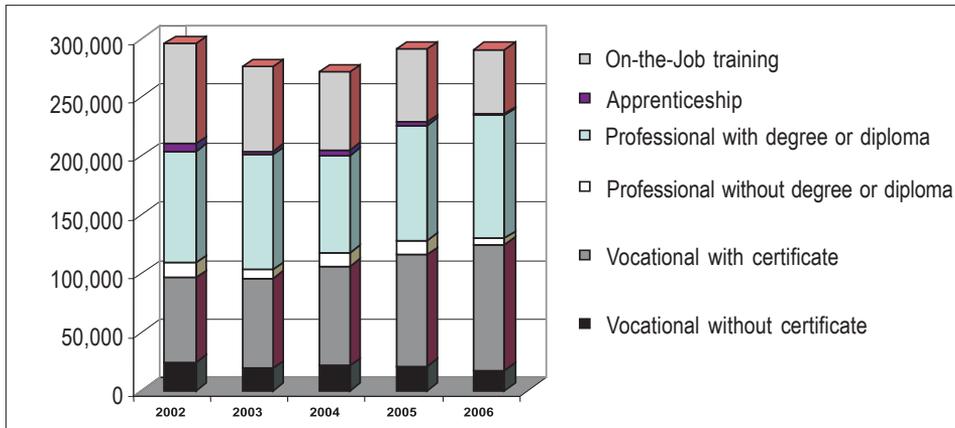
Vocational w/o certificate	4,450	25.1%
Vocational w certificate	17,450	16.4%
Professional w/o Degree or Diploma	425	8.3%
Professional w Degree or Diploma	4,050	8.4%
Apprenticeship	125	8.8%
On-the-job training	3,850	7.0%
None	98,025	10.4%
Not stated	1025	6.0%
TOTAL	129,400	10.3%

Source: STATIN, 2007.

There is also a contraction in individuals reporting on-the-job training and apprenticeship as shown in Figure 2, and the number reporting voca-

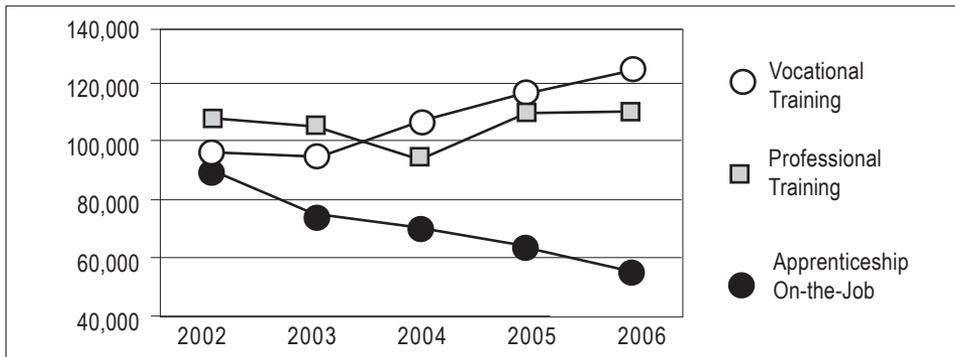
tional certification does not correspond with the figures on HEART outputs considering how these have grown. Figure 3 illustrates the fall in those receiving on-the-job and apprenticeship training reported in the labour force data. Although participation in traditional apprenticeship has declined, there is a steady output of traineeships that the labour force data do not seem to reflect.

Figure 2
Trained Workforce by Type of Training 2002-2006



Source: STATIN, the Labour Force 2002, 2004, 2006.

Figure 3
Labour Force by Type of Training 2002-2006



Source: STATIN, the Labour Force 2002, 2004, 2006.

Table 10
Occupations, Levels of Training and Earnings, Jamaica Census 2001

Position	Occupation	Employed						
		Percent of Total	Mean Annual Wage	Average Years of Schooling	Certification			
					None	CXC /GCE	Certif. /Dip.	Degree
1	Farmer - Mixed Crop Grower	10.9	114,707	7.8	94.0	3.5	0.3	0.1
2	Domestic Worker – Helper	4.7	144,167	8.5	88.9	7.9	0.3	0.0
3	Building Trade – Mason/Bricklayer	3.4	282,385	9.1	88.3	7.3	0.2	0.0
4	Driver - Car, Taxi, Van	3.1	289,202	9.4	78.1	15.9	0.8	0.0
5	Sales Person – Demonstrator	3.0	229,180	10.2	56.6	35.0	3.3	0.3
6	Sales Person - Market, Street Stall	2.7	188,080	8.9	85.9	10.0	0.3	0.1
7	General Manager - Wholesale/retail	2.7	257,941	9.4	73.6	17.2	2.7	1.3
8	Protective Services – Security Guards	2.3	253,158	9.8	68.0	22.6	2.1	0.4
9	Cook	2.2	222,921	9.6	69.1	20.9	2.3	0.4
10	Mechanic - Motor Vehicles	2.0	284,318	10.0	70.3	20.0	2.1	0.6
11	Textile Worker - Tailor, Dressmaker	2.0	179,691	9.7	72.8	20.2	1.2	0.1
12	Waiter/Waitress Bartender	1.9	204,297	10.0	68.0	25.6	1.1	.
13	Hairdressers/Barbers/Beauticians	1.7	211,580	10.2	60.5	28.2	3.3	0.1
14	Building Trade - Carpenter/Joiner	1.6	271,845	9.4	84.9	11.1	0.2	.
15	Construction Labourer - Building, Road, Dam, Grave Etc	1.5	248,400	8.9	86.7	7.5	0.6	0.4
16	Clerk – Secretarial	1.5	379,675	12.1	7.1	51.3	28.2	4.5
17	Clerk - Cashier/Ticket	1.5	241,561	10.8	36.4	49.2	7.6	0.9
18	Vendor - Street, Non-Food	1.4	204,260	9.0	85.7	10.3	0.6	0.1
19	Agricultural Labourer - Farm Hand	1.4	148,074	8.1	90.9	7.1	0.2	0.0
20	Farmer - Field Crops/Vegetables	1.3	93,584	8.0	93.6	3.6	0.2	0.1
21	Sweeper - Street/Park etc.	1.3	164,226	8.4	91.7	5.1	0.0	0.3
22	Business Professions - Accountant/Auditor	1.3	783,003	13.2	2.7	32.9	29.4	28.8
23	Vendor - Street, Food	1.2	170,155	8.8	86.5	9.8	0.6	0.1
24	Teacher - Primary Education	1.2	423,969	13.4	2.8	21.4	58.1	13.1
25	Domestic Worker - Helper in Office, Restaurant etc	1.1	175,330	9.1	80.3	14.6	0.6	0.2
26	Driver - Heavy Truck etc.	1.0	334,686	9.4	74.2	18.2	1.1	0.2
27	Metal Worker – Welder	1.0	268,755	9.9	74.2	17.2	0.8	0.0
28	Building Finisher - Electrician	1.0	311,367	10.4	55.6	30.8	4.6	0.7
29	Teacher - Secondary without Degree	0.9	391,810	13.5	2.9	23.2	54.8	14.0
30	Wood Worker – Cabinet Maker/Carver	0.9	281,644	9.6	81.3	13.0	1.0	0.0
31	Protective Services – Police Officer	0.9	489,576	10.9	23.1	55.8	8.1	1.6
32	Building Caretaker	0.9	168,733	9.0	85.9	7.7	0.7	0.2
33	Labourer in Manufacturing Operation	0.9	193,416	9.4	76.3	17.0	1.1	0.0
34	Housekeeper (incl Warden Butler etc.)	0.8	198,552	9.9	70.0	22.5	1.2	0.2
35	Fishery Worker – Fishermen	0.8	255,803	8.5	94.3	2.9	0.2	0.2
36	Agent/Representative - Technical/ Commercial Sales	0.8	448,028	11.3	22.7	49.4	14.7	4.9
37	General Manager – Other	0.7	913,593	11.9	18.9	30.1	20.6	20.1
38	Farmer - Horticulture & Nursery Plants	0.7	176,092	8.0	93.7	3.1	1.2	0.
39	Driver – Bus	0.7	308,476	9.7	67.2	23.3	2.7	0.0
40	Mechanic - Electrical/Electronic Fitter/Repairer	0.6	342,171	10.5	49.3	35.0	7.3	0.8

Source: James *et al*, 2006, Heart Trust/NTA document.

In Table 10, the average years of schooling and the kind of educational certification attained is shown from the 2001 census for the top 40 occupations. The reader should note that the four largest occupations of mixed crop farmers, domestic workers, masons/bricklayers and drivers include 94%, 89%, 88% and 78% respectively with no qualifications. These large categories of workers accounted for 22.1% of the labour force. So there is a concentration of poorly qualified workers in large occupational groupings requiring low levels of skill. Only 7% of secretaries report no qualifications, while 23% of police report no qualifications. In the traditional vocational areas, 49% of electrical and electronic mechanics, 56% of electricians, 70% of auto mechanics, 74% of welders, and 85% of carpenters have no certification or qualification. This suggests there is great scope for worker certification programmes in Jamaica through the type of unitized approach enabled by the NQF.

4. GOVERNMENT POLICIES ON PRODUCTIVITY

There is no formally adopted policy within the Jamaican government about productivity, so the policy or policies can only be inferred from the activities of productivity-related institutions, organisations, government programmes, and the institutional arrangements of co-operation that attempt to influence productivity. This section discusses the Jamaica Productivity Centre, the National Development Plan activities of 2007, the National Industrial Policy of 1996, reviews some findings about training activities within firms, the long term vision and mission of HEART Trust/NTA, and discusses a variety of arrangements and agreements between institutions and organisations that intend to impact productivity and competitiveness.

Jamaica Productivity Centre

With assistance and support from the ILO going back to 1999, in 2003 the government of Jamaica set up the Jamaica Productivity Centre (JPC) as a tripartite organisation comprising representation from the Ministry of Labour and Social Security, the Jamaica Employers Federation (JEF), and the Jamaica Confederation of Trade Unions (JCTU). The operation is funded

entirely by the Ministry of Labour. The Centre's mandate is "to stimulate a high level of national awareness of the concept of productivity and inculcate a productivity-sensitive culture in Jamaica through advocacy, knowledge generation and dissemination, and provision of technical assistance services." The Centre's activities consist of four main programmes:

- Public Education and Sensitization
- Building and Enhancing Productivity Competencies
- Productivity Advisory Services
- Productivity Measurement and Benchmarking

The JPC is actively working with the Enterprise Based Training (EBT) section of HEART to measure productivity impacts of training interventions in firms by training six staff members in a productivity measurement methodology. In addition, the two agencies are partnering on the upcoming National Productivity Week scheduled for September 2007.

A core role of the Centre is to galvanize the gains of the public education and sensitization program by seeking to ensure the development and strengthening of productivity-related competencies and abilities at a national level. Education and Training are the avenues through which this will be pursued.

The Centre will also intend to facilitate the design and delivery of training programmes, especially "train the trainer" programmes to enable firms to diagnose productivity and competitiveness gaps and design and implement solutions. Further, the intention is to influence the secondary and tertiary curricula to promote a productivity consciousness, and to collaborate with existing trainers and educators to provide competence building training and educational programs.

The Productivity Advisory Services of the Centre will also "provide productivity tools and training (computer models, software programs, data, industry benchmarks, productivity indices, best practices, reports, distance learning materials, self-learning kits, seminars and workshops, etc.) to private and public enterprises, organizations (public and private) and industries that will enhance their capacities to initiate and sustain productivity growth." (Website).

According to the Executive Director of the Centre, Dr. Charles Douglas, the activities of the Centre, in addition to the training in productivity measurement and management for HEART, include the following highlights:

The JPC has developed a consistent data series which it has used to measure productivity at several levels:

1. Whole economy – partial factor productivity (e.g., labour, capital, energy, material, and service), total factor productivity (TFP), unit labour cost, etc
2. Sectoral Level - partial factor productivity (e.g., labour, capital, energy, material, and service), total factor productivity (TFP), unit labour cost, etc
3. Industry Level (goods-producing and services providing)
4. Firm Level - partial factor productivity (e.g., labour, capital, energy, material, and service), total factor productivity (TFP), multifactor productivity (MFP), unit labour cost, etc.)
5. In addition, JPC is currently testing an analytical model which it hopes will have widespread application at the firm level. Other models are being developed aimed at services sectors such as healthcare, education, law enforcement, etc.
 - Worked with ten companies and organisations on productivity measurement and improvement.
 - Published 19 articles on productivity and engaged in 19 interviews in the media.
 - Formed alliances with the University of the West Indies, HEART Trust, Jamaica Exporters Association, Private Sector Organisation of Jamaica, Planning Institute of Jamaica, Statistical Institute, and other organisations.

The Jamaica Productivity Centre has established important linkages with both private sector firms and government and non-government institutions. The Centre works closely with the Ministry of Labour and its departments, the Planning Institute of Jamaica, HEART, the private sector organisation (PSOJ), Jamaica Employers Federation (JEF), Jamaica Trade and Invest (JTI), National Youth Service, National Insurance Scheme, trade unions, the Jamaica Council for Persons with Disabilities. Although the agency is youthful, it is already having an impact in terms of public awareness about productivity and competitiveness, productivity measurement and management, and performance linked compensation schemes.

National Development Plan

In early 2007 the Office of the Prime Minister (OPM) and the Planning Institute of Jamaica (PIOJ) initiated a National Development Plan 2030. This ambitious project aims to establish a coordinated plan involving over 30 discrete sectoral plans including a plan for training and workforce development, and a plan for the labour market, productivity and competitiveness. The first draft of nearly all the plans is now completed. These plans call for (among other things) the following (so far):

- Developing a programme of productivity management.
- Creation of incentives for enterprise development, innovation and performance
- Adoption of a national qualification framework by all providers of education and training.
- Improving career development services for both students and workers.
- Increasing cooperative training programmes between educational institutions and firms.
- Improving labour market information.

The plan for the labour market, productivity and competitiveness makes no mention of productivity-linked compensation schemes, long a favourite of the promoters of labour market reform and productivity improvement.

National Industrial Policy (NIP)

In 1996, “The National Industrial Policy - A Strategic Plan for Economic Growth and Development” was presented through Parliament to the nation. The four essential components of the Policy are:

- Macroeconomic Policy
- Industrial Strategy
- Social Policy
- Environmental Policy

The Policy sets specific targets for economic growth and includes a targeted set of strategic clusters for development including information technology, entertainment and sports, light manufacturing and agro and food

processing. An integral part of the Policy is a Social Partnership which sets out agreements by the three social partners-government, labour and employers with regard to a number of areas of economic organization. Implementation of the policy, however, was only partial. The government did stimulate development of the information technology sector, and has made some inroads in the sports arena with World Cup Cricket held in 2007, but light manufacturing and agricultural and food processing have not gotten much attention. Notwithstanding this, the latter two economic clusters have grown, but not to the extent envisioned or timetabled by the NIP. An important new investment coming into production is the new ethanol plant using sugar cane, based on a public-private partnership.

HEART Trust-NTA and the Productivity Question

The HEART Trust-National Training Agency has become an increasingly important stimulus to productivity improvement. The agency has put in place a comprehensive workforce development system with the following features:

- A new National Qualification Framework (NQF) based on a standards-driven, competency-based (or outcomes-based) approach to education and training with five levels corresponding to levels of employment from semi-skilled to professional.
- Over 400 qualifications available within the framework.
- The unit competencies (standards) can be used by firms as a human resource development and HR management tool to identify the skills employees need, fill gaps in learning skills, use the NQF as a reference in considerations of wages, develop succession plans, and generally, as a productivity enhancement tool.
- A network of 28 training institutions serving 42,580, over 100 community-based training programmes serving 13,143 and work-based training in the form of traineeship-4,579, traditional apprenticeship for 423 and workforce development programmes in firms for 18,793 (all figures for 2006-07 ending in March 2007).
- Training programmes for instructors, assessors and trainers.
- Availability of over 1,400 assessors trained to assess the units within the various qualifications.

- A Quality Assurance system to monitor assessments and to accredit programmes offered under the framework.
- A Special Incentive Programme (SIP) aimed at firms to take up the NQF and partner with the agency to get workers assessed and certified within the framework. This programme reduces the cost to firms of participating in worker certification, provides instructional material, provides assessors and instructors as necessary, and finances costs associated with firms becoming Recognized Training Organisations by the NCTVET including assistance to complete accreditation documentation and training of in-firm assessors.
- Financing for the Beyond Project that trains young entrepreneurs and offers business incubation services and support.
- Financing for projects aimed at the technical high schools and the technical and vocational offerings in secondary schools to upgrade the offerings, rationalise the offerings, and to bring them within the NCTVET framework.
- Financing of programmes offered at community colleges and by private post-secondary providers.
- Memoranda of Agreement and Memoranda of Understanding with a variety of partner organisations and stakeholders including the Jamaica Employers Federation, the Jamaica Hotel & Tourist Association, the CHASE Foundation (for early childhood training), the ICT4D Project (Information and Communications Technology for Development), and International Education Collaborative Foundation in information technology access, and partnerships with two major bauxite companies-all aimed at improving access to training and certification. The agency participates in 35 formal partnership arrangements.
- Workforce development programmes in cooperation with firms with 11,276 enrolled in EBT at July 2007 serving 417 firms, and 17,038 enrolled for the fiscal-year-to-date this year. A total of 18,793 were enrolled for all of 2006-07 ending in March 2007. This is the most important productivity initiative of the agency and has grown rapidly since its introduction in 2000 with 41 firms. The programme identifies training and performance gaps and shapes training programmes using the unit competencies (or standards) and a work-based training approach along with instructors and instructional material supplied by the Trust.

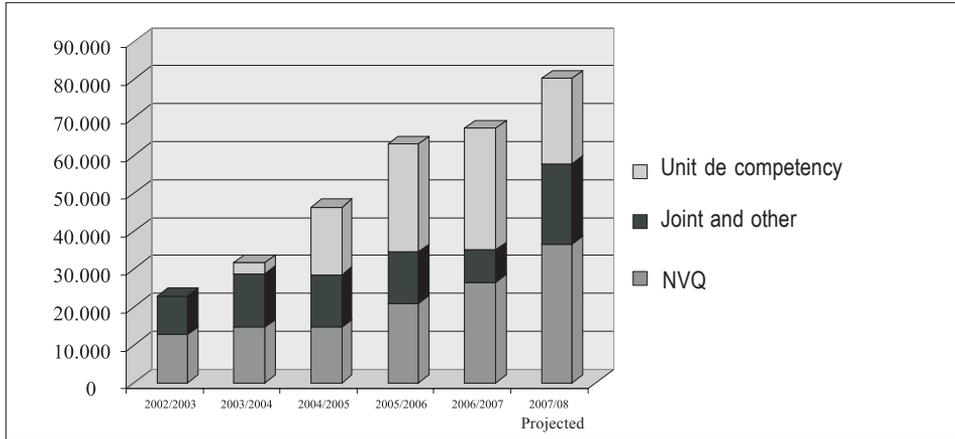
HEART has also clearly identified the link between skills, investment, job creation and productivity. The Vision Statement reads as follows:

“A Jamaican workforce, trained and certified to international standards, stimulating employment-creating investments, contributing to the improved productivity, competitiveness and prosperity of individuals, enterprises, and the nation.”

This vision has led HEART in the direction of setting a long term target of certifying one-half the employed workforce (about one-fourth of the workforce currently hold some form of qualification or certification. In 2004 an analysis was conducted showing that this appeared feasible by about 2010, if certification included the many working individuals acquiring unit competencies and not a complete qualification. This analysis was re-run in October 2006 using a more narrow definition of certification and this showed that it would take until 2012 to certify the approximately 400 thousand individuals needed to reach the target. Newer labour market data, however, is showing more rapid growth of the labour market and employment than the analyses took into account. There is also the question of how many participants in HEART’s programmes might be prone to double counting, as many participants continue pursuing training and tertiary education over time and the data are not clear on this factor. Regardless of these problems, HEART and NCTVET now count over 100 thousand participants per year as shown in figure 4 with about 80 thousand certifications within an annual period (in a labour market of about one million 250 thousand), so there should be a quite noticeable increase in the data on workforce qualifications.

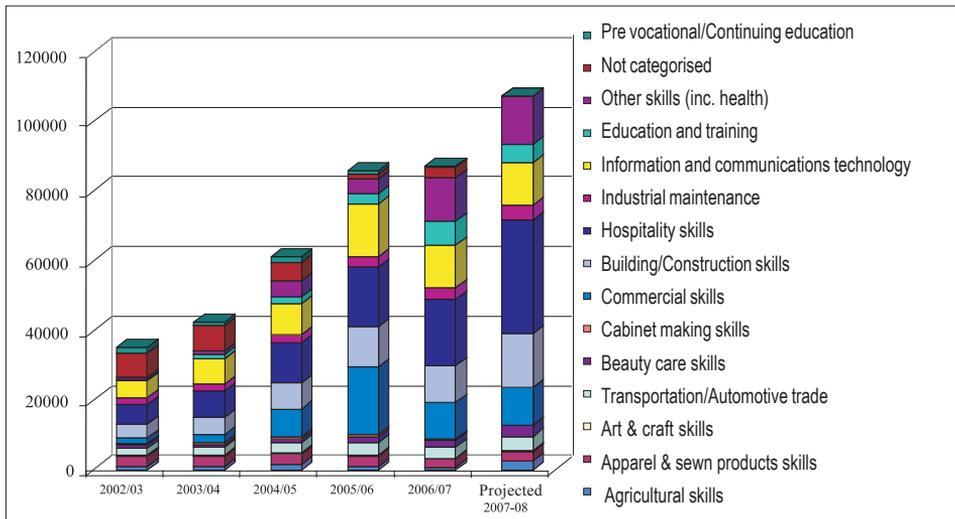
This level of participation reflects the large increase in capacity that is related to both growth in income from the three percent payroll levy that supports the agency, and the introduction of its new framework for training, assessment and certification in 2003. By the year 2002 the agency had reached a plateau of slowing growth at about 35 thousand participants per year. As shown in Figure 5, growth started increasing greatly after the new framework was introduced, with a current projection of 107 thousand participants in the current fiscal year.

Figure 4
HEART Certifications 2002-2006/2007 and projected 2007/2008



Source: Compiled from HEART Trust-NTA Annual Operational Reports

Figure 5
HEART enrolment by sector 2002-2006/2007 and projected 2007-2008



Source: Compiled from HEART Trust-NTA Statistical Summaries.

Training in Firms

In 2003, the World Bank commissioned a study in Jamaican firms that found:

- Over 90% of firms provide training
- 84% of firms report sending workers on short courses
- 80% send employees to conferences and seminars
- 38% support long-term formal training
- 27.5% report providing apprenticeship training (whether formal or not)

(Source: Market Research Services, Ltd., World Bank, 2003)

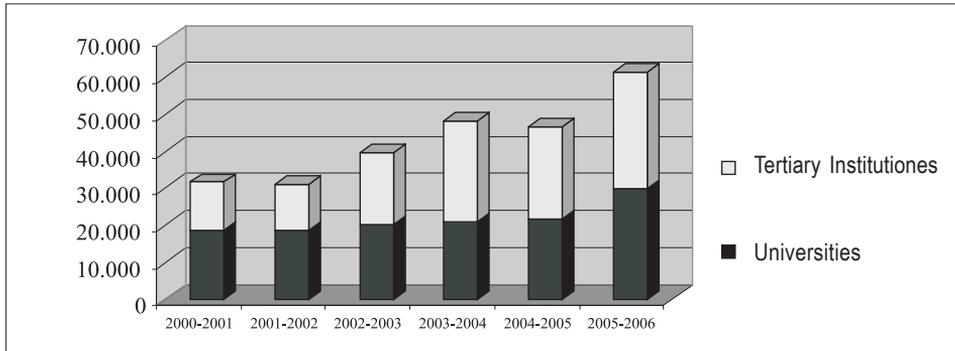
However, most of the literature on training in firms in the region suggests that the better educated mid and upper level workers receive most of the training, and that it is not necessarily aimed at lower levels of employment where a major portion of the productivity problem exists, and where gaps in basic education are most apparent.

Expansion of Tertiary Education

Jamaica has seen a significant increase in education and training opportunities at the post secondary and tertiary level. In addition to the expansion in HEART, the number of tertiary institutions has increased with the addition of the University College of the Caribbean with campuses in Kingston and Montego Bay, expansion of the Northern Caribbean University (formerly West Indies College), increasing enrolments at UTECH and UWI, and the establishment of additional smaller institutions such as Crowne Institute of Professional Studies offering British City & Guilds certifications, the newly formed International University of the Caribbean, and offshore educational institutions including Nova Southeastern University, and University of New Orleans. Expansion of tertiary provisions is illustrated in Figure 6.

The Planning Institute of Jamaica shows a total of 61,619 enrolled in 2006, up from 31,701 in the year 2000, and James (2004) noted the number of persons with tertiary education in the population has more than doubled since 1990.

Figure 6
Enrolments in tertiary institutions and universities
2000-2001 - 2006-2007



Source: Economic and Social Survey 2001, 2003, 2005, 2007.

Conclusions on Productivity Policy

While there is no formally adopted government policy on productivity, the policy inferred from government activity is to promote and contribute to productivity improvement through:

- Via the JPC: Promotion of productivity awareness to firms, government and non-government organisations, schools and the general public, and
- Providing technical assistance and training to manage and measure productivity, improve performance management in enterprises and government organisations, and to promote the use of compensation schemes that link pay to productivity.
- Increasing the qualification profile of the workforce with policies that have promoted an expansion of post secondary and tertiary education and training programmes.

There is still disagreement on performance linked wage schemes, as well as the question of flexibility in terms of weekend work and scheduling of workers.

5. HEART TRUST-NTA AND PRODUCTIVITY IMPROVEMENT

This section reviews evidence about HEART's economic and social impact and reports on training participation and expenditures, investments, and job creation.

Although there has not been a great deal of research into productivity and the training programmes offered by HEART Trust-NTA, return on investment research contracted by the agency from 2004-2006 using census data from 2001 (James, et al 2003, 2006), however, does show positive results for HEART compared to other educational offerings and specifically measures productivity effects as part of the social rate of return. These studies used traditional Mincerian analytic techniques modified to take the large non-wage sector into account, consistent with Sir Arthur Lewis's analysis of Caribbean economies. It is important to note that the data set included 2001 census data and predates HEART's recent expansion.

Private Returns, the part referring to what an individual gains from the education and training, show first of all, that at the lowest level of training, Level One, HEART training compensates for the weak secondary education profile that a preponderance of learners bring to HEART and makes them comparable to higher achieving secondary graduates. For the years of schooling, the private rates for HEART TVET are about 11.8%, compared to 6.9% for investment in the secondary years of education, and the same as the rate for secondary completers who have passed four CXC CSEC examinations. For Level 3 training the rate of return is 15.73% just for the years and 15.7% for obtaining the certification, i.e., 31.43% overall. The non-HEART Certificate / Diploma yields a much lower rate of 12.73%. A person with an Associate Degree who then takes a HEART occupational programme at Level 1 or higher will earn an overall rate of return of 19.94%. The comparable non-HEART Associate Degree yields an average rate of return 13.05%. Clearly the level of education achievement combines with the training to produce higher returns. A stronger secondary education profile combines with training to produce higher returns, and a Diploma or Degree combined with HEART makes earning higher still (and all higher than the education alone).

Second, the industry in which HEART training takes place matters. The following sectors have a significant differential impact on wage levels:

- **High Returns-** Construction (36%), Tourism (26%), Business services (22.8%), Clothing (21.1%)

- **Lower Returns** –Agriculture (both automotive services and bus driving); Transport; Miscellaneous Personal Services; Other Repairs

Finally, the highest private returns go to investment in quality, i.e., in the ability to achieve certification.

Social returns, referring to benefits that accrue to the wider society are even more interesting. Using quantile regression estimates, the research shows investment in HEART occupational training substantially **reduces** income inequality, while all other education investment tends to increase inequality. The reason for this is that HEART is very well self-targeted to the poor, with approximately half of its beneficiaries being from poor households. The findings also show that HEART training is the only kind of education activity in which the probability of achieving certification is not closely tied to income level. Poorer students do almost as well as wealthier ones. Considering that HEART training reaches a broad spectrum of society and achieves high self-targeting of the poor these data are compelling reasons to appreciate HEART TVET as a poverty reduction strategy.

Crime Reduction: Noted in the productivity analysis as a contributing factor to productivity problems, the research finds that the more HEART graduates in a parish, the lower the crime rate. A one percent increase in the rate of crime (as measured by the percentage of households who are victims of crime during the year) will cost a 6.6% decline in the average wage. HEART education helps to mitigate these effects, especially through the income equity channel. Reduction of income inequality by 1 index point will reduce the rate of crime by 3.7%, thereby reducing the negative effects of crime.

HEART training brings large social benefits to the parishes and to Jamaica as a whole. A 1-year increase in the average number of years of schooling through HEART training has a high impact on productivity in the parishes, especially in the non-wage sector, and in the economy as a whole. This is also evidence that HEART helps both workers and firms invest in other collaborative capital, takes advantage of technological change, and raises productivity and earnings. The estimates are as follows:

- The external rate of return to primary education is 21.6%.
- The external rate of return to Grade 9 secondary education is 22.09%.
- The external rate of return to HEART remedial education is 22.09%.
- The external rate of return to Grade 11 education is 21.2%.

- The external rate of return to HEART Level 1 training is comparable at 20.7%
- The external rate of return to Heart Level 2 training 19.1%.
- The external rate of return to Heart Level 3 training is 16.8%.
- The external rate of return to Heart Level 4 is 15.5%.
- The external rate of return to Heart Level 5 is 13.2%. Since this is slightly smaller than the corresponding private rate of return of 13.5%, it indicates a moderate level of signalling for this level of training.

Migration: Since Jamaica is prone to high migration, estimated at 80 percent of tertiary graduates, and many millions of US dollars per year, the productivity foregone is an important consideration. The authors note:

“A 1% increase in migration (as measured by the percentage of households with at least one person migrating during the year) initially costs a 2% decrease in the average wage. However, current investment to raise the average number of years of schooling by 1 year offsets these migration costs by generating a 2.03% productivity growth effect. This may occur because HEART TVET directly enables better adoption or adaptation of technologies while allowing lower-end skills to be more attractive to the foreign market, migrate and thus slow the growth of population and the number of claimants on income. Conversely, a 1-year decrease in migration will directly increase the average wage by 2%. This would add to the productivity-increasing effects of education even when filtered through migration. The dominant factor that limits migration is the growth of the average productivity of the non-wage sector and the size of the non-wage sector itself. HEART education is the primary mechanism by which the economy promotes such productivity growth.”

Other Social Benefits of HEART and TVET: Of great importance as well is the evidence that more TVET through HEART leads to moderated family size, reduced vulnerability, and higher security of living conditions for the family of the HEART graduate. In many cases, the results generated by, say, HEART Level 1 occupational training are better than those generated by Grade 11 education, with respect to both the average level of living and the security margin achieved. Further, HEART TVET education perpetuates its benefits into retirement and defies the traditional well-behaved age-earnings profile by being “bi-modal,” i.e., by achieving the highest benefits during the years of peak entrepreneurial energy in the mid-40s and again maintaining or raising income during retirement years. Because of this tendency to promote business involvement, HEART education is likely to per-

petuate its benefits into the next generation. One reason for this is that, like all educated parents, HEART parents will send their children to school. However, another and perhaps more important reason from a development perspective is that, unlike most other forms of education in Jamaica, the occupational specificity and entrepreneurial focus of HEART TVET support the accumulation of HEART TVET education in the form of physical business assets that can be passed directly from one generation to the other.

Investment to raise the average level of education by 1 year in Jamaica generates an average net social rate of return (private plus external), i.e., a rate of productivity growth, of about 26.7%. The same investment in the non-wage sector nets a social rate of return of 40%. In this context, the **wage** varies with productivity and hence with the accumulation of the capital that generates the external benefits.

The overall indication is what matters, and this seems to be that capitalist employment does not provide a substantial attraction to persons in the subsistence sector who receive HEART occupational training, and movement will most likely only be triggered by substantially better offers than are now indicated by the data. It is worth repeating that this finding is consistent with findings that HEART education narrows income inequality. Here, the data seems to clarify that a significant reason for this is its effect in raising the earnings productivity of self-employed persons.

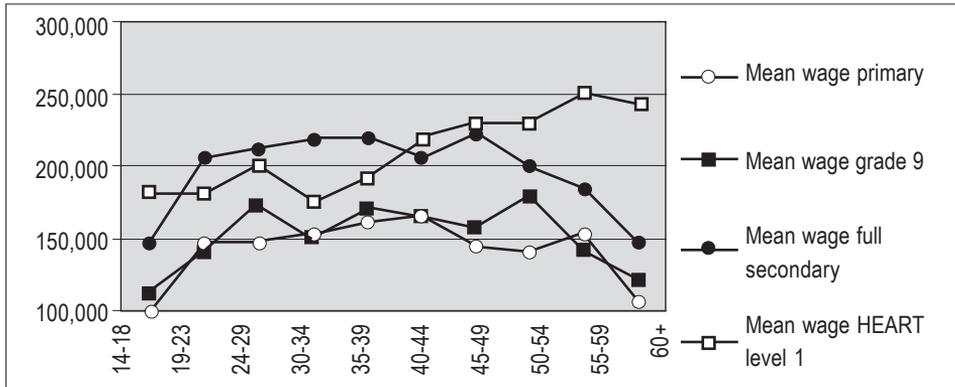
6. PROXY INDICATORS FOR POSSIBLE PRODUCTIVITY IMPROVEMENT

This section examines some potential proxy indicators that signal likely productivity effects if the Indicators are favourable. The amount of investment in training, job creation, and foreign direct investment is examined.

Investment in Training by HEART Trust-NTA

The growth in participation in HEART has been achieved without much of an increase in expenditure when inflation is corrected. Table 11 shows the amounts in current and constant Jamaican dollars over the past six years, and this is displayed graphically in Figure 8. Expenditure in real terms increased by 22.4% over the period at an average annual rate of 4.3%; this is considerably higher than the growth rate of the economy.

Figure 7
Age-Income Profiles for Non-Wage Sector



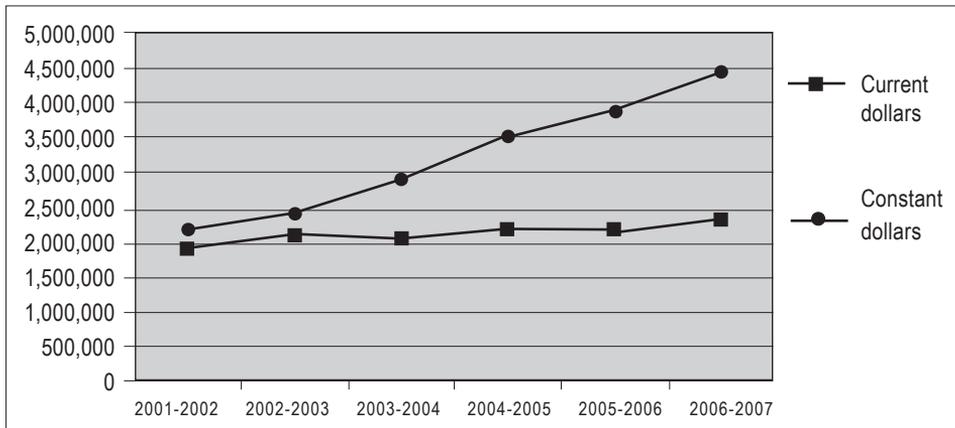
Source: James, et al, 2006.

Table 11. Investments in Training (Ja\$)

HEART Expenditure	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
At current dollars	2,174,744	2,404,125	2,890,422	3,500,489	3,874,743	4,438,102
At constant dollars	1,907,670	2,108,882	2,035,508	2,174,217	2,164,661	2,335,843
% Change		10.5%	-3.5%	6.8%	-0.4%	7.9%

Source: Economic and Social Survey 2001, 2003, 2005, 2007.

Figure 8
Training expenditure of HEART 2001-2007



Source: HEART Trust-NTA Annual Reports and Annual Training Reports.

Job Creation

Between 2000 and 2006, total employment grew by 20.4% with especially strong growth in 2002 (10.2%) and 2006 (6.3%) and an average annual growth of 2.8%, a better rate than growth in the overall economy during the period, but the data available can not be said to show a relationship between productivity growth and employment creation at this point. This growth is shown in Table 12.

Table 12. Total Employment 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Total Employment '000	933.5	939.4	1,036.8	1,054.1	1,055.2	1,056.9	1,123.7
Male '000	552.4	554.8	602.2	611.7	610.9	611.4	646.8
Female '000	381.1	384.7	434.6	442.4	444.3	445.6	476.9
% change		0.6%	10.4%	1.7%	0.1%	0.2%	6.3%

Source: Economic & Social Survey-Jamaica.

Foreign Direct Investment in Jamaica

Jamaica has been enjoying relatively robust amounts of Foreign Direct Investment (FDI) as shown in Table 13. This FDI is concentrated in mining for bauxite, telecommunications, and in hotels. Significant new investments are continuing in the tourism hotel sector with 12 new hotels opening and the creation of at least 16,000 new jobs directly.

Table 13 . FDI in Jamaica 1997-2005 (US\$m)

Country	1997	1998	1999	2000	2001	2002	2003	2004	2005
Jamaica	203	369	524	468	614	481	721	602	601

Source: World Bank World Development Indicators & UNCTAD.

The total value of FDI stock has also climbed rapidly from US\$790 million in 2003 to 6,335m in 2005 as shown in Table 14, and continuing upward since that time.

Table 14. FDI Stock in Jamaica 2003-2005 (US\$m)

FDI stock (US\$m)	2003	2004	2005
Jamaica	790	3,317	6,335

Source: Source: World Bank World Development Indicators & UNCTAD.

The investment climate also includes the following salient points:

- 17th place ranking as a destination for foreign direct investment (World Investment Report), which has made Jamaica the Caribbean's investment mecca.
- A US\$3.5 billion portfolio of projects covering tourism, mining, ICT, manufacturing, infrastructure and educational services. This does not include a number of capital large investments, required for the energy sector but are currently at the planning stage.
- 12th place in terms of technology transfer from foreign direct investment (World Investment Report).
- 10th place in ease of regulations in doing business (The World Bank).

The data on what HEART is doing in terms of expansion and provision of services to existing workers and firms, expansion of tertiary education and the proxy variables of HEART investment in training, job creation, FDI and the FDI stock, all bode well for the Jamaican economy. The increase in education and skills should assist productivity improvement and competitiveness and attract jobs. The challenge is the need to diversify investments, for the education and training system to respond aggressively to the large investments in upscale hotels, and to create the infrastructure and services that will need to be put in place to make the investments successful.

It should be noted that there are a large number of local investments occurring too. Jamaica's port at Kingston has undergone steady expansion, one airport expansion was completed and the airport in Kingston is nearly complete, there is a new highway being built on the north coast to service the growing tourism areas, an ethanol plant has opened in Clarendon parish, one of the largest resort developments involves considerable local investment, the largest operator in the call centre business is a Jamaican national, fish and seafood farms are increasing, and local agriculture is seeing investment in new technologies including hydroponics.

7. BEST PRACTICES IN THE HEART TRUST-NTA EXPERIENCE & LESSONS LEARNT

Emergence of Enterprise Based Training

The Enterprise Based Training department operates a traditional apprenticeship programme, a traineeship programme and workforce development programmes. Traineeship has grown moderately over the past few years and apprenticeships have actually declined significantly. Most of the growth in participation in HEART Enterprise Based Training programmes is because of the large increase in workforce development programmes conducted in cooperation with firms, and in terms of a contribution to productivity improvement is likely the most important development for the agency in the past five years. From its inception in 2000-01 working with forty firms, last year services were provided to 417 firms and 18,793 worker-participants. For the four months of the current fiscal year 17,038 have been enrolled year-to-date already. Table 15 shows the growth in overall enrolments and those for enterprise based training which grew by 302% during the period, while participation of firms in different types of training grew by 69%.

Table 15
HEART Enrolment by Kind of Training

PROGRAMME	2002/2003	2003/2004	2004/2005	2005/2006	2006/07
IBT	20,828	25,346	35,672	46,521	42,580
EBT	5,919	6,259	10,256	19,730	23,795
CBT	5,766	6,605	7,673	10,189	11,512
VTDI	1,403	2,979	3,804	3,754	3,687
MOEYC & SDC	1,333	1,301	3,635	3,901	3,131
Team Jamaica	-	-	-	1,759	2,332
Total	35,249	42,490	61,040	85,854	87,037

Highlights of EBT Workforce Development Programmes

The Enterprise Based Training department has grown quickly, with training provided on a cooperative basis to 2,163 firms last year. Of the total number of firms 1,746 provide traineeships and apprenticeships, the remain-

ing 417 are mainly new partners participating in workforce development programmes conducted in the firms. The new programme is impacting employee competence, morale and motivation. Although no actual research has been conducted on productivity improvement as such, testimonial evidence has begun to accumulate about a variety of effect and cost savings.

- ***Alpart Apprenticeship Programme***

This is a project that began in 1999 to assist this bauxite processing plant to develop succession mechanisms for its ageing workforce, where about two-thirds were reaching retirement and training had not been in place to refresh the workforce. Alpart supplies both classroom and practical instruction with HEART partnering in recruiting, monitoring, assessment services, and supply of instructional materials. Over 130 apprentices have been enrolled for training of which 65 have completed, nearly all employed to the company in industrial maintenance, instrumentation & controls, air conditioning & refrigeration, etc.. The company receives a rebate on a portion of the training levy it pays in to HEART for supplying both practical and theory components. This lowers the cost of the training to the company by about one-half, while increasing both the education and skill profile of the workforce and enabling an improved competitive posture in a very competitive, price sensitive industry. The training leads to the kind of high skill-high wage the population wants.

- ***Jamalco Bauxite Construction Project***

In 2004 HEART was approached by Jamalco, another bauxite company, to assist in creating a supply of workers for the expansion of the plant, a

Table16
HEART-EBT Participation of Firms 2002-03 – 2006-07

	Active Firms 2002-2003	Active Firms 2003-2004	Active Firms 2004-2005	Active Firms 2005-2006	Active Firms 2006-2007
SL-TOP	1,150	1,250	1,113	1,455	1,620
Apprenticeship	131	123	169	165	126
Workforce Development Programmes	55	55	n.a.	298	417
Total	1,281	1,373	1,282	1,918	2,163

Source: HEART Trust-NTA Statistical Report.

US\$600m investment. A detailed specification was provided by the company of the quantity of persons needed with various industrial construction skill sets. Jamalco turned over a training facility to HEART to serve a nearby bauxite community, while HEART partnered with two additional private training providers and used its National Tool and Engineering Institute and Portmore (construction) Academy to produce a large volume of highly skilled level four welders, pipe fitters, riggers and millwrights. Although the construction project is actually on hold pending resolution of additional energy supplies to the plant, the workers have been absorbed by various bauxite companies, the ports expansion project, Caribbean Cement Company, the hotel expansion, and some overseas employers. This is again an example of creating highly skilled workers for high wage jobs, attractive to any number of investment projects now operating.

- ***Caribbean Cement Company***

In this two-phase project, HEART's EBT department supplies instructional personnel and material to upgrade existing maintenance workers in concert with the purchase of a new kiln projected to triple the plant's capacity. Trained and upgraded level 1 mechanical maintenance fitters and level 1 and 2 maintenance operators will enable the plant to reduce maintenance costs that were previously out-sourced, thus directly improving productivity.

Special Incentive Programme (SIP)

The first Special Incentive Programme (SIP) was approved in May 2004, implemented in 2005 and modified in May 2006 and again in March 2007 to make it more flexible. The programme aims to promote the participation of firms in the new National Qualification Framework by providing financing on a reimbursement basis to qualifying participating firms. Current objectives of the programme are:

1. To provide assessment, training and certification services in collaboration with contributing firms for 960 workers, and to certify 800 workers during the period (approximately Ja\$19.25m).
2. To develop up to 250 assessors in the firms (approximately Ja\$3.75m).
3. To develop up to five firms as Approved Training Organizations (ATOs) (approximately Ja\$2.0m).

Challenges encountered in implementing the programme have included the tendency of firms to focus on competency units important to them rather than showing a consistent commitment to a full NVQ qualification, while some have problems showing the tax compliance necessary to participate. Adjustments made have included a recognition that some units typically required by HEART, especially entrepreneurship and computing, will not be required within firms unless appropriate, and generally customising training proposals to the particular needs of firms rather than categorical financing (e.g. a Level 2 NVQ) that was in place at first.

CHASE Fund Partnership

The CHASE Fund (Culture, Health, Arts, Sport and Education) was set up along foundation lines to redistribute a portion of lottery earnings to benefit key social services. In education the Fund concentrates on early childhood and supports upgrades to child care institutions including a partnership with HEART Trust-NTA to train and certify existing workers to Level 2. The HEART Trust and CHASE share the cost of the training and reduced the cost to learners from about US\$200 to about US\$50, and this relatively low paid group benefits greatly. An earlier partnership with UNICEF and the Ministry of Education resulted in the certification of over 4,000 early childhood practitioners at Level 1. This project has trained over three thousand since 2005 and will reach about 4,500 upon conclusion, bringing a higher level of service and professionalism to the early childhood provisions, with an expected increase in the productivity of learning at the primary school level.

Runaway Bay-Culinary Institute of America Partnership

In 2002 HEART implemented a partnership with the Culinary Institute of America (CIA) to produce mid-level and executive chefs for the rapidly expanding hospitality sector. Prior to this, the preponderance of executive chefs were imported and granted work permits. The programme operates in Jamaica with a one-year residency at CIA in America. Now a cadre of Jamaican chefs is gradually taking up these positions that previously went to expatriates, driving down travel, accommodation, administration and salary costs for chefs in the hotels, and increasing the Jamaican brand identity of

the cuisine with a focus on Jamaican and Caribbean cuisine, also now being incorporated into the CIA's curriculum in the United States.

The HEART Log Frame Planning & Performance Monitoring Process

In 2001, HEART implemented a more structured approach to strategic and annual operational planning and performance monitoring using the Logical Framework methodology, well known in project development. HEART has trained its staff to plan using the approach and has trained over 35 facilitators with 16 active facilitators that service both HEART divisions and other public sector entities including the Jamaica Foundation for Life-long Learning, Inland Revenue Department, projects conducted with the Ministry of Education and other entities. The process introduces indicators and measures that are refined over time that assist management in achieving important objectives and the organisational mission. This has been important to the success of HEART and to the organisations that have acquired the methodology.

Further, use of the methodology allows HEART management to tie performance to compensation by providing a Performance Incentive of to 15% of base salary for the achievement of objectives at the organizational, departmental and individual level of performance. The scheme gives all workers a stake in achieving the mission each year, usually stated as the total number of certified workers produced.

Lessons Learnt from the HEART Experience

The HEART experience over the past five years, and especially since it introduced the unit competency framework, suggests that increasing access and participation is possible without great increases in expenditure. Growth was enabled by increasing participation in on-the-job training by 302%, in institution based training by 104%, and in community based programmes by nearly 100%. The additional capacities are all lower cost alternatives than HEART's typical institution-based training. The institutional growth involves establishing satellites to existing institutions, hiring mostly part-time instructors and using existing administrative support. The EBT programmes are much lower cost to begin with as there is no venue to support and in-kind services are provided by firms. The community based training is also lower

than a HEART institution as they are operated by community entities with a lower cost structure than HEART operated programmes.

Second, partnership is the way forward. As HEART developed a reputation for initiative and for achieving results, it began to attract more and more partners, and the partners bring assets to the table that also increase access and participation.

Third, flexibility is important. Large organisations like HEART and NCTVET often tend toward rigidity, an inward focus and inflexibility. Especially in times of low economic growth, there is the problem that investors and firms, usually the key stakeholders, are not really driving the agency. There has been a continuous challenge to remain flexible without sacrificing standards and accountability. Since 2002, increasing demands have been placed upon the agency by firms and employer groups for HEART to provide timely solutions relating to investment and job creation. In order to respond, HEART must frequently look beyond what it expected and find innovative ways to meet stakeholder needs.

Fourth, planning, organization, management and human resource development are critical. The organization must be constantly fine tuning objectives, indicators, measurements and information systems, while evolving the organization structure and culture, optimizing staff performance, and providing development opportunities for staff members.

8. THE CSME, CANTA, AND THE CARIBBEAN VOCATIONAL QUALIFICATION

The Caribbean Single Market and Economy (CSME) is designed to represent a single economic space where people, goods, services and capital can move freely. The *Free Movement of Skilled Persons* provisions of the agreements arises from an agreed CARICOM policy that was originally separate but related to the original Protocol II of the Revised Treaty of Chaguaramas, originally signed in 2001 and revised in 2006. The agreed policy, called The Caribbean Community (CARICOM) Free Movement of Persons Act, is now enacted legislation in all the CSME Member States. It provides for the free movement of certain categories of skilled labour, but according to the policy there is to be eventual free movement of all persons, originally by 2008, but now by 2009. Under this legislation, persons within this skilled category can

qualify for Skills Certificates (which allow for the free movement across the region). A primary purpose of the provisions is to counteract migration and local labour shortages through free movement of labour.

At the eighteenth Inter-Sessional CARICOM Heads of Government Conference in February 2007, it was agreed that “artisans” would not be immediately granted free movement status from January (as was originally envisaged), but would rather be granted free movement by mid-2007. The free movement of artisans will be facilitated through the award of Caribbean Vocational Qualifications (CVQ) based on industrial occupational standards. The conference also agreed that the free movement of domestic workers and hospitality workers could be facilitated in a similar manner to the free movement of artisans and that their cases would be considered after the CVQ model is launched. This new agreement reflects the work of the Caribbean Association of National Training Agencies with Jamaica, Barbados and Trinidad & Tobago being the prime movers. Together, the training bodies in these three countries have established standards-driven, competency based training frameworks that are generally similar. A Regional Qualification Framework blending vocational and tertiary qualifications has been accepted in principle, although it may require further refinement.

Regional accreditation bodies are also planned to assess qualifications for equivalency, complementary to the free movement of persons. To this end, so far the Member States have concluded the Agreement on Accreditation for Education in Medical and other Health Professions. No decisions have been taken on a regional accreditation body for vocational and technical qualifications.

Jamaica received authorization from CARICOM in June 2007 to award the CVQ and intends to make its first awards in October, the first country making such awards in the region.

Jamaica, through both HEART and NCTVET, has been actively assisting St. Vincent & the Grenadines, St. Lucia, St. Kitts and Nevis, and Grenada, all members of the Organisation of Eastern Caribbean States (OECS) to incorporate the use of competency based education and training into programmes in schools and post secondary training programmes. HEART has also worked closely with Trinidad & Tobago and Barbados, and introduced other CARICOM countries to the framework including the Bahamas, Turks and Caicos, the Cayman Islands, and Antigua & Barbuda.

9. SOME CONCLUSIONS AND IMPLICATIONS

If the ILO is correct about a “virtuous circle” of productivity and employment growth, although the Jamaican experience up to the beginning of the new century is not at all favourable, there are important signs that some of the conditions for improved productivity and competitiveness are coming into being. The significant increases in access to post secondary training, tertiary education, training in firms, a new route to high school equivalency through the HISEP programme (developed by HEART and in pilot with the Jamaica Foundation for Lifelong Learning), gradual improvement in the performance of high schools in CSEC exams, and an increasing recognition among the public of the critical importance of education, training, certification and qualification, suggest Jamaica is doing a great deal to address the education and skills deficit. A large remaining challenge, however, is widespread low literacy within the workforce, and insufficient remedial opportunities for both school leavers and existing workers.

And while training has expanded, there is still a need to connect pre-employment training better with training and human resource development activities in firms, and to link all of this within a NQF that is understood and accepted by a population mostly familiar with traditional tertiary qualifications.

HEART’s long term goal of certifying half the workforce sounds ambitious, but look at what the agency did to expand access without a huge infusion of new financing. It often pays to think big. It is not clear how this is achievable given the measurements that come from the labour force survey, which do not match up well against output statistics of education and training providers and deserve a closer inspection.

Related to HEART’s expansion is the need to continue offering an increasing proportion of higher level training. While Level 2 (skilled) training has increased greatly, the offerings at Levels 3 and 4 are still insufficient to produce the high skill-high wage workforce Jamaica will ultimately require to service luxury hotels, provide ICT services with higher value added, to compete in bauxite, and to move agriculture forward.

There is a need for better management of productivity initiatives and the use of indicators and measurements along with a methodology at the firm level and sector level to measure productivity gains that relate to specific activities. It is expected that the Jamaica Productivity Centre can have

an important impact here. HEART has a commitment to adopt their methodologies and apply them in its Workforce Development Programmes with firms. The return on investment research commissioned by HEART is interesting, even provocative, but needs more data from more trained persons entering the sample frame, and alternative approaches that study outcomes for learners who have participated beyond the tracer studies conducted not too long after a learner has exited a programme.

The other factors that have been contributing to the productivity problem described in the first part of this paper will also need to be addressed. The large public debt, weak absorption of technologies and low innovation, the problem of hurricanes in recent years that requires equipment replacement rather than investments in new technologies, the crime and violence – all of these problems are difficult. The new investments in tourism will dramatically affect the north coast, and infrastructure is an issue as well as availability of human resources, as a fair amount of internal migration is expected, so housing, water and sanitation, transport, education and health services will need to respond to make these investments productive.

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ACRONYMS AND ABBREVIATIONS

ATO	Accredited Training Organization
CANTA	Caribbean Association of National Training Agencies
CARICOM	Caribbean Community
CBT	Community Based Training
CIA	Culinary Institute of America
COHSOD	Council for Human and Social Development
CSEC	Caribbean Secondary Education Certificate
CSME	Caribbean Single Market and Economy
CVQ	Caribbean Vocational Qualifications
CXC	Caribbean Examination Council
EBT	Enterprise Based Training
ESSJ	Economic and Social Survey of Jamaica
HEART/NTA	Human Employment and Resource Training Trust / National Training Agency
ICT	Information and Communication Technology
IMF	International Monetary Fund
ILO	International Labour Organization
JCTU	Joint Confederation of Trade Unions
JEF	Jamaica Employers Federation
JTI	Jamaica Trade & Invest (formerly Jampro)
LAC	Latin America and the Caribbean
MLSS	Ministry of Labour and Social Security
MOEY	Ministry of Education and Youth
NCTVET	National Council on Technical and Vocational Education and Training
NCU	Northern Caribbean University
NGO	Non-Governmental Organization
NIP	National Industrial Policy
NQF	National Qualification Framework
NTA	National Training Agency
NVQ	National Vocational Qualifications
OECS	Organization of Eastern Caribbean States
OPM	Office of the Prime Minister
PIOJ	Planning Institute of Jamaica
SDC	Social Development Commission
SIP	Special Incentive Programme
STATIN	Statistical Institute of Jamaica
TVET	Technical and Vocational Education and Training
UNICEF	United Nations Children's Fund
UTECH	University of Technology
UWI	University of the West Indies
VET	Vocational Education and Training
VTC	Vocational Training Centre
VTDI	Vocational Training Development Institute

Appendix 1
HEART TRUST/NTA Completions/Outputs since Inception
Academic Years 1982/83 to 1993/94 & Fiscal Years 1994/95 to 2006/07

BROAD SKILL AREAS	Academic Years 1982/1983 - 1993/1994												Sub-total 1982 1994
	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	1992 1993	1993 1994	
Agricultural Skills	745	0	46			93	53	69	117	88	119	155	1485
Apparel & Sewn Products Skills	254	433	481	2612	4499	4585	2814	1297	1649	1587	801	1002	22014
Art & Craft Skills									0	0	820	511	1331
Transportation & Automotive Skills											215	208	423
Beauty Care Service Skills		19	43	46	48	48	50	49	57	62	131	170	723
Cabinet Making Skills (see notation 3)	-	-	-	-	-	-	-	-	-	-	-	-	
Commercial Skills			102	257	305	224	750	522	548	478	679	755	4620
Building Construction Skills	1291	587	425	385	429	358	353	369	398	286	844	875	6600
Education & Training Skills	-	-	-	-	-	-	-	-	-	-	-	-	
Hospitality Skills					88	146	198	177	241	263	409	654	2176
Industrial Machine & Appliance Maintenance /Repair								20	18	35	25	143	370
Information & Communication Technology Skills							431	396	354	393	375	347	2296
Other Skills (Maritime, Spray Painter, Music, Graphic Artist, Printing /Book Binding, Bus Driving Skills.)										48	15	38	101
TOTAL for all Skill Prog.	2290	1039	1097	3300	5369	5454	4669	2897	3399	3230	4551	4844	42139
SL-TOP (On-The-Job) - See notation 4	87	635	1145	2074	1081	2877	1849	2231	2174	2212	2441	1850	20656
Workforce Development Programme (formerly WIP) (See notation 5) VTDI (See notation 6)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	500	250	750
Pre-Vocational/ Continued Education Programme	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	700	1240	1940
Marginal Institutions	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Social Development Centres (See notation 7)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Solidarity Programme (See notation 8)			917	1517	1319	1710	-	-	-	-	-	-	5463
TOTAL for all HEART Prog.	2377	1674	3159	6891	7769	10041	6518	5128	5573	5442	8192	8184	70948

**Appendix 1: HEART TRUST/NTA Completions/Outputs since Inception
Academic Years 1982/83 to 1993/94 & Fiscal Years 1994/95 to 2006/07
(continued)**

1994 1995	1995 1996	1996 1997	Fiscal Years 1994/1995 - 2006/2007										TOTALS	
			1997 1998	1998 1999	1999 2000	2000 2001	2001 2002	2002 2003	2003 2004	2004 2005	2005 2006	2006 2007	Sub total 1994/2007	TOTAL 1982/2007
132	101	325	278	347	412	611	635	426	564	1034	593	491	5949	7434
1032	1568	1182	2543	3451	3326	2125	1305	1632	1639	1961	1916	1801	25481	47495
235	74	264	384	283	276	267	201	328	206	176	258	108	3060	4391
124	295	364	419	558	719	572	1178	1082	950	1545	2393	2330	12529	12952
60	162	173	402	288	227	333	211	465	458	744	1277	1224	6024	6747
30	97	105	153	179	224	255	1115	264	218	248	541	115	3544	3544
795	1196	1229	1016	927	1137	975	67	917	1260	5735	10942	2935	29131	33751
790	1014	1120	1061	1232	1555	1607	1299	1656	2033	3971	8457	5816	31611	38211
--	-	-	-	-	-	-	91	517	934	1501	2836	5879	5879	
649	842	972	1469	1904	1997	2518	1676	2673	4392	7136	10788	11242	48258	50434
162	187	298	288	462	593	595	1082	1010	1164	1424	1605	1076	9946	10316
401	360	421	734	864	1590	1845	2692	2903	4401	5494	11593	6928	40226	42522
25	88	87	138	228	407	961	47	248	720	2625	3023	5175	13772	13873
4435	5984	6540	8885	10723	12463	12664	11508	13695	18522	33027	54887	42077	235410	277549
102	347	481	669	1126	1124	1280	1236	1285	1259	1175	-	-	10084	30740
	-	403	552	412	687	598	570						3222	3222
666	517	811	718	561	1121	984	696						6074	6824
399	313	202	1154	1252	1103	1181	773	1215	955	968	757	147	10419	12359
n/a	n/a	n/a	-	-	19	251	187	150	208	55	200	949	2019	2019
n/a	n/a	n/a	190	36	252								478	478
--	-	-	-	-	-	-	-	-	-	-	-	-		5463
5602	7161	8034	12019	14250	16494	17047	14998	16915	20944	35225	55844	43173	267706	338654

Occupational health and safety in vocational training for productivity, employment growth and development SENATI's experience

Patricia Llanos Goyena

I. BACKGROUND

1.1 The origins of senati

SENATI was created in 1961, upon an initiative of the National Association of Industries with the purpose of overcoming the non-existent relationship between the technical education and vocational training, and the qualifications required by the productive scenario.

1.2 Participation of employers in vocational training

Employers are directly involved in defining guidelines of policies, objectives, strategies, contents, means and resources of SENATI. Vocational training relevance, profitability and quality is therefore positive. Planning and implementation are related to the production world.

1.3 Current teaching model

- Programmes are oriented to comply with the demands of the labour market.
- The educational objective is focused on the development of previously identified competencies of the productive scenario.
- Competency is defined as the ability to achieve a specific purpose as a result of an integrated activation of innate and acquired characteristics of a person (bio-psychic-social unit)
- Learning is mainly practical, in real working conditions and it is the main way to develop knowledge, skills and components of the identified competencies.

1.4 Impact of accidents on productivity

- The importance of occupational health is understood if we consider that half of the adult population works in some kind of industry, often under inadequate conditions.
- This is closely related to the productive capacity of the population and thus to the national economy.
- Active or working population of a country make up a very high percentage of the total population that varies between 30 and 50 percent. The group is important and substantial if we bear in mind that most of the population is part of the working crowd (industrial, agricultural, mining sectors, etc.) which directly generates the national production.
- Diseases and accidents at work have negative impacts on the country, industry, society and family:
 - Low productivity
 - High expenditure due to medical care and hospital admission
 - Compensations to the sick or injured worker
 - Economic and family problems

According to ILO data, every year there take place:

- 270 million accidents at work (205 per second).
- Absence for more than three days from work due to accidents.
- 160 million occupational non-fatal diseases.
- Accidents at work exceed deaths caused by:
 - Road accidents (999.000).
 - Wars (502.000)
- 2.3 million deaths related to work (5000 per day):
 - 350.000 fatal accidents.
 - 1.7 to 2 million fatal diseases.
 - Violence (563.000).
 - AIDS (312.000).

In our country, the awareness of preventing and recording accidents has been left behind. Very few or none are reported, the ability to control and supervise enterprises is beyond the available resources, thus valid information for prevention is lost.

In this context, SENATI's mission is that the learner/participant also acquires competencies oriented to the quality of service, environment care and **work under proper conditions of health and safety**.

In this sense, it was considered convenient to adopt International Management Standards.

In 1998, the implementation and certification process of the quality management system under the requirements of ISO 9001 standard was started.

In 2001, it was decided to implement and certify the environmental management system according to the requirements of ISO 14001 standard.

Finally, in 2004, the following **Institutional Policy** was approved:

“To keep SENATI at the forefront in the adoption and application of quality improvement, environmental performance and occupational health and safety systems.”

It was therefore decided to implement and certify the occupational and health management system according to OHSAS 18001 standard, Version 1999, since health and safety at work is an issue of concern for the institution.

Our Management system included Quality Management (ISO 9001:2001) and Environmental Management (ISO 14001:1996) that were implemented and certified in all our operational units; and working on an occupational health and safety system would supplement our system and it would be perfectly compatible with the already implemented standards.

II. EXPERIENCE ON OCCUPATIONAL HEALTH AND SAFETY AT SENATI

The work was developed with the support and commitment of the directing committee in the following way:

2.1 Implementation process of the occupational health and safety system

Step 1. Announcement of the decision: The National Director, through personalised letters, announces to the institution the decision of implementing an occupational health and safety system in 10 of our Operational Units. These would be: Talara, Pisco, Trujillo, Iquitos, Chiclayo, La Oroya, Huaraz, Tacna, Cusco and Surquillo.

- Step 2. Appointment of the person in charge of the Occupational Health and Safety System:** The National Directing Committee appointed a person to carry out the project. This was informed to all members of the institution through an official document.
- Step 3. Working team formation:** A working team was formed together with the person responsible for the system, as the team leader, in order to implement the system. Two industrial engineers of the institution were appointed and an occupational health expert and an occupational health and safety system expert were hired.
- Step 4. External initial training:** The hired experts trained the directing committee and the working team, respectively, and accompanied the full implementation process of the system.
- Step 5. Drawing up of the working plan:** With the support of the persons responsible for the quality system, the environmental system and the professionals of the technical management, a working plan was drawn up and after being approved by the directing committee it was made known to the 10 operational units involved in the implementation.
- Step 6. Preparation of instructional materials:** Instructional materials (a manual and a video) were prepared based on the acquired knowledge, the available information and the reality of our country and our institution. They provided the grounds to raise awareness of the occupational health and safety issue to all the staff of the institution.
- Step 7. Definition of Management Policy and drawing up procedures and work instructions:** After determining the documents to be used, the management policy was revised and defined. Procedures and operational instructions, that involved complying with all the standard's requirements and revising any document which did not include the occupational health and safety component, were elaborated. Subsequently, the policy was revised and approved.
- Step 8. Selection and training of occupational health and safety coordinators:** In each of the units involved with the implementation of the system, 2 coordinators were selected and they were trained in occupational health and safety and in the procedures and work instructions prepared and applicable to our activities.

- Step 9. Training of management committees and occupational health and safety coordinators of the 10 selected operational unit:** All SENATI's operational units have a management committee formed by a director or chief and 3 or more trainers. They meet regularly to assess the operational unit management and seek for continuous improvement. We therefore address them and we begin face-to-face training.
- Step 10. Testing:** All the staff members of the ten selected operational units were tested on the same date and time to measure the degree of understanding of occupational health and safety aspects and of the application of our documents.
- Step 11. Identification of threats and risk assessment:** Based on the defined and offered methodology, significant risks of activities were identified.
- Step 12. Identification of legal requirements associated to our activities:** With the help of a lawyer, we worked on the identification of legal requirements and prepared a specific procedure to be able to perform a continuous assessment of them.
- Step 13. Preparation of the occupational health and safety programme:** According to the significant risks, every operational unit prepared a working programme with the purpose of reducing or eliminating the degree of existing risk in the activities developed. The programme included activities, economic resources, responsible persons, times.
- Step 14. Implementation of the programme and monitoring:** After the National Director approved each programme, the planned activities were carried out and their progress was regularly verified.
- Step 15. Training internal auditors and implementation of audits:** All institution offices called for open competition of internal auditors' training. Internal auditors for each area office were selected and prepared. After training, these would be in charge of carrying out internal audits to the integrated management system.
- Step 16. Implementation of corrective actions and preventive measures:** As a result of internal audits, some deviations from some of the requirements were found in the system requirements (non-compliances) and once the main cause was determined, the corresponding

corrective actions were implemented. In this way, once such deviations were overcome, they were ready for the revision to be done by the directing committee.

Step 17. Revision of the system by the directing committee: Considering the information gathered from internal audits, monitoring and reports, the National Management Committee, together with the Director as president, assessed the degree of implementation of the system and it was decided to ask for an external audit of certification.

Step 18. Implementation of external audit of certification: A national competition was opened for the selection of a certifying enterprise and the winning enterprise (TÜV Rheinland Group) carried out a certification audit in July 2006. This enterprise certified the occupational health and safety system of the 10 selected operational units.

2.2 Towards a new objective and a new challenge for the institution

Today, our objective is implementing this system in all operational units. Eight local headquarters and one operational unit will be ready to be certified this November.

The eight local headquarters and the operational unit to be certified are: Piura, Moyobamba, Cajamarca, Huancayo, Pucallpa, Chimbote, Arequipa, Lima and Ilo.

2.3 Results of the implementation

- The institution's staff and apprentices are more aware of occupational health and safety aspects.
- The level of risk of noise has been reduced by placing silencers and by turning extremely noisy rooms (that exceeded allowed levels) into soundproof rooms.
- Incorporation of health and safety issues into the curriculum.
- Workers at a safe and healthy labour climate.
- Application and communication of health and safety issues to enterprises.
- Development of skills to provide consultancy on occupational health and safety aspects.

- Workers are now more careful and, more often, they are using the necessary personal protective equipment.
- **The directors of the institution are highly interested in training a technical expert on occupational health and safety.**

As a coincidence and for the sake of our population, while implementing our system, in September 2005, the Ministry of Labour published the “Supreme Decree 009-2005-TR - Regulations of health and safety at work” which stipulates that all enterprises, no matter their field of business, must implement a health and safety system at work.

Due to this Supreme Decree, enterprises need to count on experts. However, the market has no available experts and thus, the need to train experts in the country becomes fundamental.

SENATI’s development management office detects this need and, working together with CINTERFOR, actions are taken to determine the real need and the level of training that a technical expert on occupational health and safety must have, and the required methodology to create a new technical course.

III. TEACHING AND LEARNING METHODOLOGY

3.1 Main processes for vocational training at SENATI

- 1. Identification of needs:** An analysis of demand and employment (jobs) identification is done with the help of the directors of enterprises.
- 2. Drawing up of occupational profiles:** Workshop of participative job analysis. Description of profiles in terms of TASKS and/or AREAS OF RESPONSIBILITY, with the help of experts of enterprises and based on the information of technological future of the job.
- 3. Identification of the competency profile:** The contents of tasks and/or areas of responsibility are analysed, and the areas of competencies are defined.
- 4. Curricular design and development:** The organisation of objectives and contents is done according to the occupational profile.

5. **Implementation of resources:** Main teaching material: job positions at the Vocational Training Centre. Application of a DUAL SYSTEM that enables practical learning at enterprises.
6. **Promotion and admission of participants:** Enrolment to academic levelling and assessment of participants.
7. **Teaching – Learning:** LEARNING METHODS BASED ON AN INVESTIGATIVE ACTION. Role of the teacher: facilitator of learning experiences.
8. **Assessment and certification:** Observation techniques of Performance (processes and results) with criteria and standards of the productive sector.
9. **Following up graduates:** Enrolment of graduates into the employment exchange to place them in the labour world when an entrepreneur requires a graduate from SENATI.

Following the steps of this process, the first thing that was done was setting the grounds for its development, that is:

3.1.1 Identification of needs

Firstly, the demand was identified; as well as problems of risk prevention; national, regional and international standards, etc.; and whether this demand was real.

To this purpose,

- A. Several interviews to large and small enterprises of several sectors were carried out and entrepreneurs were asked to share their views on the needs to train or incorporate an occupational health and safety technical expert at their enterprise:
 1. **Is there an area in your enterprise in charge of managing the occupational health and safety issue?**
 2. **Is the implementation of an occupational health and safety system one of the priorities of your enterprise? How are you planning to do it?**
 3. **Does your technical staff need to acquire knowledge on occupational health and safety? Why?**
 4. **Do you investigate accidents at work?**
 5. **Is it necessary to have a technical expert on Health and safety at Work?**

6. Do you think your organisation will benefit from an occupational health and safety programme?

The results were the following:

1. Health and safety at work is managed by committees of health and safety at work, the Human Resources area or an Industrial Health and safety Department.
2. The priority is to implement an occupational health and safety system according to the current legislation and some of the enterprises have already implemented their system. Others are in the process of implementing it with the help of a special consultancy and with guidelines provided by the Ministry of Labour.
3. The staff needs to broaden and update their knowledge on occupational health and safety in order to support the strategies of the enterprise. Training is required at all levels of the organisation, this includes heads of areas, members of the health and safety at work committee, occupational health and safety assistants, supervisors, operational staff of production. They also express that the staff needs to be aware so as to reduce the occurrence of accidents and incidents at their job positions.
4. Some enterprises investigate accidents at work and they even have procedures in place, including corrective action reports.
5. They express it is necessary to involve a technical expert on health and safety at work since he/she would have the necessary skills to take part in the implementation of the safety system at the enterprise.
6. They remark that the implementation of an occupational health and safety programme would no doubt bring in benefits to the enterprise.

- B.** We interviewed occupational health and safety experts of the Ministry Labour and of Health, experts on occupational health of hospitals, and an academician of the only university that offers training in industrial health and safety to the country

Each of the interviews were carried out with corresponding representatives of the institutions and, aware of the purpose of our interview, we arrived at the following conclusions:

B.1 National University of Engineering

Interview with Jorge Ruiz Boto, Secretary General of the National University of Engineering.

Considerations and comments:

- The demand by enterprises of Industrial Health and Safety Engineers has been increasing; this shows the need of many enterprises to meet current requirements in terms of occupational health and safety, such as the Supreme Decree Nr 009-2005 TR.
- Industrial health and safety professionals are exclusively in charge of implementing and monitoring, in coordination with all the areas of the enterprise, the compliance with occupational health and safety standards, established by the enterprise and the government.
- The issues of occupational health and safety should be approached separately and for the same amount of time. On average, each subject could be dealt with in 30 hours of class during a month.
- The issues to be approached in terms of safety would be the response to emergencies, preventive safety inspections, and the use of personal protection equipments, among others.
- With respect to the occupational health issues, the following topics could be covered: ergonomics at the job position and awareness of the staff.

B.2 ESSALUD

Interview with Mr. Gerardo Arias, Head of the Centre of Risk Prevention at Work (CEPRIT).

Considerations and comments:

- He informs that unlike what happens in Peru, in some other countries of Latin America such as Colombia, Argentina, Chile, among others, there are educational institutions that have implemented specialization degrees on health and safety at work, and possessing such degree is a requirement to be a safety supervisor at an enterprise, pursuant to their law.
- A technical degree oriented to the persons in charge, or workers of the enterprise that in some way will be responsible for implementing and/or maintaining a health and safety system at work would be

very necessary, since the offer of this type of courses are not covered by universities.

- Since the specialisation degrees offered by Universities try to cover the whole management system of the enterprise, they do not tackle the practical field of the occupational health and safety application. As a result, graduates often lack this kind of experience.
- The management of statistical information regarding the development of the occupational health and safety system at enterprises is still very limited, therefore institutions such as MINTRA or ESSALUD that should be managing such information are still unable to do a follow-up.
- Topics such as: internal inspections of health and safety at work, ergonomics at job positions, and awareness of the staff should be approached as part of the curriculum and are competencies that the staff should also have.

B.3 Ministry of Labour and Promotion of Employment

Interview with Eng. Alfredo Torres, Deputy Director of Occupational Health and Safety in the Ministry of Labour (MINTRA)

Conclusions and remarks:

- The implementation of the occupational health and safety system is still being developed by enterprises so the progress and MINTRA's demands towards them are still basic, and inspections also include information feedback to enterprises that contributes to the implementation of said system.
- On one hand, medium-sized and large enterprises may have the resources to face the situation and implement their occupational health and safety system; however, small enterprises may not have the resources available and a course offer proposal should also be done taking them into account.
- Enterprises frequently approach MINTRA looking for information on institutions that provide advice on the implementation of an occupational health and safety system; therefore, the offer of an occupational health and safety workers' specialization may have the demand of interested enterprises.
- A checklist has been obtained on items to be assessed when Occupa-

tional Health and Safety inspectors visit enterprises to carry out their inspection tasks. This list shall allow them to give an idea of what should be included in the specialization course or the technical degree course curriculum.

C. Technical assistance work for the definition of a specialization regarding occupational health and safety

In order to strengthen the executed work, technical assistance was requested from OIT/Cinterfor and the following was carried out:

C.1 Main Goal:

- Accurately define the need of having technical experts in the entrepreneurial context that provide guidance for the implementation and application of Occupational Health and Safety Management Systems considering regulatory demands.

After a fluent exchange between the consultancy firm and the professionals of Development Management of SENATI, a working plan was reached that considered preferably the study of expectations to elaborate a proposal adapted to our reality.

C.2 Mission development

Following the institutional presentation and the visit to some workshops of SENATI's Headquarters, the consultancy firm stated that from the presented aspects, the following were deemed remarkable for their importance considering the consultancy's purpose:

- The strong link to labour reality.
- The teaching method based on the "learning by doing" model with a strong component of dual training. During the workshops, it was possible to observe the practical learning by students and the premises available that are similar to those of enterprises.
- The wide coverage with centres in several points across the Peruvian territory.
- Different training levels covering: basic, middle or higher levels.
- SENATI's prestige in the market and the demand of its graduates.

C.2.1 National Industrial Association

Meeting with representatives of employers.

The purpose of this meeting was to identify how employers are man-

aging Occupational Health and Safety within their enterprises and to detect the competence that technical experts should have that may contribute to the implementation or maintenance of an Occupational Health and Safety System considering the Supreme Decree on Occupational Health and Safety.

To achieve this purpose, some questions were presented which, after being discussed, resulted in the following answers:

- 1. Which are the most pressing issues that you can identify regarding Health and Safety in your Enterprise?**
 - Widening the identification and analysis of health risks (noise, chemical pollutants, etc.).
 - Having more information available.
 - Staff training.
 - Improving spaces, infrastructure and working environments.
- 2. Is there a specific area within your enterprise where the issue of Occupational Health and Safety is managed? How is this area organically structured?**
 - The Occupational Health and Safety Committee.
 - The Head of safety.
 - The management level.
- 3. What would your enterprise require to implement the S.D. regarding Occupational Health and Safety?**
 - Staff commitment.
 - Higher awareness.
 - Increasing team work.
- 4. How would you describe an Occupational Health and Safety specialist that may work at your enterprise?**
 - Specialized professional.
 - Leader.
 - With a proactive attitude.
 - Empathising with the staff.
 - With the ability to train others.

At the end, a dialogue was started among the participants on the way they are implementing the Supreme Decree related to Occupational Health and Safety.

From the whole exchange, the following is concluded:

- Most of them are confused about the Occupational Health and Safety Committee's role thinking that it is in charge of managing Occupational Health and Safety, when in fact, it is a body for the participation of workers.
- In general terms, they require more information on the subject.
- When describing the specialist that may work in their enterprise, they clearly aim at a professional with firm knowledge and the capacity of multiplying the issue.
- They place the responsibility regarding Occupational Health and Safety on the Management or the maintenance area.

Following the Working Plan, Occupational Health and Safety specialists were interviewed.

C.2.2 Rebagliatti Hospital

Interview with Dr. Marcos Carlos Rodríguez, from the Occupational Health area of the Rebagliatti Hospital Network.

Conclusions and remarks:

- He described his tasks as a member of the Occupational Health internal service of Rebagliatti Hospital.
- He highlighted the lack of specialized human resources in the subject, both regarding industrial safety and hygiene and the labour medicine area.
- When referring to the regulations and particularly to the Supreme Decree 009-2005-TR on Occupational Health and Safety, he indicated the non-compliance with other previous regulations, for instance, the need of creating a List of Occupational Diseases as well as of protocols for medical exams to workers.
- He stated that he would have liked to develop more practical knowledge during his Master's Degree training at San Marcos University.

As to the question regarding the possibility of developing a degree course for Occupational Health and Safety Technical experts, he stated that the idea was extremely positive in order to increase the follow-up of risk situations that may be carried out in work centres and thus collaborate with labour doctors.

C.2.3 Labour Risk Prevention Centre - CEPFIT

Interview with Mr. Gerardo Arias from the prevention area of CEPFIT ESSALUD, Industrial Safety and Hygiene Engineer, graduated from the National Engineering University.

Conclusions and remarks:

- He referred to his training and the situation experienced when foreign experts were required to train specialists to work in such issue, since Peruvian universities have no offer on the subject.
- He fully agreed with the need of having technical experts helping start the implementation of the occupational health and safety system.
- He pointed out that although there are management experts, there is no one to assume the operational role.
- He stated that he was aware of the increase on specialists demand and assured that the training of technical experts would enable to anticipate the future demand in order to complement the engineer's or external consultant's tasks.

C.2.4 Andean Labour Institute - ILA

Interview with staff members of the Andean Labour Institute (Director and person in charge of occupational health and safety).

Conclusions

- The importance of decision 584 (Andean instrument of Occupational Health and Safety) and of Resolution 957 (regulation of the Andean instrument of Occupational Health and Safety) was pointed out in the interview.
- They emphasized the need of having a tripartite implementation of the Supreme Decree and a significant participation of the State.
- They also stated that the supply and demand of degree courses associated to Occupational Health and Safety are increasing and it was mentioned that the Occupational Health Division of the Environmental Health General Directorate would start developing a master's degree on Occupational Health in collaboration with Cuba, due to the lack of occupational health professionals in the country.
- The person in charge of occupational health and safety of the Andean Labour Institute stated that enterprises that wish to compete in

the market already have their prevention services available and that, from an international viewpoint, it is not acceptable that prevention services in Peruvian enterprises are not compulsory.

- They thought it was extremely positive that SENATI is training technical experts, Occupational Health and Safety operators, due to its great prestige, its national coverage and focus on practical learning.
- In order to collaborate with this possibility, some resources were appointed from other bodies that may assist or have their premises available through agreements or conventions with SENATI (Laboratory of the National Engineering University, equipments from the Ministry of Health).
- It was also seen as important for SENATI to take up the task of raising awareness in entrepreneurs, given its good relationship with that sector.

C.2.5 Trade Unions

Subsequently, the representatives of Trade Unions (CGTP – General Confederation of Peruvian Workers, CATP – Peruvian Worker’s Autonomous Union, CUTP – Peruvian Worker’s Central Union) joined the meeting:

Conclusions and remarks:

- As the representatives of workers, they shared their experiences regarding Occupational Health and Safety and they referred to the problems resulting from outsourcing, the particular situation of some sectors, such as stevedores, and workers’ unawareness of their rights.
- Trade Union representatives found it positive to train Occupational Health and Safety Technical experts that collaborate in the detection of risks and in workers’ health care.

C.2.6 Graduates of Occupational Health and Safety Master’s Degrees

Interview with Mr. Francisco Franco. Representative of CEPRIT. Industrial Safety and Health Engineer, graduated from the National Engineering University.

Conclusions and remarks:

- In his understanding, there are no more than 200 graduates from the only university in Peru that trains specialists in that subject.
- He stated that several Peruvian entrepreneurs are not aware of the real competitiveness requirements. Due to the coming demands, en-

trepreneurs will have to provide risk prevention services in order to export.

- When being asked about the possibility of having Occupational Health and Safety Technical experts, he answered that in fact they were trying to train teams in a practical way and at work, since they had observed the need of having people informed and collaborating with engineers.
- He pointed out that engineers would be able to devote more time to design, planning and research if technical experts were available.
- Technical experts, in his opinion, would act in the work field and in the continuous relationship with workers and would be extremely important to favour cultural change.

Interview with Mr. Alejandro Borda, Head of the occupational health unit of the Almenara Health Network.

Conclusions and remarks

- They work with a team of doctors, nurses and engineers, who identify, assess and control risks and perform workers' health surveillance within the hospital.
- He stated that they would like to have Occupational Health and Safety technical experts available. From the network, they would offer to aid the practical training of technical experts regarding health issues.
- Six years ago, when working as the Head of the Occupational Health Peruvian Society, they had the intention of creating an institute to train Occupational Health technical experts but they could not materialize the project due to several problems (lack of infrastructure, human resources, etc.).
- He underlined that the three training fields should cover the cognitive domain, attitudes and skills.

3.1.2 Final conclusions for the definition of needs

After carrying out a workshop with entrepreneurs, interviewing experts on the subject and exchanging opinions with social actors involved, the following conclusions are drawn:

1. Supreme Decree 009-2005-TR cannot be implemented if human resources' training is not increased.

2. In all the sectors consulted, there is consensus regarding the need of training human resources, and the role of a technical expert would be particularly valued as a different profile from that of a Master's degree graduate or a University postgraduate
3. SENATI's structure and approach would be the ideal context for the creation of the Occupational Health and Safety degree course, both in the consultancy firm's opinion and that of the consulted social actors.
4. There would be certain bodies with which agreements would be signed to share the infrastructure needed for the training of Occupational Health and Safety Technical experts.
5. Teachers' training should be revised in order to form a team that shares the preventive theoretical framework and the conditions and working environment.
6. In order to help raising awareness regarding occupational health and safety, SENATI should increase the importance given to this issue when training its graduates: increasing risk awareness in each occupation as well as prevention, and including the understanding of their labour rights.
7. The training offer of Engineers and doctors specialized in the subject should be increased.
8. In order to implement the Supreme Decree and to improve labour health, it is necessary to have a policy specifying the role of the State and agreeing with this undertaking of SENATI.
9. In line with the experts' training that SENATI may carry out, it is necessary to work on raising the awareness of workers and employers.
10. It is essential to have the collaboration and participation of trade unions and employers' organizations.
11. Training would be provided at the Technical Higher Education level by SENATI's Higher School of Technology.
12. By training technical experts in the area of occupational health and safety, there would be an increase in productivity and employment for the development of the country.

3.1.3 Recommendations

1. To continue with the process of implementing the vocational training programme for Occupational Health and Safety Technical Experts.
2. To visit an Occupational Health and Safety Training Centre in order to share experiences regarding training and insertion in the workplace.

INFOTEP and SIMAPRO Training and productivity experience in the Dominican Republic

Juan Casilla - Leonard Mertens

INTRODUCTION

INFOTEP was the first vocational technical training institution in Latin America that adapted and implemented the SIMAPRO (System for the Measurement and Improvement of Productivity) methodology as a tool to link up with the productive sector, starting in the year 1997 and to this date. Although experience in the region began some years before in Mexico, in the sugar sector, its connection with a VTTI was very weak.

INFOTEP's experience in applying SIMAPRO leaves several lessons for vocational technical training policies that seek to interrelate with the improvement of productivity in enterprises, with a comprehensive and participatory approach, according to the principles of Decent Work.

This paper is an attempt to order the experience in a way that allows learning to be diverted to other institutions and to policy design. Two institutional macro learning experiences are inferred from this experience in order to arrive at significant impacts.

The first is the strategic vision and capacity to persevere of the institution. Training policies focused on productivity require a cultural change in VTT institutions, are experienced on the micro level and are difficult to multiply in the short term ('delivery'). This takes time and simultaneously, since 'large' figures of population attended are not generated, is often not very attractive politically. INFOTEP showed a perseverant vision and interrelated experiences at the micro level with macro proposals through instances such as the annual productivity conference.

The second macro learning that the INFOTEP experience shows is that the VTT institution must be capable of renewing itself constantly and, at the same time, renewing the methodology, without abandoning its main axes that make it sustainable in time. It can happen that a certain component or

aspect is abandoned and later on in the experience is taken up again, as occurred when applying the group performance measurement component (collective competency) in the INFOTEP experience.

The experience also shows pending challenges. Perhaps the two most important ones are: one, how to achieve better coverage when applying this methodology ('delivery'), i.e., how to go from a more specific experience to a generalized one; and two, how to form learning networks between enterprises and institutions that apply the methodology, in order to enter into a dynamic process aimed at the continuous improvement of same.

These lessons learned and pending challenges are addressed in this paper on the basis of three sections: background and context; SIMAPRO trajectory in INFOTEP and actions for the future. Direct sources were used for this analysis, resulting from monitoring the experience for 10 years by the authors.

BACKGROUND AND CONTEXT

Halfway through the nineties, INFOTEP began to incorporate productivity into its strategic plan and its activities. In the INFOTEP 2000 Strategic Plan the contribution to national productivity appears as one of the axes of the institution. It was rectified in later strategic proposals of the institution.

In the nineties, productivity appeared as a prospective need when faced with the imminent changes that were expected to arrive with the trends at the world level of an opening up of trade and technological change. The underlying purpose in those years was to prepare Dominican Republic enterprises, especially the SMEs that were producing for the domestic market, so that they might better face those foreseeable and imminent changes.

This implied a need to change as an institution and was thus visualized by the head office of the institution at the time: from an institution

In 1995, **INFOTEP** was an institution which carried in its very roots the culture of change, efficiency and relevance as regards the attention paid to the needs of its clients. It began with the implementation of INFOTEP PLAN 2000 the process of supporting the productive sectors of the country (workers and enterprises) to develop the conditions required to confront the righteous of the new world economic order, in which it has had to get inexorably involved.

used to operate in terms of the logic of supply to a logic of demand. To turn towards the enterprises and the demand in the labour market; modifying the initial training and skills development curricula, based on rigidly interpreted disciplines, towards a flexible curriculum based on on-going reading of demand, meant changes in the paradigm and the organisational culture of the institution.

At the beginning of the decade 2000, prospecting became reality, not because of a decision made by the economic and trade policy of the country, but because of a dramatic change in the environment of the markets where they traditionally had competitive advantages. Faced with the recession of those years in the U.S. and the appearance of Asian emerging countries, especially China, the competitive advantage of the RD export industry began to vanish. Simultaneously, some segments of the tourist sector lost their competitive edge and were not able to modernise, being left in a backward position as regards infrastructure and staff qualifications. The need to adapt enterprises to the change stopped being a problem of the SMEs alone and spread to industry and the service sector, of medium and large-sized enterprises accustomed to operate in external markets.

In the mid-2000s, the signature of free trade agreements, to which was added the macro effects of remittances on the appreciation of the national

Year 2002: Export industry case

Management visualises a new international division of labour for the Dominican clothing industry. Faced with Chinese competition in prices, quality, consistency and delivery fulfilment, it remains for the Dominican industry to occupy the niche of the market of immediate responses to non voluminous demands, taking advantage of the proximity to the North American market. This requires much more flexibility in production than in the past. The enterprise began with a new type of module, where the main objective is flexibility or adaptability to a wide variety of dress styles. It means a much smaller number of persons, capable of undertaking all the operations involved: a high performance multi-skilled team, where the payment system is no longer by individual piecework but a salary with possible group compensations. The competency profile of this staff is to know how to work efficiently on all the operations and be capable of rapidly changing styles of dress. Guides consider them to be an adequate instrument to be able to train staff in multi-skills as a support for a flexibility strategy.

currency vis-à-vis the U.S. dollar, productivity became a critical subject for all enterprises of the Dominican economy. Faced with this global pressure from all markets, a need appeared to go forward taking qualitative leaps in the transformation of the productive structure. On the one hand, a species of specialization of the economy is to be observed, in niches of markets where the country can generate a competitive advantage, and on the other hand, there was an intention to incorporate more knowledge to the productive processes as a means to enhance productivity.

One of the hubs of the Competitiveness Plan that was developed in 2006-2007, is systemic competitiveness, where the institutions are expected to contribute in a focalized and interconnected manner to the improvement of productivity. It is INFOTEP's job to supply not only initial training but lifelong training as well, linked to the needs of enterprises, especially in terms of enhancing productivity. Advisory services to enterprises, in the design and establishment within their organisation of a system of permanent learning aiming at the continuous improvement of productivity and working conditions, became a part of the institution's mission.

Year 2007: The Dominican Republic is in the middle of a transition from a closed economy to an open one, generating pressure on the enterprises that are oriented towards the internal market. At the same time, exporting enterprises face more players in markets that were before their domain, especially in the case of assembled products (free zone). If to these two phenomena are added the change in the tax system, the over-valuation of currency and the costs of indirect inputs (energy), the competitive capacity of enterprises is being subjected to ever more demanding tests. 'To pass the test' is no longer for the enterprises something that one had to prove once in a while and which for many was an 'automatic pass'. Now it is a demanding test, rigorous and performed daily, under penalty of leaving the market and closing the doors. This is reflected in a behaviour of strong and permanent changes, not very foreseeable, where enterprises close, change their direction, begin new lines of production and expand.

TRACK RECORD OF INFOTEP WITH SIMAPRO

The track record of INFOTEP with the implementation of SIMAPRO is closely related to three moments in the recent evolution of competitiveness of the economy of the Dominican Republic.

- **First stage**

INFOTEP begins SIMAPRO implementation in the year 1997. The approach is broad, both from the methodological perspective and of the economic sectors in which the implementation starts. It was orchestrated through the department of entrepreneurial advisory services, which is an extension of classroom training towards training in entrepreneurial management in the field, in practice.

In terms of methodology, a comprehensive approach of measurement and improvement of productivity was chosen, that surpasses SIMAPRO's original methodological proposal. Several types of performance were differentiated. The first is performance at the financial and economic level, at the level of the organisation as a

COMPREHENSIVE PRODUCTIVITY MEASUREMENT

Four types of indicators

1. Economic and financial performance

...for strategic planning...

2. Processes performance

...to evaluate the quality of de process...

3-4. Group and individual performance

...to motivate staff and change behaviours...

whole. The second is at the processes level, both technological and organisational. The third refers to group performances, where SIMAPRO's origins are, in other latitudes. (Pritchard, 1990). The fourth is the individual performances component, the competencies. Finally, two components were named performance of human resources.

Work was done initially with the first three measurement systems, to then incorporate the fourth, the competencies. The latter were approached with the AMOD model, that is derived from DACUM.

The purpose of this approach was to provide a diagnosis and plan of action to improve the whole organisation. Thinking of the SMEs, it was understandable that a comprehensive approach would have a better impact than a partial approach. Even more so if there is concentration on manage-

ment of human resources since in the SMEs the HRM systems are not very developed and studies indicate that one of the most recurring problems is precisely administration. Therefore the proposal seemed to be attractive. As structure it is somewhat like what was later known as the system proposed by the 'balanced scorecard' .

In the financial-economic performance component there is a breakdown of a series of basic indicators of organisation of the hierarchical tree of sub-indicators, that can be managed from the perspective of human resources and of the organisation. For example, the relationship between investment in equipment and the investment in skill development per individual.

The processes component considers a set of indicators of process quality (21 in total), close to the concept of lean manufacturing and total quality. Measurement is approximate, i.e., precise data are not resorted to, but rather it is done through a qualitative self-evaluation of the organisation itself.

The group performance component, the SIMAPRO, is based on the objectives of the organisation, projected in each area or group. A distinction is made among process objectives (volume, quality) and social objectives (safety on the job, absenteeism, cleanliness). The axis is the participation of workers in the definition of the indicators, parameters and improvement proposals.

The individual performance component measures the gap between the competency and results profile desired and the profile of each individual. The method used, AMOD, is participatory and at the same time allows a learning route to be outlined, a species of curriculum mesh, for the individual

Year 1997: Training was delivered for 4 days to the 40 entrepreneurial advisors INFOTEP has at the national level. The course included methodology of measurement and improvement of productivity. It was made up of the presentation of the measurement methodology at three levels: a) economic-financial; b) processes management; and c) human resources. The course concluded with an INFOTEP proposal to start with six pilot experiences, of which the advisory staff considered to be the most suitable for this type of work was in charge. It is expected that to the extent that these experiences advance and the methodology takes shape as part of the official INFOTEP supply, the profile of the advisors will have to be adjusted and revised, since not all advisors seem to have the preparation or the attitudes/abilities needed to undertake an advisory exercise based on the measurement methodology and productivity improvement proposed.

Year 1997: In the six enterprises visited the reaction of managers and workers interviewed regarding the methodology was very positive. The financial-economic indicators encouraged the enterprises to aim their administrative practice towards a strategic direction in terms of construction of indicators and the analysis of same. In several enterprises administration was extremely poor. With the methodology they became aware and were able to put their administration in order.

In the case of Pyensa, management commented that the financial indicators had helped to be "more precise regarding which the key indicators were for the enterprise for its strategic planning. They could better succeed in the initiatives of productivity improvement." In Khouri, the construction blocks enterprise, they had never calculated benefits on assets, nor unit cost, because they did not have a reference price for an important part of the raw materials., the sand, which comes from a mine developed by the same enterprise. With advisory services they were able to calculate costs and benefits for the first time.

With the process management indicators, weaknesses in the productive process were identified, such as the need to reduce waste (Pyensa), delivery time (Rattan Dominicana), reprocessing and loss of start up time for new machinery (Khouri-blocks); downtime for maintenance (CamposFrio); appropriate operation of the cooling system and readiness of the equipment (Helados Noris); inventory under way and reworking in the paint area (Macel furniture). As a result of (self)diagnosis, the respective managements took action/correction measures and the result was an improvement of the indicator in question.

The construction of the HRM family of indicators caused greater impact because of the highly participatory methodologies orchestrated: visualising, to detect needs and improvement opportunities; SIMAPRO, system for measurement and improvement of productivity. Both begin from the opinion and point of view of the workers/staff, which in a context of the tradition of Dominican society are not 'daily bread'. The main problems identified and simultaneously addressed were the lack of co-operation of the staff with the objectives of the enterprise in general, lack of staff integration, lack of order and cleanliness (Macel furniture).

It began with a pilot group of 6 cases that were later to be presented at the annual productivity conference in that year (1997). In just a few months (4) they managed to advance the implementation of the methodology in 8 enterprises in different regions of the country. There are advisors who are accountants, others who are engineers and others specialists in HR. It is because of this that some of them focused on financial indicators while others on process management or human resources. The proposal has the particularity of bringing together the three types of indicators, which caused all the

advisors to learn something new, outside their speciality, placing themselves in an unequal situation regarding each other. The methodology thus became an element that unified the criteria of implementation among the advisors themselves, helping central INFOTEP to administer itself.

However, this turned out to be a proposal which was difficult to sustain in time, particularly with the changes which began to occur in the advisory team in the following years, especially after the year 2000. The advisors trained in their work trajectory in HR found it difficult to develop financial-administrative or process competencies. Also, those who had a speciality in the administrative and engineering field found it difficult to go into HR management in depth.

In the first years of SIMAPRO implementation, there was an important quantitative expansion. For the year 2001, 75 enterprises at the national level had implemented the methodology. This did not mean that they all sustained it, but that they had implemented it at some time in their organisation or, otherwise, they had trained to implement it. They belonged to various branches of activity, 45 of them grouped in the industrial sector and the remainder in trade and services. More than half were SMEs.

In that year INFOTEP prepared a study to evaluate the impact of the SIMAPRO methodology. They took into account the opinions of entrepreneurs and workers. The outstanding aspects are mentioned in table 1.

- **Second Stage**

The second stage of INFOTEP's implementation of SIMAPRO started at the beginning of the year 2000 and coincided with the change in context of the economy. On the one hand, medium-sized and large enterprises of the export sector confronted a profound change in their markets, with greater demands regarding quality and delivery times. On the other hand, the tourism sector required greater quality in services to be able to obtain a better position in the market and take advantage of the opportunities that were not materializing.

At the same time there were changes in staff in the advisory area of the institution, among other reasons because they found better employment options elsewhere. It was very difficult to replace the old and train the new advisors in all the methodology. Even more so when greater stress was laid on individual competencies than on collective ones.

Table 1
SIMAPRO Impact - INFOTEP 2001
Main results according to social actor

Entrepreneurs (n=68)	Workers (n=59)
<p>General: Methodology has been beneficial to very beneficial (88%)</p> <p>More impact on:</p> <ul style="list-style-type: none"> • Improvement in product quality (23%) • Improvement in process quality (20%) • Efficacy in use of resources (14%) • Participation of employees in troubleshooting (14%) • Staff training (11%) <p>Improvements observed as of SIMAPRO implementation in:</p> <ul style="list-style-type: none"> • Participation of workers in troubleshooting (69%) • Staff motivation (76%) • Efficiency of processes (83%) • Efficiency in use of resources (79%) • Service quality (82%) • Hour per person production (52%) • Consumption of materials and energy (55%) • Postsale quality (55%) 	<p>Improvements observed as from SIMAPRO implementation in:</p> <ul style="list-style-type: none"> • Concern by enterprise to train staff (90%) • Salary and other financial benefits (60%) • Relations between fellow workers (90%) • Safety conditions on the job (80%) • Communication and co-operation (93%) • Knowledge on job duties (93%) • Commitment of management regarding workers (83%) • Autonomy in the development of activities (80%) • Personal and group performance (94%)

Both factors contributed to the fact that advisory services began to focus on the component of improvement in individual performance of workers, the other components being abandoned (financial economic, processes and group.) It should be mentioned that through individual competencies and especially the way they were addressed, it was possible to impact on group and process performance.

At this stage SIMAPRO concentrated basically on two instruments. The first was the identification of individual competencies related to a job and aimed at improving productivity in the role or job, through a learning process based on competencies. The methodology applied was the AMOD. With the evidence shown by workers and validated by a panel of experts of the organisation, INFOTEP certified the workers.

Year 2001. Guides for self-training and evaluation by competencies appear

Concept of traditional trainer role transition:

The development of training has a self-direction or self-learning component and is based on the active participation of the operational staff in its implementation. It allows personalized progress in learning and assigns learning responsibility to the individual. The enterprise has to generate the learning conditions (materials, location, schedule and support staff). This does not eliminate the use of the classroom, but rather it becomes a place for operational groups to meet to share knowledge, with the support of the supervisor and the co-ordinator of the programme. The traditional instructor is not involved. Generation of a space for analysis and reflection is induced and facilitated among the operational staff, supervisory staff and some specialists (in quality, for example). Evaluation of performance occurs at the workplace and it is an on-the-job training space. It is the most important component in the training process since it is its realisation in the productive process.

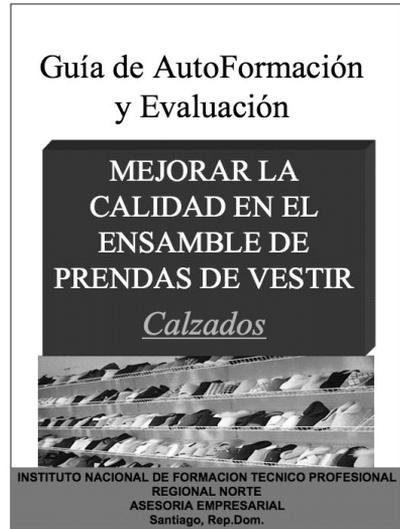
The second was the design and development of the Guide for self-training and competency-based assessment (GAEC, in Spanish) to improve efficiency and quality in a certain productive process. The reference methodology of the Guide is the SCID, that is derived from DACUM and which means systematic curriculum development based on instructions. It is an 'express' tool that in an expedite manner can be produced once a defined structure for the sector or branch of activity has been obtained.

This instrument is produced by the INFOTEP advisors jointly with the technical and operational staff of the enterprise. A custom-made suit is produced in each organisation, but it has a common structure. It is a similar concept to 'mass customization' that is used in industry or services to combine standardisation with flexibility.

The development and extension of this instrument is concentrated in a geographical area of the country and in a sector: the enterprises of the free zone in the north of the country (Santiago). It can practically be concluded that INFOTEP's SIMAPRO focused mainly during the years 2001 to 2006 on the production and implementation of the GAEC in these enterprises and in that region. Without exaggerating and comparing with initiatives that were simultaneously implemented at the time in other latitudes, especially in Mexico, INFOTEP achieved leadership in the implementation of this tool in Latin America.

The GAEC has the following features that make it stand out as a relevant training instrument in a context of high and changing requirements in quality and in costs:

1. It addresses generic and specific aspects, in a comprehensive manner, since it refers to the productive processes but also to social needs (safe working conditions, communications, gender equity) and personal needs (personal health care, HIV/Aids prevention).
2. It is flexible, adapting quickly to changing needs.
3. It is dynamic, focalising on critical aspects to be improved by the enterprise and staff.
4. It is a custom-made suit of each organisation, since images and specifications corresponding to the organisation are applied.
5. The guide is at one and the same time a training and an evaluating instrument; it becomes a portfolio of evidence in competency of the workers.
6. It is managed by the enterprise itself, with the assistance of the institution as support and external auditor.
7. It is low-cost once generalisation of the instrument begins in the organisation.
8. It is participatory, since it is worked on and analysed by a group, causing collective and individual reflections on processes and working conditions.
9. The possibility of certifying staff, having the guide as a benchmark or standard, requiring as evidence for certification the impact on productivity.
10. The possibility of updating initial training in the INFOTEP workshops, applying the guides to the students, and thus establishing a 'natural' link between this training and the needs of the productive sector.



Several enterprises where the methodology is being applied take part in another INFOTEP programme: 'the little school'. It involves the enterprise providing space and machinery to train individuals with no experience through an instructor paid by the INFOTEP free zone project. A first step in integration of the implementation of the productivity and occupational competency methodology with the initial INFOTEP vocational training system methodology has been to link the little school to the guides. Also in initial training in INFOTEP workshops. When the guides had been applied there was a reduction in hours of initial training in clothing manufacture from 240 to 120, in Santiago Regional.

For the year 2007 the INFOTEP North Regional had attended, through its department of advisory services, 63 enterprises to establish the GAEC. Via this instrument, 1972 individuals had been certified. In all the enterprises there was a productivity improvement impact, both regarding the labour factor and all factors.

For example, in a leather goods enterprise (special footwear) the productivity indicators, by comparing the 'before' and 'after' having applied the guides, showed the following result: in the cutting area defects decreased from 6.4% to 3.7%; in dancing footwear, they declined from 15% to 3.2%, and the reprocessing came down from 17% to 3.3%. (data from the enterprise)

Typical case of design and implementation of the GAEC (2007)

A typical case of GAEC implementation and its link to measuring and improving productivity is that of the Timberland establishment in Santiago, Dominican Republic. It is a company dealing with the production of footwear (boots and casual shoes) for the international market. Its production processes are part of the manufacturing cycle from the preparation up to the finishing of the product. It employs 1810 employees in 11 plants, located in the Santiago Industrial Park..

The advisory service for the improvement of productivity (SIMAPRO) was launched in 2005. The objective was to contribute to the improvement of quality and productivity of human resources, levelling its levels of competence and enhancing attitudes favourable to teamwork and performance in the productive process. It chose to use the competency-based training strategy by applying guides for self-training to the workers and middle manage-

ment of plant 10, in two production shifts in the operations of 'stichen' and 'bottoming' and later incorporating the remaining sub-processes, including inspection and packaging.

The GAEC is a tool to train operational staff in the development of generic and specific competencies, needed to achieve good performance in a productive process. It includes knowledge associated with the critical operations of the production process as well as general behaviours related to customer services, safety and personal hygiene, order and cleanliness. The specific competencies refer to operations and phases of the productive process; in the case of footwear, cutting, stitching, audit., repair, lasting, injection and finish are included.

The GAEC process begins with the design of the guides of which the Steering Committee is in charge. The Committee is responsible for organis-

Year 2004: Consolidation-Maturing

The success of the maturing stage will depend, *inter alia*, on some specific actions that will allow progress in sustainability and expansion: (i) involve and make responsible the middle management (supervisors) and operational management in the overall management of the project, by changing INFOTEP's role as executor to facilitator of the implementation of the guides in the enterprises; (ii) apply the evaluation model – audit – certification as an instrument of 'final accountability' of the expansion of the project; (iii) make the project more visible, both to INFOTEP and to the enterprises (image, recognition of the enterprise, dissemination), under the concept of 'permanent and inclusive learning in the organisations'; (iv) update the contents of the guide, aiming at continuous improvement (including a title alluding to same) and including subjects such as 'lean manufacturing' and '6 sigma'; include in the evaluation model ('semaphore') an additional colour (blue) that refers to outstanding performance in the competency; (v) experiment other ways to reproduce comprehensively the guides for the workers, for example, delivering to them only the part on self-evaluation and evaluation, while the part on explanations is only made available for consultation in some strategic point of the enterprise, such as the training classroom); (vi) organise encounters for the exchange of experiences on the implementation of the guide, among enterprises, in order to encourage institutional learning in this field; (vii) provide multimedia digital equipment (photographic and video cameras) to the advisory area to document and disseminate experiences; (viii) expand the methodology and instruments to other free zones in the country and enterprises that are not free zones.

ing and leading the process in the enterprise. The following step is to apply the guides and with feedback from the participants assess the strengths and weaknesses found during the implementation process.

The guide was implemented by beginning with the stitching operation (upper part of the shoe) in two working shifts. The remaining operations were then gradually incorporated: bottoming (lower part of the shoe), lasting (last of the shoe) and finish; it was supplemented with a guide for kitting (preparation). There was a total of 6 self-training guides that were produced for 317 workers. It was supported by a team of external instructors supported by the Steering Committee under the co-ordination of an INFOTEP entrepreneurial advisor.

A plan for training supervisors was defined as a complement to the GAEC process and to provide support to the production process, improvements were suggested by workers as they went along. For those purposes it was supported by the INFOTEP Middle Management standardized programme, that included day-long team events. Corporate managers were also given training in managerial abilities.

- **Third stage**

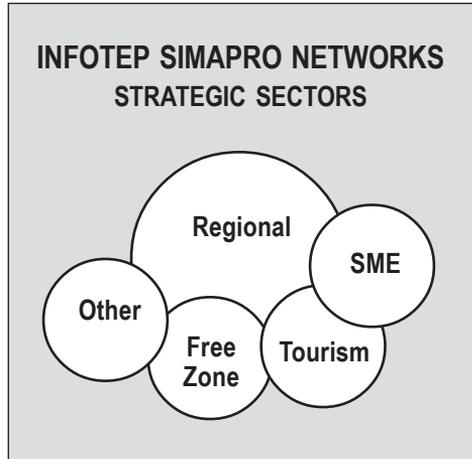
The third stage of SIMAPRO implementation by INFOTEP, begins in 2007. Several factors converge. In the first place, an opening up of trade with Central American countries. In the second place, competition with countries of Southeast Asia, especially China, in manufactures' export markets (assembly). In the third place, a partial recovery of the tourism sector. In the fourth place the drafting of a national competitiveness plan with specific training tasks.

It can be said that reality went as far as that which was expected for the nineties, but at the time it was a probability which still had to be lived. At present, changes are constant and unpredictable in the enterprises of the country. What is predictable is that permanent training of staff aimed at the enhancement of productivity is an imperative need for enterprises in view of this environment.

INFOTEP's management visualised its role in this context in the following way. In the first place, training on offer in the institution will always be behindhand in view of the specific needs of the enterprises. This does not mean that the supply will not return to competencies identified together with

the productive sector, but that it will emphasise more lasting and less specific aspects of competencies.

In the second place, enterprises must develop their own internal permanent training systems. INFOTEP is called upon to support enterprises in designing and orchestrating said systems. This means that its role as supplier of courses must change into that of an advisory agent that accompanies enterprises in installing the systems.



In the third place, the permanent training systems in the enterprises must aim at individual and collective productivity improvement in the organisation. In this way investment in training is focalized towards impacts in terms of productivity and working conditions (Decent Work). This allows training to be managed according to ROI principles (return on investment), which allows the enterprise to record its results and render accounts for the scope of same.

In the fourth place, both the supply of training and the advisory services for assembling permanent learning systems aimed at an improvement of productivity and working conditions (Decent Work), require a strategic focalization on the part of the institution; in this case, synergy with the national competitiveness plan. This allows INFOTEP's effort to be interconnected with other Government and private sector initiatives, thus mutually reinforcing each other. As regards SIMAPRO, it means specialization regionally and nationally in some sectors or productive chains (or clusters) that converge with the national plan. This does not mean that enterprises of other economic branches or regions will be left out, but that the emphasis will be placed on those that from a macro-meso perspective have been identified as having the greatest potential in the short and medium term.

Half-way through 2007 INFOTEP gave a new orientation to its SIMAPRO experience. On the one hand the group performance component was included once again (measurement - feedback - improvement of productivity and working conditions). This collective competency component had been virtually abandoned in the previous stage. The change in advisors and lack of

practice led to decide in favour of an intensive training programme in this component, with the incorporation of new aspects that in the first stage had not been incorporated. Especially the availability of software with an internet platform to process and document more expeditiously the SIMAPRO process and the introduction of feedback techniques based on question pedagogy and critical reflection, supported by nano-learning tools.

On the other hand, the knowledge accumulated in the management of the GAEC would be extended towards all the regional offices of the institution. Focalising is sought in this extension, that translates into each regional specialising in a sector, productive chain or cluster.

Both lines of action converge and interrelate with each other, on the basis of the configuration of learning networks. Advisory services do not end in the enterprise: At the same time they accompany participation in a network of exchange of experiences and knowledge on the management of permanent training systems in organisations, oriented towards the improvement of productivity and living conditions. This changes advisory services from a static approach to a dynamic practice, that includes the option of learning and horizontal development (between enterprises and training and study activities).

This new orientation in INFOTEP's implementation of SIMPARO occurred in the framework of a collective learning experience of the advisory team and with the participation of enterprise representatives. It was an advisor training activity on the supply side and of enterprise repre-

Year 2007: Towards transformation of the service

The context of INFOTEP's role in its relationship with the enterprises of the country will have to evolve, to be able to offer valid and relevant services. That contributes to the development of a totally different environment from those years when the institution began its work. The greatest challenge is probably to stop being an institution that offers courses, 'packaged courses' or custom-made suits, to become one that collaborates with the enterprise to install and sustain permanent and inclusive permanent learning systems. This not only changes the approach of the institution but also requires new competencies for its staff, able to provide this type of services. It implies going from focalizing on a specific competency to a holistic competency approach that involves technical aspects with social and organisational ones.

Year 2007: Infotep Santiago

The integration of SIMAPRO and Self-training guides in the scheme followed in Santiago, Dominican Republic, in the free zone sector, incorporates measurement of plant indicators into training with the feedback from the results or performance of the team (module), the contents of the guide becoming nano-learnings at the same time as the operational dynamic of the working team, with the supervisor, a facilitator and an advisor, is monitored and followed up.

In August, 2007, 1430 workers of Grupo M were certified in occupational competency, by means of Self-training Guides, in the general competencies and techniques identified for the production of Poloshirt, Tank Top, T-shirt, warm coats, pants, *inter alia*. This process began in 2005 and showed, by way of the indicators provided, the impacts achieved and especially the impact of the guides on attitudinal variables (behaviour, attitudes for change) which in this case have been decisive in the implementation process of Lean Manufacturing on which the enterprise is working.

representatives on the demand side, in the SIMAPRO management tool (Systems of Measurement and Improvement of Productivity) and Guides for Self-training and competency-based assessment. These two tools complement each other and their implementation in the organisation leads to a practice of permanent and inclusive learning practice oriented towards the improvement of productivity and working conditions, with the participation of all the staff. It is because of this that it is considered a valid and relevant proposal in the context of transit from an economy based on low cost labour and inputs towards one the main dynamic axis of which is the incorporation of new knowledge.

65 entrepreneurial and technical advisors from INFOTEP took part in the training as well as 40 enterprise representatives from the human resource and production areas. Several sectors were represented, some of which stood out because they were considered strategic within the National Competitiveness Plan: the free zone, tourism, agricultural industry, SMEs, construction, trade.

The training had three results. In the first place there was a levelling in the capture of the SIMAPRO methodology among the advisors and technical staff of the area of support to INFOTEP entrepreneurial competitiveness. For new advisors it was an introduction to the tool; for more

senior ones it meant refreshing and updating their knowledge and ability to handle the tool.

In the second place, a concrete supply proposal was made by INFOTEP to enterprises to install and maintain a SIMAPRO model. It is a letter of introduction to the institution where it states its speciality and capacity for response. This allows the institution to distinguish itself in the market with a product that is aligned with the values and principles of the institution and, universally, with those of the ILO.

In the third place, SIMAPRO was launched in several enterprises, around 20 of them, that took part in the training. The activity was used to involve enterprises and to train their representatives in the methodology, in the implementation route and in the logic of being a part of an institutional learning network on SIMAPRO implementation.

CHALLENGES AND FUTURE ACTIONS: SIMAPRO - INFOTEP

Future actions have been classified into 4 sections. The first is the strategic order in which SIMAPRO is implemented as an INFOTEP programme towards enterprises: In which sectors and regions? And, with whom? This refers to macro interconnectedness.

The second is of a tactical order and refers to how the extension of the SIMAPRO implementation is co-ordinated among Dominican enterprises more quickly and with a self-accelerating model.

The third section is of an operational order and refers on how to manage the expansion of SIMAPRO under quality criteria, laying stress on the management of competencies as a tool for that purpose.

The fourth is focused on the sustainability of SIMAPRO implementation. Inside organisations this is achieved through interrelations with other productivity enhancement programmes and towards the outside, by means of learning networks between enterprises and institutions.

1. Strategic

On a strategic plane, decisions are related to what sectors should be focalised in implementing SIMAPRO. It is advisable to start with sectors or branches that match what have been identified as priorities at the global country level, so that synergies can be generated between a diversity of in-

struments that will be projected towards them. This does not mean that others will be left aside, but that more attention will be paid to the strategic ones from a macro-sector perspective.

Priorities by sectors are generally considered by regions, since the same sector is not usually a priority in all regions of the country. It is a specialisation that must be interpreted with flexibility, since the dividing lines between regions are not at all uniform or unambiguous.

Which are the priority sectors and from what perspective?

A first strategic sector is tourism. It is a sector that relies heavily on static competitive advantages. To transit towards dynamic advantages, the quality of service and efficiency will have to be improved, to make the sector competitive on the basis of its human capital. It is a sector which is expanding, although not at the same pace in the whole country. The prospects regarding a more comprehensive tourism, that includes the community near to the tourist areas as part of the attraction for visitors, pose important challenges regarding competencies to be developed at the level of individuals and organisations. It is an opportunity context to be put to better use with SIMAPRO to generate greater impacts on employment and welfare.

Specifically, it will be necessary to work very closely with the Ministry of Tourism to gradually interconnect the projects from a global vantage point. The same is true of associations of entrepreneurs of the sector and skills development centres of same. The complementary services sector linked to the communities will also have to be included.

In terms of regions, although this sector is present in the whole country, the most dynamic part is concentrated in the southern region. Because of this it is recommended that the INFOTEP South Regional specialize in the implementation of SIMAPRO in this sector. This does not mean that other Regionals develop experiences in this sense, but rather that it will not be their specialization.

A second strategic sector are the enterprises of the free zone. Although there are a heterogeneous number of sectors in the free zone, those which have traditionally prevailed are in the clothing industry. Recently, the presence of others has been increasing, such as leather goods, electronics, automotive parts, plastics producers, apparatus for the health sector, communications centres (phone service) and document processing.

The context of the sector and especially the clothing sector, is an obligatory transition towards the creation of dynamic competitive advantages, because the static ones based on cheap labour stopped being functional when confronted by competitors from other countries. The SIMAPRO may be a tool that, from the perspective of human resources, contributes to the transition towards products of greater value added.

The most dynamic region as regards free zones is the north. What is recommended is that INFOTEP's North Regional specialise in free zone enterprises, without this meaning that it cannot attend to enterprises from other sectors such as construction, tourism or agro-industrial clusters. In practice in recent years, this Regional has already generated a great deal of activity in this sector, whereby this specialization would seem to have been 'natural'.

A third strategic sector is the small and medium-sized industry associated to the sector of machine tools, installations and instrumentation industries. It is a sector that, in an open market, has to activate its capacity to generate dynamic competitive advantages. Most occupy niches in the markets, whereby their competitive capacity is in specialisation and in generating from there on, a relatively static advantage. It has the potential to generate jobs rapidly and in variety, which makes it possible for individuals of different competencies to find employment.

These enterprises exist in the whole country. Perhaps their greatest possibility of development is in the capital, in Santo Domingo, because of the diversity of market niches there are in this urban area. It is up to the Centre Regional of INFOTEP to specialise in the implementation of SIMAPRO in SMEs of the industries mentioned. As in the other Regionals, the Centre Regional has been working in this sector of enterprises, because of which specialisation would be 'a natural' in this sector too.

A fourth strategic sector is agro-industry. Partly because of the re-launching of some sectors that had been abandoned and that at present provide new business opportunities, as in the case of sugar mills. Also because of the markets which are arising for tropical products, especially fruits. In both cases an attempt is being made to take advantage of the static competitive edge (climate, water, earth) that with technology, organisation and staff training, becomes dynamic.

There are possibilities in several parts of the country. Where they will have to be boosted most, however, is in the southern region, given the opportunity for employment this means for a region with very few develop-

ment options. The South Regional of INFOTEP may specialise in implementing SIMAPRO in enterprises of this sector, although not exclusively, and as has been mentioned more than once. Even here there have been approaches to the sector, especially to the sugar mills sector.

It is worth pointing out that in the case of the sugar sector, attention will have to be paid to the service at the national level, since the mills are dispersed throughout the country and at the same time there are not many of them.

2. Extension of the implementation

So far the INFOTEP experience with the advisory service for enterprises in SIMAPRO implementation has been approached as a project. There is sufficient evidence at present that the tool is valid and relevant in the country's present context. It is recommended that it advance to the status of *strategic programme*, where the institution visualizes it strategically in its policy and in its processes. This does not mean that it should become a bureaucratic process for enterprises, but rather give it greater institutional scope, both towards the outside and the inside, linking it among other things with the initial training workshops.

The extension of SIMAPRO to a greater number of enterprises and at the same time with the flexibility and capacity for response that there has been so far, is not easily handled with its 'own' staff, nor is this advisable, so as not to become a 'heavy' instance with the risk of becoming too bureaucratic. In a natural way in some Regionals the figure of SIMAPRO facilitator or specialist, is at the same time a specialist in the productive area, that is connected as an external to the institution, and is under contract to accompany a certain sub-process within the SIMAPRO methodology with a enterprise that needs it. The person responsible for the relationship with the enterprises continues to be the INFOTEP advisor, who has a portfolio of enterprises under his charge and works on co-ordinating and linking SIMAPRO with other services of the institution as regards the enterprise.

The recommendation is to transform this experience of facilitator-specialist into a policy for the implementation of SIMAPRO in enterprises. This would be done in order to be able to reach a greater number of enterprises, flexibly and with a 'custom made' type of attention within the framework of a methodology (analogous to the concept of mass customization). It requires that a bank of consultants or specialists be formed who have complete do-

minion over the tool and at the same time have the technical expertise in a productive sector or branch.

The advantage of this kind of specialist is a triple one. In the first place because it is possible to reach more enterprises without expanding the structure of the institution. In the second place because the SIMAPRO tool can be related with other techniques and with better practices in the sector, through the technical 'expertise' of the specialist. Thirdly, because the tool can also be disseminated autonomously, since the consultants-specialists can also apply it directly with enterprises, if the latter so desire or because the INFOTEP capacity for assistance has reached its standardised limit.

The INFOTEP would co-ordinate the bank and accredit the individuals who have demonstrated capacity as SIMAPRO facilitator-specialists. The recommendation is to define the competencies required with a technical committee composed by the present facilitator-specialists and representatives of some enterprises who have had the experience and have been clients of the process. It is advisable to keep the format of competencies and accreditation simple but significant; the validity of the accreditation would be temporary, be it because of the cycle of the version of the SIMAPRO model or because of the years of practice of the individual (for example, every 3 years).

Also recommended is that facilitators-specialists or consultants be knowledgeable as regards the sector where they will apply the tool. It does not necessarily mean that they must be specialists in the productive process, but they do have to have knowledge of the trends and good practices in the sector.

3. SIMAPRO management competencies

As a supplement to the quantitative extension of SIMAPRO we must turn to the quality of the said extension. In the final analysis experience has demonstrated that SIMAPRO, to be implemented well, basically depends on two things: firstly, the involvement in and support of upper management of the system; secondly, the training of the co-ordinator, middle management and specialists (quality, industrial safety, systems) in their function in SIMAPRO management. In the context of extension the need for trained advisors and specialists-facilitators in the methodology and in the role they have to play is added.

To ensure the quality of the training of the individuals who play different roles in SIMAPRO implementation, the establishment of the competen-

cies in order is recommended and, based on them, the training instruments (manuals, cases, practices) and instruments of evaluation (portfolio of evidences). This allows us to accredit the competencies acquired by the individuals through INFOTEP. For example, certification of SIMAPRO coordinators in the enterprises, the specialists-facilitators, middle management. It also allows people within the institution to develop a training and career plan for advisors in the management of the tool from the perspective of INFOTEP as a training entity

Competencies can be established in many ways and not necessarily is any of them good. The institution will have to define what architecture of competencies shall be used, in order to specify the principal decisions to be taken regarding the model to be followed, which makes it possible to return to the points of origin in the evaluation of the proposal and analyse whether they were appropriate or whether they need adjustments.

We have gone part of the way. A profile of competencies aimed at strategic objectives and goals of the institution in 2005 has been developed for the advisors in a participatory manner. To do so a comprehensive model of competencies was applied, focused on results but that at the same time allows a learning and development itinerary to be established (Annex 1). The re-use of this architecture of competencies employed for the advisors is recommended as is the production of profiles of the same architecture for the remaining roles.

It is recommended that, to outline the competencies of the roles in the implementation of SIMAPRO, the good practices used in the country be repeated and, having the architecture of the competencies model defined, the most important conducts and technical capacities required be identified. To structure the identification of the competencies it is recommended that the basic scheme of SIMAPRO implementation in 5 steps be used as a support (Annex 2). On the basis of this scheme the competencies can be located in a model similar to that used by model ISO 9000 and, at the same time, they can be linked to the deliverables or results that are expected from each core activity of the implementation in the short and medium term.

It is advisable to make a benchmark comparison with experiences in other countries where SIMAPRO is implemented (Mexico, Cuba, Chile). Likewise, self-training and evaluation manuals based on these competencies shall be based on the said good practices in the country and would be supported by the efforts being made elsewhere.

It is recommended that the evaluation instruments be kept simple and significant, rescuing cumulative learning in a dynamic perspective. This would imply that those which are part of the competency to be demonstrated propose, apply and disseminate improvements in the SIMAPRO instrument itself. This allows and obliges the institution to enter into a process of continuous improvement regarding the implementation of the model.

The possibility of certification is an opportunity that must be taken advantage of. It is something that INFOTEP has been doing in the last few years: certifying people in their occupational competency. If that practice were to be extended to the competencies of the different roles involved in SIMAPRO implementation, it would help in the quality of same and could gain greater credibility as an institutional proposal. Providing the certification model is simple and transparent, so that it may acquire real social recognition and value.

4. SIMAPRO sustainability

Even though there may be difficulties in initiating SIMAPRO in an organisation because of all a change in the organisational culture implies regarding the management of learning and knowledge, it is much more difficult to sustain the model in time. Practice has taught that, for many reasons, it cannot be expected that all organisations will be able to sustain it always and with the same enthusiasm and commitment.

At the same time, sustainability is the result of an organisational learning process where the organisation learns itself, with the help of the external milieu. To the extent that the environment shows itself to be more dynamic in learning, greater will be the impulses towards the organisation to continue to locate and improve the way. It is up to the institution to create and facilitate spaces of a milieu favourable to learning in SIMAPRO sustainability.

For both reasons work on two complementary approaches is recommended. The first is the organic interconnectedness of SIMAPRO with other strategic programmes in the organisation, such as ISO, 5S, lean manufacturing, TPM, RSE. It is a dual linkage. On the one hand these programmes lean on SIMAPRO to become culture and to measure its impacts on productivity. On the other hand the insertion of SIMAPRO in these programmes will increase the probability that the organisation will continue to apply and to innovate SIMAPRO.

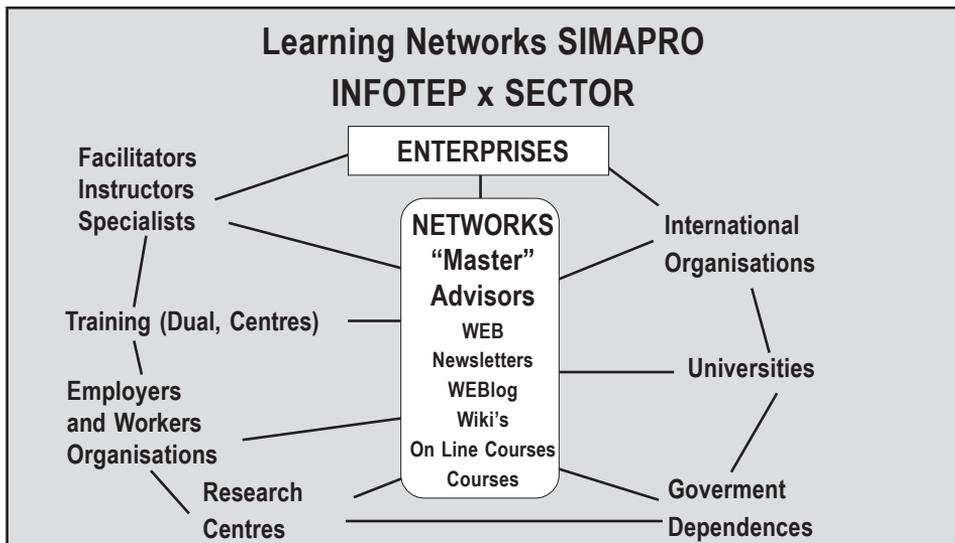
The second is to work on SIMAPRO implementation on the basis of the NETWORK institutional figure. It starts by generating individual experiences in some organisations, which same extend to others when sharing the experience it has had. The NETWORK not only includes enterprises that apply or attempt to apply SIMAPRO, but they also involve specialist consultants, employers' and workers' organisations, training institutions, government dependencies, research centres and universities, international agencies. In the centre of the NETWORK is the institution represented by the INFOTEP advisor.

It is up to the advisor to keep the NETWORK active, especially at the beginning. How is it done?

It will be necessary to establish regular activities of exchange of experiences and simultaneously to activate and invite participants in second generation web sites (web 2.0) to facilitate exchange between members spontaneously and directly.

It is recommended to assign to advisors the function of integrating and starting up operations on the NETWORK by sector, branch of activity or specialisation (see, for example, in the tourism sector of the DR: <http://simaproeste.ning.com>)

According to the case there may be one or more advisors per NETWORK, depending on the complexity of same as well as the development of the com-



petency of the advisor. One of the quantitative indicators of the INFOTEP SIMAPRO programme would be the amount of NETWORKS installed; another is the amount of enterprises, and with them of people, who are part of each NETWORK. In qualitative terms, an indicator would be the depth and significance of the SIMAPRO tool improvements proposed in the web forums or in the NETWORK meetings.

At the international level, INFOTEP will be part of a set of NETWORKS that are working in a similar direction. At the same time it is relevant to recall that INFOTEP is one, if not the pioneer institution in the vocational technical training area in the Latin American region, working on the experimentation, adaptation and development of SIMAPRO, since 1997. Therefore, it has a lot to share with homologous institutions in the region.

An important network to which INFOTEP belongs at the international level is that made up of the different dependencies of the ILO. Subregional and Regional Offices participate in it, such as the ILO Office in Mexico, Central America, Southern Cone. A key role is played by CINTERFOR, the ILO International Training Centre in Turin and the ILO training department in Geneva.

Each one plays a different role in which INFOTEP can participate. The Mexico Office co-organises regular encounters for exchange of experiences in SIMAPRO in Mexico and Cuba. CINTERFOR participates in research and development of institutional proposals on SIMAPRO. The Turin Centre provides international presential and distance courses on the management of human resources by competencies where SIMAPRO is part of the curriculum. ILO Geneva interconnects initiatives such as SIMAPRO with the vision and policies regarding decent work that the organisation disseminates at the world level.

The recommendation is that INFOTEP tightens and participates more in these international NETWORKS. This allows Dominican experiences to become known and at the same time encourages INFOTEP to innovate and improve the programme continuously, with the aim of generating forcible contributions to the improvement of competitiveness and decent work in the country.

The experience of education for work of the POCET/CENET, Honduras 1990-2007 Education/training and increased productivity

Mario Hugo Rosal G.

INTRODUCTION

The education-for-work methodology was put into practice in Honduras at the beginning of the 1990s. This methodology was applied and validated with the aim of improving the level of life of the poorest sectors of the population in rural areas of the country. One of the objectives of this initiative was to contribute to the fight against poverty, which is partly rooted in low labour and productive capability stemming from a lack of training/education, organization and job opportunities.

Neither the formal education system nor vocational training have responded opportunely to the educational needs of people in the age group who are able to produce but who are illiterate or have low levels of skill. Education for work is a contribution to combating the high levels of chronic poverty that impede human development for individuals and groups, especially among the rural population.

A NEW APPROACH IN ADULT EDUCATION

There have been three kinds of initiatives to tackle the educational and productive deficiencies of adults in rural areas:

- a. The formal education system has implemented literacy and adult education campaigns and permanent programmes, but these have failed to overcome illiteracy in rural areas.

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- b. Vocational training has not responded; it has been geared mainly to modern economic sectors so the poorer population groups have been marginalised and they have not reached this kind of training.
- c. Development organizations have promoted productive projects as an instrument to help in the formation of small enterprises in response to the growth of the informal sector.

These efforts have taken the form of partial projects, and this has tended to hinder progress towards integrated development.

The aims of education for work were to bring literacy and basic training into vocational training, so these educational processes would be coordinated with productive work and organization for self-managed production in rural areas.

The beneficiaries

The beneficiaries of the education-for-work initiative were the economically active population and unemployed people between 15 and 49 without schooling, with or without monthly wage, the illiterate and inactive female population, and supposedly literate adults who did not complete their formal education and became functionally illiterate.

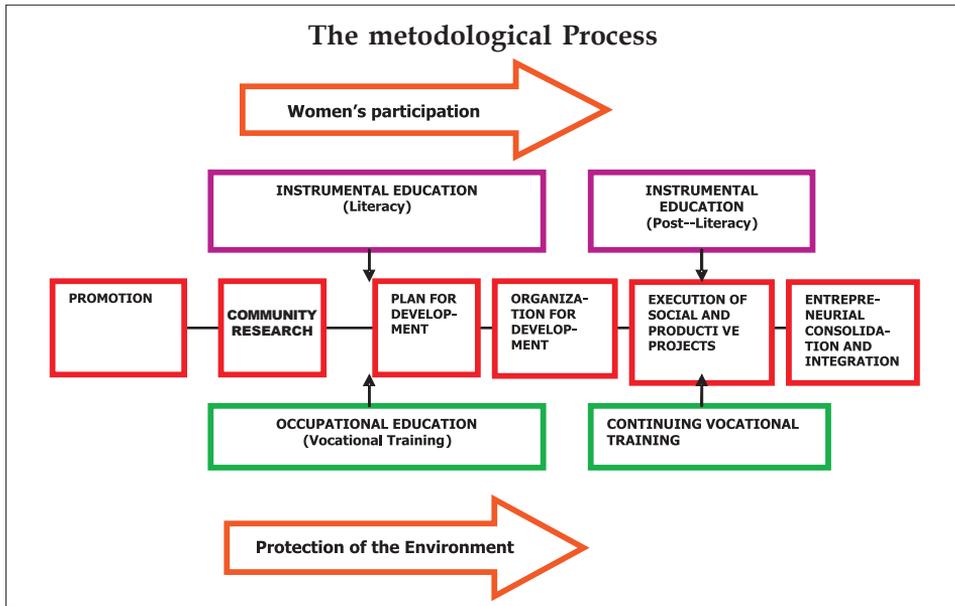
Methodology

The methodological process consists of the following components: participative community research, a community development plan, socio-entrepreneur organization, the execution of projects, and instrumental and occupational education.

The methodological process

Participative Community Research

The aim of participative research in the education-for-work initiative is that the participants should begin to think scientifically through the ordered study of their own situation using basic social research techniques. The final stage of community research is to put the problems that have been found in order and present them in a community dissertation.



Planning of Community Development

This stage involves sketching the route from the situation that has been found or recognized through local research to an ideal of what the community could be. This plan includes an ordered series of steps and specific actions that will have to be undertaken in sequence to improve the situation of individuals and of the group.

Socio-Entrepreneurial Organization for Collective Work

Using the Community development plan as a basis, members of the community are organized around productive of social activities that have been defined in previous stages of the process.

Execution of Projects

The productive and social projects are the integrating core of instrumental education and occupational education (VT) through 'learning by doing'. They are a means to foster the creation of productive units that have a sense of permanence, acceptable levels of income, entrepreneurial management, and the ability to sustain themselves with their own resources or by taking

advantage of the opportunities that are available to them through the formal system.

Instrumental Education

This is geared to facilitating the conscious and reflective perception and assimilation of labour and productive activities. It is made up of three areas of study: reading and writing knowledge and skills, basic arithmetic, and humanistic training.

Occupational Education (VT)

The aim of this is to develop a specific ability considering the requirements of a job or occupation. It is made up of the areas of technical training to carry out a productive activity, training in organization for collective work, and entrepreneurial training to administer and manage productive units.

WOMEN'S PARTICIPATION AND THE ENVIRONMENT

In education-for-work methodology there is a twofold emphasis: that women should participate on an equal and equitable footing with men in all educational and productive activities, and that technological innovation should be used but with due care for the environment.

Preliminary results

The main achievements can be summed up as follows:

1. The ability for autonomous management in the communities involved:
 - Forming teams of local educators to manage the process; forming productive groups; setting up inter-group organizations for production, management and commercialization (cooperatives); helping communities to be able to analyze and understand their own reality, define and prioritize their needs and plan their own development; improving levels of education and production; and increasing the participation of peasant women in community development efforts and in educational and productive activities.
2. Promoting a favourable national and institutional environment in government and also in the private sphere, which favours the adoption of education-for-work methodology in national policies and institutional practices.

EDUCATION FOR WORK AND ITS LABOUR AND PRODUCTIVE IMPACT ON THE POPULATION

The objective of the study, the population and sources.

In order to establish the connection between vocational education/training and increased productivity and decent work, research was undertaken among some of the beneficiaries of the POCET/CENET project in two different periods. The conclusions are given below.

The aim of this research was to determine in what way, how, and to what extent the application of education-for-work methodology had wrought improvements in the quality of life of the beneficiaries. Improvement would be measured as reduced dependence on seasonal work, increased opportunities for autonomous work, the diversification of production, increased productivity, and improved levels of productive organization.

The population surveyed consisted of the oldest and most active communities in the POCET/CENET area of influence, which had participated in the methodological process for three years. Communities that had a minimum of three productive groups per community and that had executed at least two projects were selected. This involved one group of only men, one group of only women, and a mixed group. The research was based on the results obtained by educators, who made up an accessible control group, and it involved 34 out of a total of 198 occupational groups.

The information sources were the productive groups, the technical educators in production, local and regional educators, regional cooperatives, mixed groups, one group of women (besides a focal group) and the families of participants.

The target population were the people who took part in the experience. Visible quantitative aspects to do with production were found in the material surveyed, and also qualitative aspects, namely the perception of the actors involved, based on their experiences. A noteworthy aspect of this was the importance in time of the transition from one situation to the other, and why these changes should have occurred. As we shall see, the beneficial effects go beyond the sphere of economics and production. It emerges that education can have an impact that enables people to manage their situation in an increasingly rational way, and new relationships are generated within the community and outside it. What happens is that the new vision and new practices in work lead to a new attitude to life.

This research was built around three components that are derived from the educational processes involved, and these are closely inter-connected in a logical way. First, the **productive** component – this may not be the direct aim of education for work but it does constitute an indicator of the labour ability that is generated; second, the **labour** component – which translates into the ability of the worker as such, as the result of the educational process; and third, the impact on **well being** or raising the level of life, which is the ultimate goal of these processes.

Productive impact

An outstanding component of the programme is to formulate productive processes that are conceived as a **laboratory** in which learning takes place under the principle of ‘learning by doing’, and from this flows the connection between education and organization, management, production, credit and commercialization.

This means analysing the improvement of the beneficiaries’ work or the results of that work, that is to say bringing about ‘manual literacy’.

The target sample groups were in the POCET/ CENET area of influence, and the experience lasted from 1992 to 2000. In this period, out of a total of 198 groups 33 were researched (16%), and this involved 266 participants of whom 224 were men and 42 were women (25%). The groups mostly date from 1990, but there was one from 1986 and one from 1987. These two groups had been linked to peasant organizations, and they subsequently joined the education-for-work process.

Productive projects

The region with the fewest **projects** was Comayagua, followed by Intibucá and Marcala. The greatest number were to be found in Siguatepeque and La Libertad. The minimum number was 3 and the maximum was 15.

Increased production

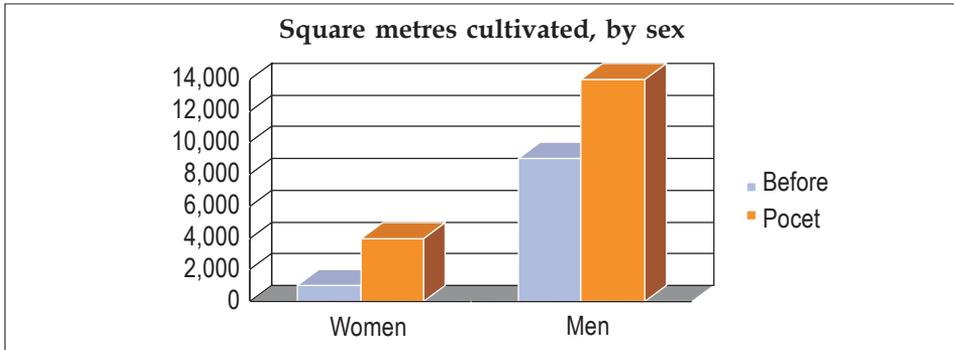
It emerges that in spite of higher production costs, illnesses and increased labour costs, all groups increased the areas they were working and intensified cultivation, which resulted in yields that were considerably higher.

The table below shows the area cultivated before the project, the area now, and the percentage increase.

CULTIVATED AREA IN BLOCKS

PROCUCT	BEFORE	NOW	DIFFERENCE
COFFEE*	157.5	253.25	95.75 (60.79%)
MAIZE	123.5	180.0	56.5 (45.75%)
KIDNEY BEANS	48.25	72.00	23.75 (49.22%)

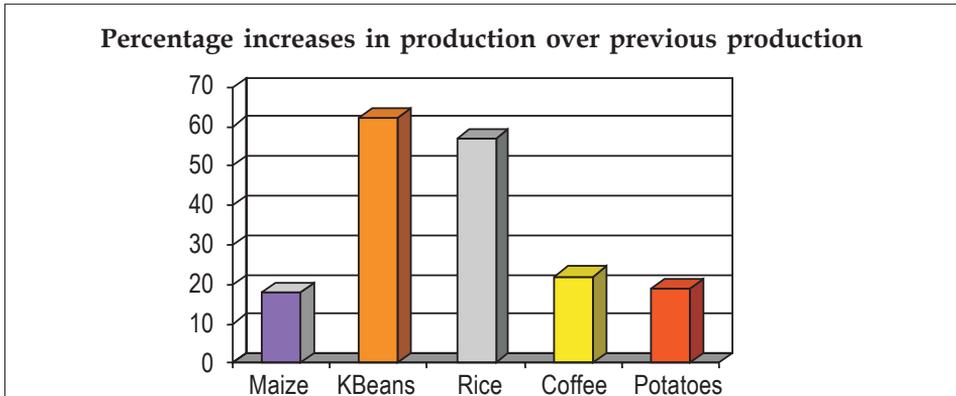
The chart below shows the area cultivated by sex, before and after the project.



Productivity

The chart below shows the increase in yield per block. It is clear that these increases depended on opportunities to execute projects with an alternative educational base, and this made it possible to adopt more suitable technology, and also to increase the investment in terms of inputs and work force.

It can be seen that there were considerable percentage increases in production per block of maize, kidney beans, rice, coffee and potatoes.



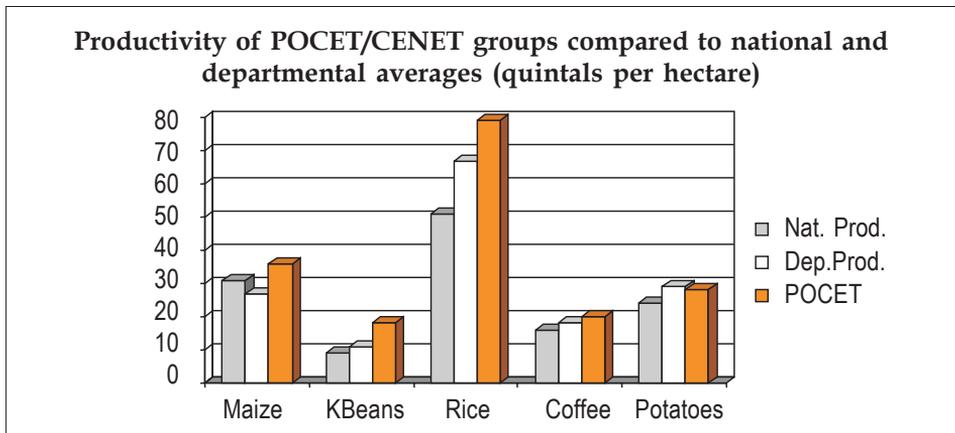
Increases in production were due to a variety of reasons including the following:

- People’s attitude towards the application of technology.
- Internal and external resources were utilized in a rational way.
- The productive projects implemented had been tested previously.

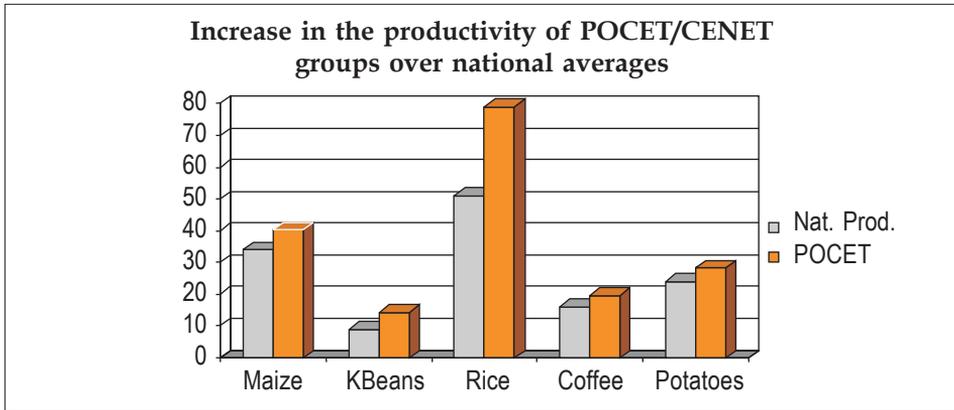
The table below shows the increase in production per block. This is measured in quintals (100 pounds) per block (approximately 7,056 square metres), before and after the education-for-work methodology was applied.

Yield per block in the five areas					
PRODUCTS	NOW	Q/BLOCK	BEFORE	Q/BLOCK	DIFFERENCE
MAIZE	41.4	q/b	15.08		26.32
COFFEE	19.3	q/b	8.7		10.6
KIDNEY BEANS	14.6	q/b	6.1		8.5
POTATOES	205.5	q/b	154.5		51
CHILLI	160	q/b	120		40
RICE	80	q/b	70		10
VEGETABLES	22	q/b	0	New product	0

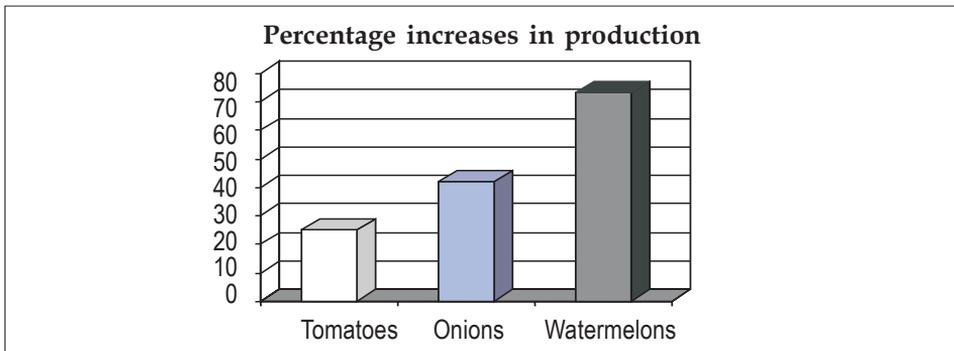
We can use a more specific analysis to show the increases in production of five of these products by a comparison with average yields in the country and in the department.



It is important to note that production per unit of measure by the POCET/ CENET groups increased in comparison to average production in Honduras as a whole. This is shown in the chart below.



There were also significant percentage increases in production per block in other products like tomatoes, onions and watermelons, as is shown in the chart below.



Financing: investment and re-investment

The application of this methodology created opportunities for financing far in excess of what was available previously, but this investment would not have been possible without credits. It was necessary within the initiative to generate suitable credit lines to finance the productive projects involved.

Investment

PRODUCTS	NOW Total cost of inputs	BEFORE Total cost of inputs	DIFFERENCE Total cost of inputs
Coffee	2269		2269
Maize	1223	993.5	229.5
Kidney Beans	776	207	489
Chilli	4800	240	4560
Cabbages	7500	3680	1500
Carrots	2800		2800
Tomatoes	6625		6625
Other vegetables	7440		7400
Rice	3040		3040

Financing: credit and similar sources

New resources were required to finance the increasing amounts of inputs and to acquire the materials and tools needed for the productive experience. Credits became necessary and, in fact, indispensable for the POCET/CENET learning project. Although the main function was to validate a methodology rather than to make credit available, the productive groups needed finance.

Thus a credit and commercialization unit was set up, and this paved the way for a fund which was administered in the form of a trustee agreement with the savings and credit cooperatives in the sector. Under this system, credit was considered an educational tool, and this amounted to a break with paternalism and progressively opened the way towards formal financing institutions, with all their rules.

Profits

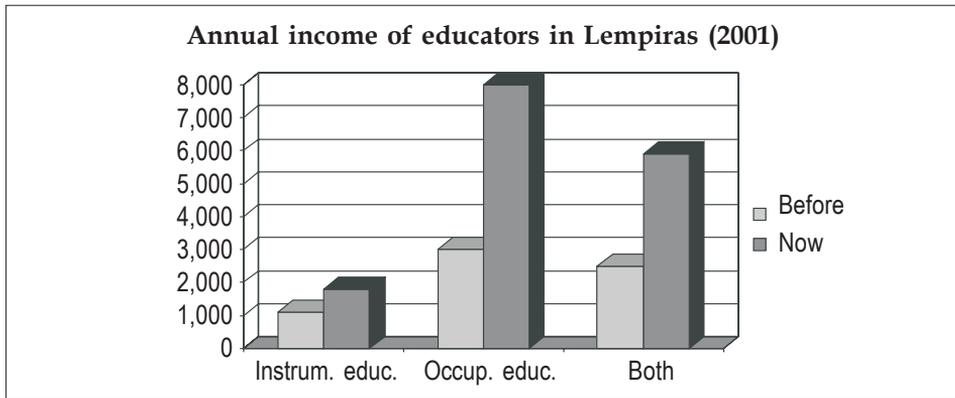
Income per product increased thanks to the adoption of technologies, the increase in production areas and the adoption of business administration methods. This applied especially to the production of basic grains, vegetables and coffee, and the beneficiaries of the project made substantial profits.

The table below shows the profits and global increases in 2001 Lempiras (Honduras' currency) for some products, following the application of the education-for-work methodology.

Profits

PRODUCTS	NOW			BEFORE		
	Income	Outlay	Profit	Income	Outlay	Profit
Coffee	18,116.50	11,363.00	6,753.50	5,707.70	3,382.50	2325,20
Maize	6,167.00	4,284.00	1,882.00	2,038.80	1,231.00	807.80
Kidney beans	5,459.30	3,066.00	2,393.30	1,794.00	330.00	1,464.00
Potatoes	31,650.00	21,830.00	9,820.00	12,450.00	3,979.00	8.471.00
Chilli						
Tomatoes	17,280.00					
Carrots	13,333.00	7,320.00	6,013.00			
Cabbages	54,400.00	12,900.00	41,500.00			
Other vegetables						

Source: based on area instruments and workshops. Annual income of educators in Lempiras (2001).



Improvement of self-employment

The figures below show that there was a general falling trend towards labour sales outside the community. With the exception of Zone II (Siguatepeque), where the labour sales outside the community held steady at a high level both internally and externally, the overall trend was downwards.

The application of new technologies enabled women and men who previously had to work outside the community to dedicate more time to work-

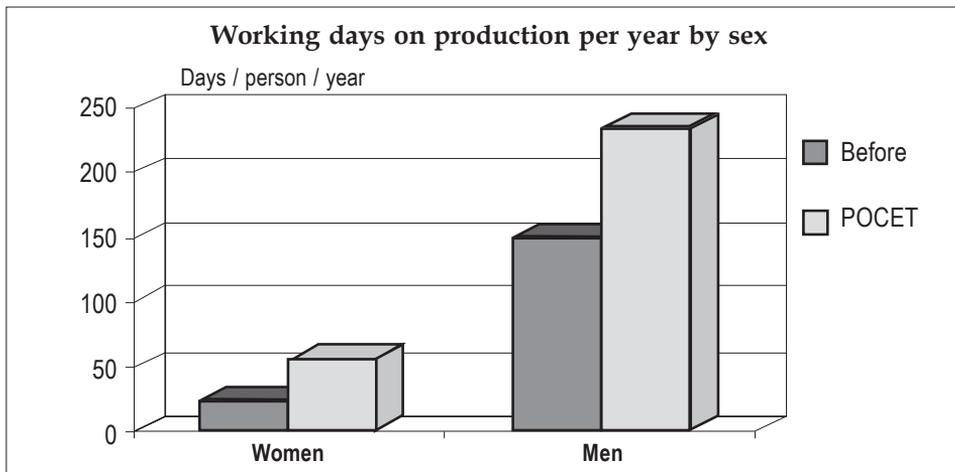
ing their own land. This increase in working days per person on their own productive units contributed to the expansion of the cultivated area.

PERIOD ZONE and total number of group members	NOW		BEFORE	
	Ls * in the community	Ls outside the community	Ls in the community	Ls outside the community
I (64)	10	0	43	8
II (37)	31	21	33	19
III (51)	15	8	27	12
IV (64)	32	1	67	4
V (47)	25	4	41	47

*Ls = Labour sales

There is another aspect to be taken into account. The fact of having more opportunities to work on productive projects generated more worker days spent on productive activities, and when this activity involved an alternative product there was less migration. This is what happened with maize and kidney beans: there were alternative production possibilities like vegetables, and therefore more time was spent on this occupation. On the other hand, coffee producers were more dependent on their only one crop and they were therefore obliged to sell their labour outside the community.

In the chart below it can be seen that the number of hours worked by men and women increased after the project went into operation.



Job creation

From what has been explained above, we can deduce that the execution of productive projects contributes to creating more opportunities for work in the productive units and in the rest of the community. These are not only economic or technological opportunities, they are also of a social nature.

Internal and external labour	Person days	Person days	DIFFERENCE
PRODUCT	BEFORE	NOW	
COFFEE (3 zones. I, III and IV)	111	159	48 (43.2%)
	152	337	185 (121%)
MAIZE (4 zones)	135	123	-12 (-8.9%)
	104	238	134 (128.8%)
KIDNEY BEANS (2 zones, II and V)	34	69	35 (102.9%)
	42	131	35 (102.9%)
TOTALS	280	351	71 (25.4%)
TOTALS	298	706	408 (136%)

The non-shaded bands show internal labour and the shaded bands show external labour. At the bottom there are separate totals for the two kinds of labour, reached by adding the figures vertically. The difference is obtained by subtracting previous labour from current labour horizontally along the band.

Thus we have the increase in labour that corresponds in part to the increased investment (greater attention to coffee cultivation). In all products there was an increase in the amount of external labour employed, which is justified by the implementation of new technologies and increased production.

New employment opportunities

When we talk about rural employment we usually think of enterprises that move into an area to reduce unemployment there. It is as if peasants or the rest of society always have to depend on some outside agency for employment, as if rural development is inevitably brought about by some other sector that is better equipped for the task of promoting development.

But opportunities for employment can be generated by the peasants themselves: they can form microenterprises and do well in the informal economy.

FINAL REMARKS

The data and figures given above indicate that there is a very close connection between vocational education/training on the one hand and increased production and decent work on the other.

The manner and the degree to which the application of the education-for-work methodology has improved quality of life for the beneficiaries have been demonstrated. This progress is evident from the fact that seasonal work has decreased, there are now more opportunities for autonomous work, production is more diversified, productivity is higher, and there are better levels of productive organization.

Very poor peasants can learn how to plan their development through organizing themselves on various levels, and gear their efforts to a number of specific objectives among which production is given priority.

These processes have their starting point in people acquiring knowledge about their physical environment and being convinced that it is necessary to overcome obstacles to take advantage of that environment for the benefit of the productive group.

Important aspects come into play like knowledge of the type of soil and the topographical profile of an area, the selection of seeds, fertilizer and pest control inputs, regulating shade, moderation in the use of agro-chemicals, and the progressive incorporation of organic fertilizing agents whose beneficial effects are gradually discovered and valued. All these factors make it possible to plan productive development in the context of sustainable environmental conditions. There can be no doubt that education has played a part in this transformation since basic vocational education and training helped to initiate the process of productive diversification.

Knowledge and the application of new technologies have made it possible for women and men who previously had to work for a wage outside the community to dedicate more working days to cultivating their own land. This increase in person days for their own production has meant more employment for family members and also for outside labour, and it has led to a better utilization of resources, greater labour stability, and the creation of jobs.

In spite of increased production costs, days lost through illness and higher labour costs, the groups have increased the areas they have under cultivation, and what is even more important they have made more intensive use of land, especially for the cultivation of basic grains.

There has been a global increase in the yield and productivity of a number of products: for example, maize yield has risen 174%, coffee 97%, kidney beans 139%, potatoes 33% and chilli 14%. It is important to bear in mind that increased yields involve increased investment in the factors of production.

The POCET/CENET experience showed that development must be endogenously-based and not based on an outside agency doing things for people. No project should be perceived as a donation, there always has to be a commitment on the part of the participants. In this, a crucial effect of education is that the population should not merely manifest their dissatisfaction with what they come to perceive as impediments to improving their life situation, but that they should develop the permanent ability to engage in undertakings to improve it.

The education-for-work methodology has made an observable impact on welfare levels of the people involved in the experience. Education and work are now perceived to be closely connected in all aspects of their lives. It is clear that the stimulus to organized work that flowed from the execution of productive activities and instrumental and occupational education has made a real contribution to improve employment opportunities for the members of the groups.

Finally, the fact that the participants' welfare has improved is clearly shown by indicators that reflect the satisfaction of basic needs as regards food, education, health care, housing and clothing.

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