

- Questions with *text field* for answer (fig. 6a). Text fields accept any type of alphanumeric text entry.
- Questions with *radio buttons* (fig. 6b). Radio buttons represent exclusive choices.
- Questions with *checkboxes* (fig. 6c). Checkboxes allow multiple responses within a single group of options. A user can select as many options as apply.

Intrebarea: 1:

Suma numerului de protoni (Z) si a numerului de neutroni (N) din nucleu reprezinta numarul de magnetizare

a)

Intrebarea: 2:

Străbunii electronice sunt în număr de:

3

5

6

7

b)

Intrebarea: 3:

Care din următoarele 3 simți particule subatomice?

electroni

protoni

neutroni

c)

Fig. 6. Different types of questions:

a) with text field; b) with radio buttons; c) with checkboxes.

The back-end of the e-learning site developed is presented in figure 7. From the back-end interface, the webmaster can configure the WordPress platform. The webmaster can use this interface to upload files on the server, to modify the information on the pages, to modify the design of the site, to approve the comments on the site and to manage the student's accounts. These administration pages are realized in PHP language and are dynamic.

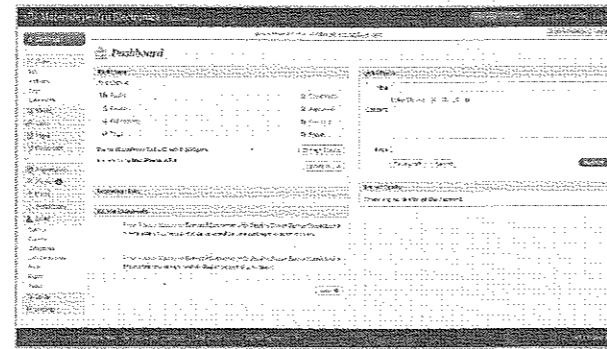


Fig. 7. The back-end interface.

3. CONCLUSIONS

In this paper an e-learning site is presented. The site can be found at <http://materiale.utcluj.ro/>. This site is useful for Materials for Electronics course. The site contains information about the course and laboratory. The users can find on the site information about course, curricula, staff etc.

After login, the students can find on line the power point presentations and the laboratories of the Materials for Electronics course, auxiliary materials for their homework etc. Also they can evaluate their skills using on-line tests.

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Promoting the Entrepreneurial Spirit within the Romanian Electronics Industry

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Abstract: The objective of this paper is to present the strategic project “Promoting the entrepreneurial spirit within the Romanian electronics industry”, co-financed by European Social Fund (ESF). Its main objective is to promote entrepreneurship in Romanian electronics industry, the electronics packaging education, and technological transfer, to offer technological and technical support for innovative SMEs, in order to compensate the small entrepreneurs number (~50% of the European average).

1. CONTEXT

When properly unleashed, the entrepreneurial spirit has proven to be the greatest force for generating wealth that the world has ever known. Entrepreneurship is the great engine of job creation, innovation, economic growth, and the rise of low-income communities out of poverty. According to World Electronics Forum, electronics industry is an important vector for lasting development giving almost half of the world's patents, exceeding the turn over of all traditional industries.

In Romania there are highly trained human resources their potential being renown, the Romanian specialists are appreciated and they are employees of big companies as Intel, Motorola, Siemens, Nokia, Renault, Alcatel, Microsoft, Infineon, etc. Of the 40,000 Romanian researchers, 16,000 are employees in multinational companies Research – Development – Innovation departments.

If during the '90 the electronic industry had a strong downtrend, almost disappearing in 2000, one may notice a strong revival, registering important investors as Solectron, Celestica, Infineon, also Nokia, Romania being considered a low-cost production zone.

One of the reasons for the economic problems we identified in the Romanian industry is the lack of economic dynamism, the low commercial success rate of innovation. The level of dynamism depends on the number of firms which are launched, the number of employees with decision power, essential in the new, innovative companies.

Within the seminar “Modalities to support innovation and the technologic transfer”, Nicolae Vasile said: “Unlike the UE average, where 58% of the SME are innovative in Romania only 18% are innovative”. In 2007 only 19% of the Romanian firms launched new products.

The obstacles for innovations in Romania are:

- mentality - the researcher / inventor approaches themes without finality in the economy (30 points for each national and international patent and a bonus from the ministry) and, this way the process become a purpose;
- a lower pressure for the participation at international projects, because of the large funds given through PN II;

- The lack of a critical mass for important projects. One can not approach important projects because of the Romanian research system structure. Of 6000 research units, only 700 are larger, the ones belonging to the traditional system.

Another problem is the weaker entrepreneurial spirit in Romania, as compared to the countries having traditional free market economies. By the end of 2007, on the Romanian territory were registered 527,931 enterprises. Also were 147,024 family associations and 234,444 individual entrepreneurs. The majority of SME are micro-enterprises (88, 6%).

Although, the SME sector has 85,5% within the registered enterprises at the Commerce Register (1990 till present 1.063.277), the number of active enterprises is smaller. This way, out of the 527,931 enterprises only 450,202 are active, as compared to the financial reports from 2007, which are lower than those from 2006, when 463,504 of the SME are active.

„The average density of SME is of 26 SME/1000 inhabitants, a half of the UE average which is over 50 SME/1000 inhabitants. Finally the SME, also the top-ranking ones have problems regarding the innovation culture, intellectual property protection, quality assurance and competitiveness through ecological products and technologies

2. WHY IS IT SO DIFFICULT TO BE ENTREPRENEUR?

In an entrepreneur case, complex meta-competences are necessary including technical and non-technical components. From the idiosyncratic perspective (someone's way to react) Deakins (1999) presents a summary of the characteristics: persons having high need for achievement, who take risks, who are innovative, visionary, self confident, have high energy, capacity to inspire, are proactive, have desire for autonomy, high internal locus of control, flexibility, emotional stability, initiative, resilience and tenacity, assertiveness, self awareness, commitment to other and tolerate ambiguity or uncertainty.

Roberts Edward B. (1988), on a statistical significant basis found the technological entrepreneurs group “more introverted (I), (0.10),

more intrusive (N) (0.05), and more thinking oriented (G) (0.05) than the general population and not different in judging preference (J)”. Keirsey and Bates describe the INGJ type of personality as the inventor.

From the personality point of view, the technological entrepreneurs are more extroverted than their colleagues, engineers and scientists. The technological entrepreneurs present extremes in their orientation for using both thinking processes, analytic and intuitive, both strong in the engineers and scientists case. (Ward AE., 2005)

An extensive set of entrepreneurial typologies is offered by Gray (1987): soloist, key partner, grouper, professional, inventor-researcher, High-tech, workforce builder, inveterate initiator, concept multiplier, acquirer, speculator, turn-about artist, value manipulator, lifestyle entrepreneur, committed manager, conglomerator, capital aggregator, matriarch or patriarch, going public, the alternative entrepreneur.

From the technical perspective, the needed competences for an individual in order to succeed as an entrepreneur are offered generically by the educational system. The knowledge an entrepreneur needs for starting a business are: understanding small business, intellectual rights and their protection, finance, marketing, business plan elaboration, strategic planning, legal issues, including assurances, logistics, clients/ providers management.

The knowledge needed for running a business is: marketing, protection of intellectual rights, financial management, strategic management, human resources management, production management, supplies management, quality management.

The entrepreneurship abilities of a person are influenced by socio-cultural conditions: path dependence and social models, role models, attitude towards success/failure, existing relations (social safety).

3. BUSINESS IDEAS AND OPPORTUNITIES - WHERE DO THEY COME FROM?

- Changes in technology, legislation, society, marketing

- The lack of a critical mass for important projects. One can not approach important projects because of the Romanian research system structure. Of 6000 research units, only 700 are larger, the ones belonging to the traditional system.

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3. BUSINESS IDEAS AND OPPORTUNITIES - WHERE DO THEY COME FROM?

- Changes in technology, legislation, society, marketing

- Variation of products – new benefits, various advantages offered to the consumer

- Competition: comparative advantages (favoured access to resources, lower costs, ability to imitate, unpleased clients, etc.)

- Personal qualities

- Niche positioning

- Knowledge, abilities obtained at the work place

- New ideas / innovation – quite rare.

It is interesting the fact 85% of the patents issued by OSIM (Romanian State Office for Inventions and Trademarks) are not protected. This means that patents are free for use. The patent literature all over the world is the most important source of technical/scientific information, with a high degree of novelty (maximum 18 months between the moment of submitting the patent requests and the issue moment).

4. HOW CAN A SMALL ELECTRONICS COMPANY ENTER THE GLOBAL VALUE CHAIN?

In R&D intensive sectors, with short lifecycles products and an innovative industrial climate, requiring high organizational flexibility, contractual understandings are preferred. The sub contracting is the main vehicle through which the companies externalize more and more products and services, forming alliances with suppliers and customers.

Lead firms in electronics industry concentrate on the creation, penetration and defense of markets for end products and increasingly the provision of services to go with them while manufacturing capacity is shifted out-of-house to globally operating turn-key suppliers.

The global network relies on codified inter-firm links promoted by the International Organizations for Standardization, making possible the transmission through electronic data exchange technologies of the specifications, directly to the design departments or to the machines and robots in the factories of the under contract producers.

If we analyze the lifecycle of the electronic products, we will notice that most of the value added on the value chain of the products is due to activities requiring high qualification. Most of the phases

before the transfer to the mass production belong to this category. From product concept to industrialization the maxim investments are in high qualified human resources.

5. PROJECT OBJECTIVES

The project objectives are to promote the entrepreneurial culture, to offer training, technical and technological support for enterprises and employees, to promote adaptability, entrepreneurship. Target group 8000 specialist involved in electronics industry

6. RESULTS

Although the implementation of this project is only at beginning, the first results are:

670 participants enrolled to various seminars, courses or consultancy for business, technological transfer.

1. Business and entrepreneurial courses – 51 participants

2. One Transnational Technology Transfer from Anubis Technology SRL Romania to "Softelligence" Mexico

3. Consultancy, technical and technological support for eleven SMEs:

- ACTANAV, private owned company, with target activity is the production of medical devices;

- Advanced Materials Development-AMD Initiative, private owned company, founded in 2007, having as core activity research in physics and natural science;

- S.C. ALMA ENGINEERING SRL, a “spin-off” entity, developed on experience, competence and pragmatic approach of the relationship between technical university education and economical environment, offering support services in research, development and engineering, innovative projects, including technological transfer. Technical and economic evaluation of the intangible assets, including patents, know-how;

- ATEC Net Systems S.R.L. founded in 2003, is a private company with Romanian capital. The company is part of the ATEC, group that activates

since 1993. The company has ISO 9001-2000 trust and its implementing the "TQM" (Total Quality Management) inside the group. ATEC activity domains: research and development of electronic systems and devices for the publicity domain (remote desktops for publicity); Audio-video electronic systems and telecommunication equipments, elevator industry, emergency communications;

- S.C. ELAROM SRL is a research and small production company, in wireless and medical equipments, systems for climatic factors monitoring, automated equipments;

- EXITRONIC - company was founded in 2008 and is producing light panels, with 10 mm thickness;

- L&G ADVICE SERV SRL, founded in 2006, specialized in IPC Training and certification programs (IPC-A-610, IPC-A-600, IPC J-STD-001, IPC-7711/7721, IPC/WHMA-A-620).

- NGL BUSINESS is a specialized in audio-video hi-tech home application and acoustic rooms;

- RADIO CONSULT SRL, with the following activities: hardware and software design and consulting for communications, digital signal processing for low and radio frequency signals, development of remote control applications for devices connected to computers.

- MERODE SOFT 2007 SRL, founded in 2007, software and data base applications.

- SC SUITCORP SRL is a company founded in 2007, the company develops electric and electronic products as well as custom phonic isolations applications based on clients demand.

4. Standards, training and certification, professional development - IPC-A-610D - Acceptability of Electronic Assemblies – 5 certified trainers.

5. E-learning technological courses Electronic Packaging, Embedded Systems, DFM, R&D Project Management will be released at end of September 2009.

All training programs will restart in October 2009, and all Romanian specialists in electronic engineering, entrepreneurs in electronic industry are invited to participate.

6. Campaign "Are you an Entrepreneurial Mind?" 582 participants answered the question: "Are you an entrepreneurial mind?" The results are:

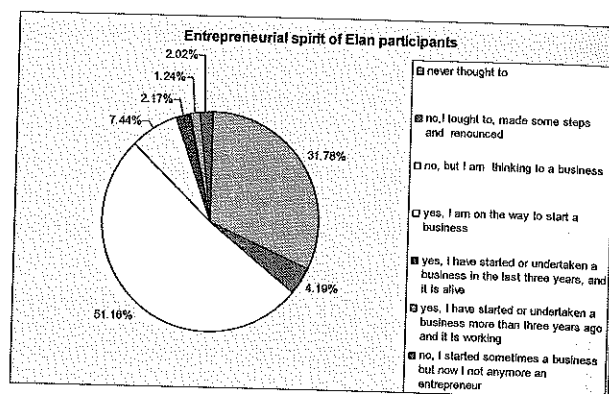


Fig. 1 Entrepreneurial spirit within ELAN project participants

Only 3.41% out of 596 participants have a business and only 1.24% of business is older than 3 years.

Integrating all this information it is about time for us to rethink our poverty alleviation strategy and replaced it with a wealth creation strategy. Wealth creation requires wealth creators. Wealth creators are producers, entrepreneurs. To have entrepreneurs, Romania must fostering or enhancing entrepreneurship or entrepreneurial spirit of its people since their childhood. With this wealth creation strategy, there would be more concern about the preservation of a country's wealth including its natural resources. There would be concern about enlarging its production base and about adding more value to what it has. This added value comes from new ideas that those entrepreneurs materialize. Romanian companies can start as suppliers for several integrators, but they also have the liberty to join different global value chains, and business lessons can also be learnt by Romanians. Romanian companies can survive as niche players, be it in regional or global niches.

Moreover, products and services need to be adjusted to the demands and preferences of the consumers, in the so called "glocalization". Having regard to clients' demands, new products, new processes and new markets can be created with 80% imitation and 20% innovation. The current context can be equally exploited by companies in small countries. It all depends on the entrepreneurial

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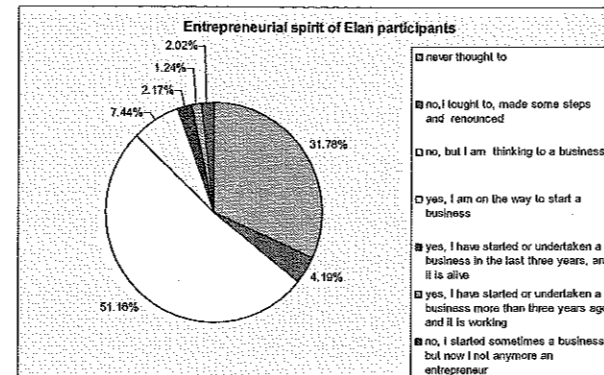


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education and spirit of the population. The best examples in this direction are Finland and Singapore.

One way for Romania is orientation towards creative industries. Attention should be paid to both the technological and the non-technological sectors of the innovative industries. According to the World Bank, 7% of the world's economy is covered by creative industries.

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