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Management Under the Sign of Value

The people were always preoccupied with the concept of value and the need to find a unique means to assess the value, whatever it was: salt, stones and metals – more or less precious – to mention just a few; ultimately, their common sense and practical experience converged to the concept of *money* as a mutually accepted measure of value associated with various, different things – in order to serve as a medium of exchange, to facilitate commercial transactions. Besides serving as a medium of exchange, money is also serving as a unit of account, and it functions as a store of value (retaining this value over time).

Anyway, it should be mentioned that money, as a measure of all things' value, appraises – cynically – even the peoples' health value, and their life value (this is exactly what the insurance companies do, and kind of business they run and make profits out of it)!

Debit and credit cards become more and more intelligent (so-called *smart cards*, in that sense of including technology). Electronic currencies (e-money) are supporting the booming global trade, shortening distances and durations. Currently, new information technologies – as *blockchain technology* – stimulate the advance of new types of e-money – as bitcoins, praised as a lot safer.

Looking for means to storing the value, people have extensively used various types of money (currencies), along with precious stones and metals (copper, silver, gold, platinum). In order to store larger values in smaller volumes and masses, rich people were and still are using fine artworks (paintings, sculptures, antique objects, jewelry etc.) In management terms, to maximize the value stored, one should decide on the optimum assortment of these elements, based on complex calculations of present and future values, market trends, and other factors.

Successful artists are keen about the copyright of their literary and other artistic works (like paintings, photographs, musical compositions, and alike) while successful entrepreneurs and business people equally value the tangible assets (real estate: properties consisting of pieces of land, with associated buildings, crops, plantations, mineral resources) as well as intangible assets – mostly technology intangibles (patents, software). Other examples of business intangible assets are: trademarks (legal name for brands), lists of customers, franchise agreements.





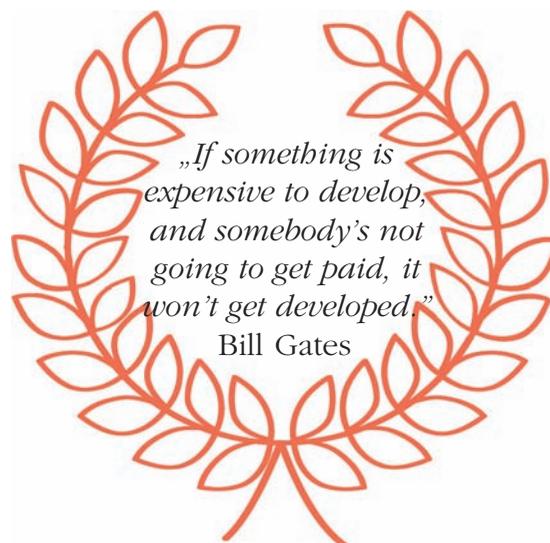
An important issue in valuing a company – subject to thorough research for many scholars – is appraising the value of its intellectual capital, which includes human capital, relational capital, structural capital (out of which *intellectual property* is just one component). When a company valuation is needed, in order to make a strategic decision (in cases of business mergers or acquisitions, for example), its value includes both tangible side and intangible side; in many cases – mostly high technology companies – the value of intangibles happens to be significantly higher.

In time, the understanding and laws on intellectual property have evolved, across territories; during the 19th century the term of ‘intellectual property’ was coined; ultimately, nowadays, the intellectual property laws are well established in Europe, North America as well as other parts of the world. Intellectual property markets and associated brokers are commonplace today.

In order to better manage the human capital and human capital talent, an accurate assessment is required. This is why many researchers set a special focus on measuring the human capital talent.

As far as assessing the relational capital, an increasing role is played by the explosive use of social networks. As an illustration, according to Bloomberg publications: „Facebook reported revenue of \$7.01 billion in the third quarter, a 56 percent increase from a year earlier. ... The company also said mobile-only monthly active users increased, surpassing 1 billion” (*Bloomberg Businessweek*, November 7 – November 13, 2016, p. 19); and „There are half a billion tweets a day. For Twitter, that’s a business opportunity” (*Bloomberg Businessweek*, October 31 – November 6, 2016, p. 50). This is the massive impact of the combined effect of networking capital and information value, linked to the trendy concept of ‘click monetization’!

Cezar Scarlat
Senior editor



*„If something is
expensive to develop,
and somebody’s not
going to get paid, it
won’t get developed.”*

Bill Gates

Multiculturalism Based on Moral Values

Sorin Ionescu, Florin Dănilache, Iuliana Grecu, Andrei Niculescu

University POLITEHNICA of Bucharest, Romania

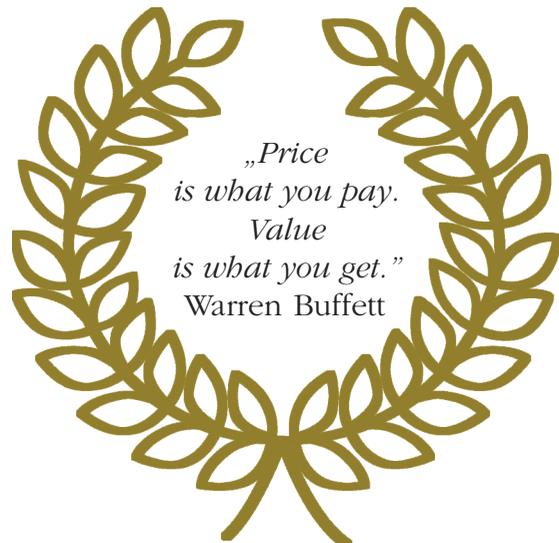
Abstract

The article analyzes how the foreign students adapt to the education system and daily life in Romania. First, it shows the attraction of Romanian universities for foreign students to attend graduate, masters and Ph.D. studies. Then it identifies some of the Romanian culture's particularities. Based on the responses to a questionnaire, the article identifies foreign students' opinion about how they are perceived by the Romanian colleagues and by the Romanian society in general. Likewise, the article identifies the Romanian students' opinion about their foreign colleagues. The paper also shows some changes that have been made in teaching to ensure the performance of all students, including the foreign ones.

Keywords: students, technical education, cultural adaptation

Introduction

Traditionally, higher education in Romania has a worldwide reputation as a center of excellence in learning, teaching and practice. Romanian universities and colleges have been receiving thousands and thousands of students from all over the world, especially from developing countries. Today, almost all Romanian universities are partners with thousands of well-known universities from all over the world. Romania has become one of the countries offering state-of-the-art facilities and cutting-edge research opportunities, together with the chance to walk in the footsteps of so many of the world's most influential thinkers.





Higher education institutions in Romania began to provide education services based on promoting international cooperation between universities, in order to respond to the requests coming from different industries. In these conditions there appeared a large number of educational offerings for students from different countries.

Romanian education was popular among foreign students, especially after World War II. Before this event, between 1850 and 1914, many Romanian students have studied in other European countries and afterward they have contributed in building up the Romanian education system, Romanian industry and culture. Today, when Romania is part of the European Union, it can be noticed an increased mobility among youngsters that decide to go abroad for studies in European or American universities.

The purpose of this article is to identify key aspects that represent an attraction for

foreign students to come to study in Romania. To identify these attractive factors, we have started our analysis with a range of studies which underlined the cultural particularities of the Romanian people.

Romanian Education System's Attractions

The Romanian higher education system comprises 48 public universities and 56 private universities. These universities include 536 faculties, with a total number of 620,529 students enrolled. Mention should be made that the data available do not allow for the identification of the accurate number of individuals enrolled in the Romanian universities, either public or private.

In 2014, 12000 foreign students were registered in Romania and in 2015 their number reached 21000. Most of them were coming from other European countries, especially from France, but 6100 foreign



students were from non-European countries. The number of foreign students registered for a bachelor degree is around 19.000, for a master degree is around 1000, and for Ph.D. around 1000. Foreign students have arrived also from Arabic countries; for example, there are around 1500 registered students from Tunisia and around 900 from Morocco.

The application file must be sent to higher education institutions in Romania by the 15th of September (for undergraduate and graduate studies), but there is no deadline for Ph.D. applications. International students have to prove good knowledge of the teaching language (English, French or German). For the students who do not meet this criterion, there are specialized departments where they can improve their language skills.

It is commonly believed that foreign students decide to attend the Romanian universities due the high quality of the education. There are also opinions that state that Romanian universities represent an attraction due to lower tuition fees in comparison with other European countries and also due to the low cost of living. Research has demonstrated that foreign students have chosen Romania to complete their education because the living costs in Romania are low, even though the trend is heading towards the European Union level; also universities tuition fees are smaller compared to other European countries (2300 Euro per year). There is also the possibility of getting hired in a multinational company at a wage similar to the ones in the European Union. In addition to this, the Romanian Government offers study scholarships to performing students. The annual budget for studying in Romania is €5500 (€4700 – living expenses, €300 for books, €500 for holidays/travel in Romania).

The majority of the foreign students enrolled in the medical universities, but other universities are also sought. For example, Politehnica University of Bucharest has around 27.000 students, of which 800 are foreign students enrolled for a bachelor, master and Ph.D. degree. From the total of 800 foreign students, 700 come from Arabic countries and Turkey.

Politehnica University of Bucharest is the oldest and most prestigious engineering university in Romania, with a tradition of over 190 years, accumulating the efforts of some of the greatest teachers of our nation. It defines its uniqueness by creating knowledge through research and technological innovation and by implementing it through education and vocational training at European level. Politehnica University boasts many years of academic excellence.

The studies in the Politehnica University of Bucharest can be taken in international languages at different faculties. For bachelor level, there are available studies in electronics and telecommunications engineering (in English, French, German), computers and information technology (in English, French), applied electronics (in German), mechanical engineering (in English, French, German), chemistry and engineering of organic chemicals, petroleum and coal chemistry (in English, French), materials engineering – materials science (in English, French), economical engineering for electrical, electronics and power engineering fields (in German), economical engineering for mechanical field (in German), aeronautics (in English).

For master level, there are available studies in business management (in English), biomedical informatics (in English), automatic translation technology (in French), business administration of industrial systems (in German), engineering and management



of industrial systems (in French), software engineering (in English), mechatronics and bionics technique and organization (in German), management digital enterprise (in English), artificial intelligence (in English), advanced microelectronics (in English).

Another attraction factor is represented by the certification/specialization/qualification programs offered by universities. Transferable qualifications aid mobility, making it easier for students to further study, to transfer achieved credits to other higher education institution or to launch a career. In order to facilitate and ensure that the recognition and transferability of higher education qualifications programs, Politehnica University of Bucharest developed and applied a number of instruments, among which: European Credit Transfer and Accumulation System (ECTS), the Diploma Supplement (DS), The European Quality Charter for Mobility, The European Qualifications Framework for Lifelong Learning (EQF), The ENIC Network (European Network of Information Centre on academic recognition and mobility), The NARIC Network (National Academic Recognition Information Centre).

The Romanian Culture's Particularities

From discussions with foreign and Romanian students resulted that Romanian people demonstrated kindness towards the foreign students that have come in Romania for studies. Nowadays Romanians are adapting to the European culture, but some cultural aspects have been formed over time and can not be ignored. The Romanian folklore, traditions, customs, mores, popular literature, classical literature, art, film, religion, nature, architecture added to the cultural particularities of the Romanian people. Opinions are quite divergent, but the Romanian peasants, which until 50 years ago used to represent the majority in the country, believe that one should be welcoming, tolerant and humane, instilling this belief to the general population.

It is true that different races have contributed to the Romanian people, some in a higher proportion such as Dacians, Romans and Slavs, and others in a smaller one, like Turkish. For example, Stănescu (2006) quoted Drăghicescu (1907) that stated in a classic book that the Scythians transmitted to the Romanians a strong will, a sharp mind and a nature that is lively, open to relations; on the other hand, they also transmitted some kind of guile, hypocrisy, duplicity. From Thracians, it has been inherited the sober character and some sort of guile and even the tendency to deceive. The Romans would have transmitted the forbearance, strong-willed character and sometimes choleric temperament. Slavs contributed with a sense of sociability, an exuberant enthusiasm, belief in superstitions. From the Turkish people, it is believed that Romanians acquired a certain carelessness, belief in destiny, in faith and luck and the lack of confidence in

themselves. From the experience of being in contact with the great empires that used to be across the borders, Draghicescu believes that came also the passivity, the resignation, the lack of offensive power and the defensive resistance practice. From these key cultural particularities resulted the heterogeneity of the Romanian people ethos.

As shown in the literature (Stănescu, 2006), the great Romanian philosopher Lucian Blaga believes that the geographical placement has influenced the Romanians' bodies and souls. The great French geographer de Marton noted that Romania's geography is an almost ideal space. Being sedentary and practicing agriculture to survive, the Romanians perceived that time passes in cycles. The great historian Vasile Parvan speaks about fatalism, melancholy, levity into action and about a shell where the soul retreats. The philosopher Constantin Noica noticed a serenity and a fear of change, a shepherd cosmic solitude. The writer Mircea Eliade noted that Romanians who were surrounded by great empires have adapted, and that they are neither pessimistic, nor passive, nor resigned. The sociologist Mihail Ralea believed that Romanians are essentially good, with no memory of the evil, they are not

infatuated and they exhibit passive adaptability resulting from the specific East passivity. Other scientists have noted the Romanians' tolerant and open character, no religious wars, and that the Christianity has profoundly influenced their lives.

The authors believe that these divergent characteristics belong to people of every nation. The historian Lucian Boia (1997) noted that one can say anything about the Romanians and about others as well, as the ethnic psychology is inconsistent as it has no scientific grounds. However, there is an eastern component in the Romanian culture.

In the present research, we've tried mostly to identify how foreign students are being accepted among the Romanian students. Taking as a reference Hofstede's theory (Hofstede, 1995), studies have been conducted in Romania to determine the cultural particularities. Culture is the „structure of thought and action, the mentality widespread in the environment” (Kelly, 2004). These aspects have been formed over time, depending on various factors: economic, political, social, geographical, demographic etc. Regarding the business culture, different business cultures differ (Hofstede, 1995) based on five criteria:



The image shows a large, three-dimensional white sign mounted on a light-colored wall. The sign spells out "Universitätsklinikum" in a bold, sans-serif font. The letters are raised and cast shadows on the wall behind them. In the background, a balcony with a metal railing is visible.



Power distance: shows the existing inequality. When the distance is small, the subordinate's dependence towards the leader is small; if the distance is small, people consider themselves equal and organizations are becoming decentralized. Having a big distance requires obedience.

The degree of individualism: individualism allows for personal freedom, personal achievement. Collectivism emphasizes group that protects the person in exchange for loyalty. In collectivist societies, man lives through the society; in the individualistic organizations, human involvement is small, what is more important is to satisfy individual needs.

The degree of masculinity: masculine societies seek performance, feminine societies seek prosperity. Masculinity is characterized by earnings, recognition, advancement, promotion; feminism by means of cooperation and security. In masculine societies, enterprises and managers are aggressive, disagreements are high. In the feminine societies, the pre-

dominant style is the democratic one, where the role of managers is moderate.

The uncertainty level: the need expressed by predetermined rules. Without them, there are stress, anxiety, irritation. In uncertainty tolerant societies, plans are developed for short term, while in intolerant societies each action is carefully planned.

Time management: businesses can be targeted for the long term when it promotes perseverance, thrift, savings, or for short-term, when it encourages initiative.

The Trampenaars model (Trampenaars, 1997) identifies the following characteristics of culture: universality/particularity (the emphasis is on rules or relationships), individualism/collectivism; emotionality/neutral (to display or to not display feelings); specific/diffuse (to make a difference or not between private and professional life); social status is acquired/purchased (obtained by achievement or by age, education); sequential/synchronous (simultaneous or successive events); internal/external control (it is believed that people can control their destiny or not).

Gallup Romania has conducted in 2005 a survey on the business culture in Romania and found a large power distance in management, collectivism, femininity, high uncertainty avoidance and a short-term orientation.

A recent research (Mușat, 2013) shows the following indicators for cultural characteristics (Figure 1): the power distance – 80, the degree of individualism – 30, the degree of masculinity – 42, tolerance to uncertainty – 90, long-term orientation – 52. The study also investigated the degree of indulgence which obtained the value 29.

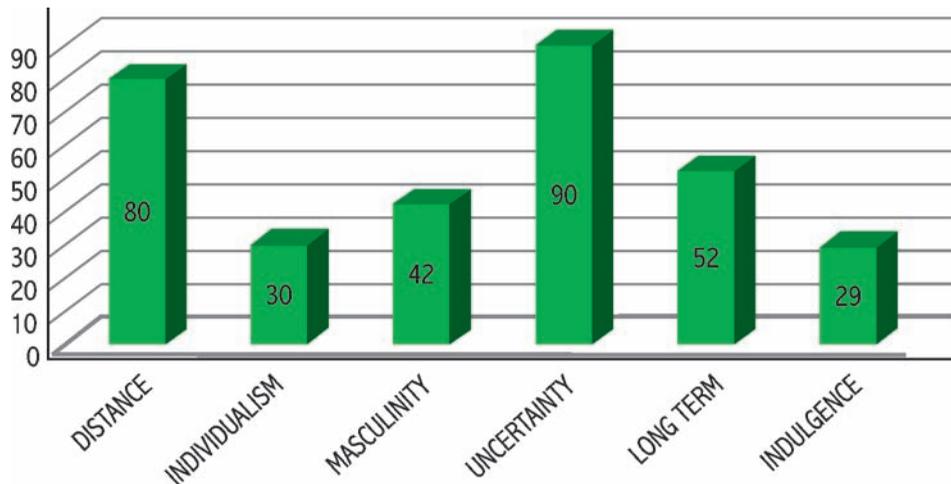


Figure 1 – *Cultural characteristics of the Romanians*

(Source: Muşat, 2013)

Research Methodology

The research sought to determine how foreign students adapt in Romania. It was conducted at the Engineering Faculty of the Politehnica University of Bucharest. In this faculty, classes are taught in foreign languages like German, English and French. The Engineering Faculty has 500 students enrolled for the bachelor degree and 150 students enrolled for the master degree. Out of the total number of student, 300 are foreign students.

In order to identify more accurately the relations between Romanian and foreign students, the research has been conducted over an entire year of study, namely the final year so the students knew each other for four years. Two questionnaires were developed, containing similar questions addressed to Romanian and foreign students. The sample encompassed 50 students that answered the questionnaire: 30 Romanians and 20 foreigners.

The questions referred to the following aspects:

1. The impact of the existence of mixed groups;
2. The existence of rivalries among students by forming mixed groups;

3. Relations between students;
4. Participation in joint activities outside teaching hours;
5. Consultation between students on preparing lessons;
6. Group unity;
7. Ease of adaptation to the Romanian cultural environment;
8. Interest of the foreign students in knowing the Romanian culture;
9. Knowledge the language in which courses are taught;
10. Knowledge of the technical language used at courses;
11. Adaptation to Romanian standards of behavior;
12. Existence of Romanian students' disturbing behaviors towards foreign students;
13. The level of knowledge of the Romanian language.

Foreign students have responded to two more issues:

14. If Romanians are talking about their country;
15. If teachers give responses to requests to clarify some issues being taught.

Relationships Between Students

From the answers given by foreign students, it was observed that they unanimously believe that they know well the teaching and technical language, they are interested to know Romanian culture, teachers respond to their wishes to clarify issues raised in courses and Romanian students do not manifest disturbing behaviors towards them.

Also, 90% of them believe that they have friendly relations with their Romanian colleagues, but they have learned from Romanian culture form a distinct entity. A percent

of 70% of them consider that the existence of mixed groups has a positive impact on their training, and they also consult Romanian students in clarifying certain aspects of the courses. They do not find it difficult to adapt to the environment and living conditions in Romania, they have learned Romanian language well, and they benefit from their Romanian colleagues speaking about Romania.

Figure 2 shows the Romanian students' opinion (**R**) and the opinion of foreign students (**F**) about the group unity, green showing a positive response:

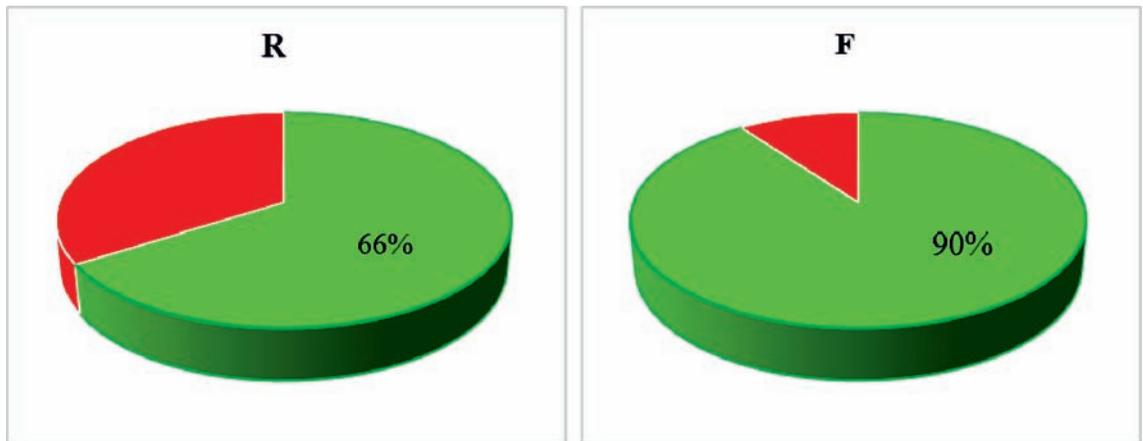


Figure 2 – *Unity of the group of students:*

a) *Opinion of Romanian students*

b) *Opinion of Foreign students*

Also, 50% of the respondents consider that there is an emulation between Romanian and foreigners to acquire education. The same percentage believes in participating in joint actions (Figure 3).

From the answers given by Romanian students, we can conclude that students unanimously considers that the foreign students adapt well in Romania, that cultural information is being exchanged between them and that foreigner students quickly learn Romanian.

It is noted that two thirds of the Romanian students consider that the existence of mixed groups has a positive impact in training, that students consult with each other while preparing their homework, that there is unity in the group and that foreign students are interested in knowing the Romanian culture.

However, two thirds of the Romanian students consider that there is no special emulation if foreign students are part of the group or not, that they do not participate

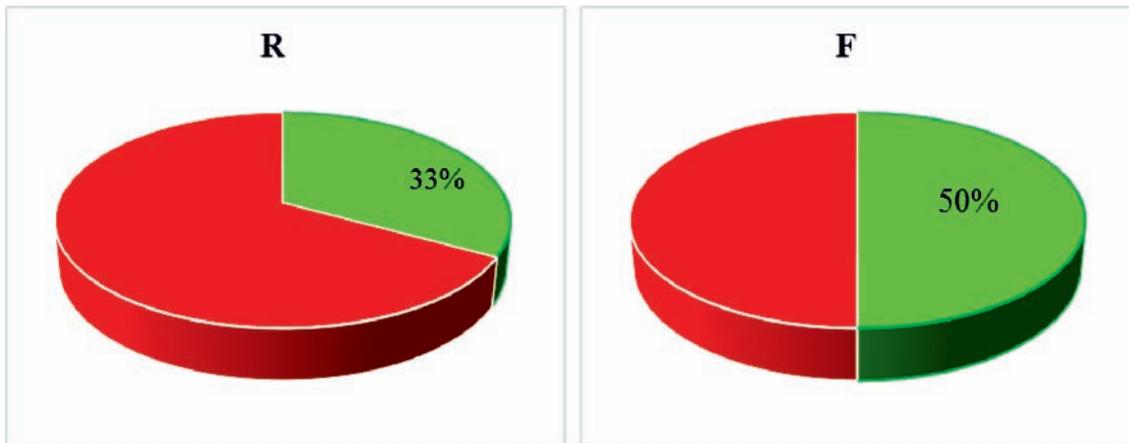


Figure 3 – *Emulation for teaching and joint actions:*
 a) *Opinion of Romanian students* b) *Opinion of Foreign students*

in common activities in their free time, and Romanian students' behaviors not disturb foreign students. Figure 4 shows that 33% of Romanian students believe that some of

their behaviors affect foreign students (red), but foreign students say they are not disturbed by Romanians' behaviors:

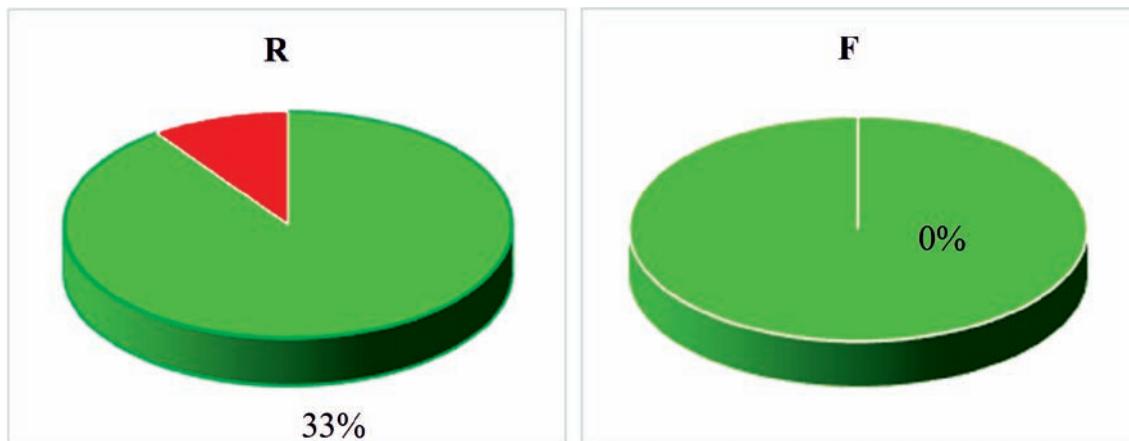


Figure 4 – *Degree of inconvenience pressed by the Romanian students' behavior towards the foreign students:*
 a) *Opinion of Romanian students* b) *Opinion of Foreign students*

Also, 85% of the Romanian students consider they have established friendly relationships with foreign students and that they have learned some aspects of the culture of the countries the foreign students come from. They also think that the foreign students speak to an acceptable level the

technical language used in courses and that their behavior is compliant and kind in our country.

In conclusion, Romanian students consider that foreign students adapt well to the conditions in Romania, both in terms of behavior and the Romanian language,

that friendly relationships are established and that they exchange cultural information. Regarding the educational process, there is a collaboration between them and they are not considered as separate entities. All being students, it is estimated that they know very well the language in which the education process is conducted.

It seems however that the friendship does not extend to the extra-curricular activities, although some Romanian students have responded that they went together with the foreign students to different conferences, they made visits to potential employers, they went to clubs, theaters and

concerts, doing sports and excursions together.

The study also compared students' opinions about their relations. The same proportion (66-70%) of students think that it is a beneficial thing that their learning group is a mixed one. Romanians feel emulation for teaching in 33% of the cases, while foreigners in 50% of the cases. The same percentage (80-90%) believe that relations between them are friendly, which helps for homework (66-70%). Romanians feel that foreigners easily adapt to the environment (90%), but only 70% of foreigners feel the same (Figure 5):

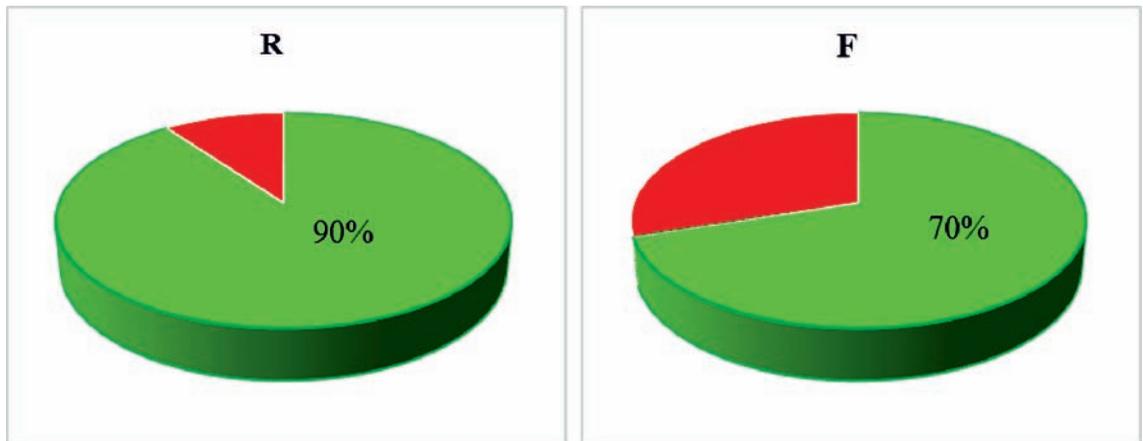


Figure 5 – *The easiness of adaptation of foreign students:*
 a) *Opinion of Romanian students* b) *Opinion of Foreign students*

In order to create a friendly social and learning environment to foreign students, Politehnica University of Bucharest provides the following supports: printed books and practice handbooks written in foreign languages, with specific indications for foreign students; e-books and practice handbooks written in foreign languages posted on the Faculty website (the Moodle platform); specialist advice for foreign students; attracting and motivating foreign students to participate in Annual Student Scientific

Sessions; tutorials for carrying out practical activities within multinational companies operating in Romania; facilitating participation in scientific conferences and congresses with technical profile; providing accommodation and participating in on-campus social activities.

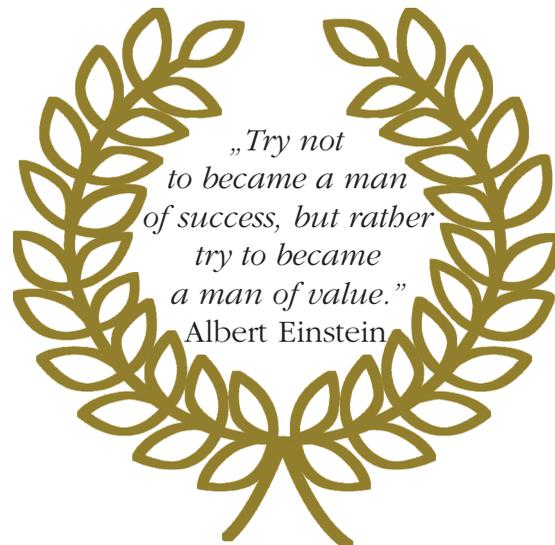
Conclusions

The study shows that foreign students are welcome in the Faculty of Engineering from Politehnica University of Bucharest.

Romanian students are friendly to their foreign fellows. There are no displayed differences between Romanian and foreign students, they are all considered to be peers with the same interest, pursuing training in engineering. This behavior is a consequence of the fact that Romania was at a crossroads of civilizations. At the same time, foreign students retain their cultural identity, as well as Romanian students.

Foreign students get the advantage of a wonderful blend of tradition and modernity, vitality and performance, along with traditional and new campuses at low cost. Also, studying at Politehnica University of Bucharest offers a unique cultural experience in a dynamic and multinational environment. Besides earning a world-class qualification, international students have the chance to learn new languages, get international intercultural skills that are of

great value to future employers and an essential advantage in a dynamic world, build friendship and professional networks lasting forever, travel and take practice or exchange studies in other countries.



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Sources of Funding for Entrepreneurship

Simona Nicolae

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Abstract

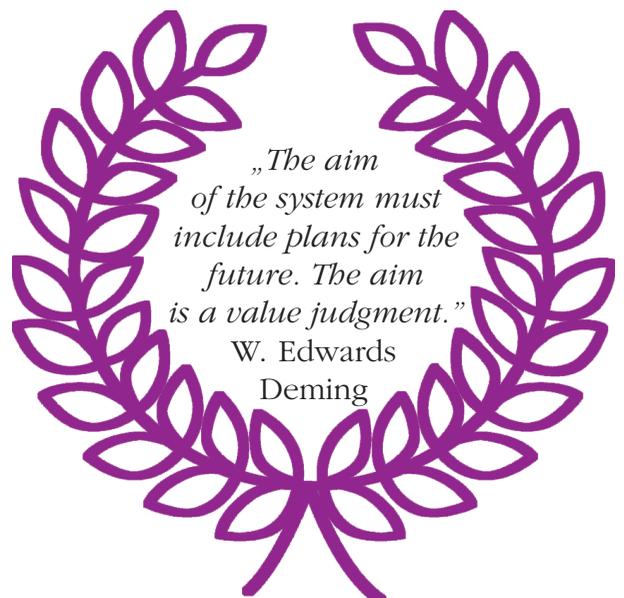
The present study aims to approach the main financial ways by which a young person in Romania can put into practice a business idea, in an organized and legally manner. Most often, youth is not an advantage when it comes to financial options in a business and may constitute an obstacle in starting projects at an early age. However, there are programs at a national and European level which encourage young people to start down the path of entrepreneurship. We consider useful to synthesize and present some of them as a measure of the opportunities that a young person in Romania has in transforming the potential values into real values.

Keywords: entrepreneurship, start-up, loan, finance

Introduction

Entrepreneurship took an increasing magnitude over the last few years and it is the field that, following IT, is marked by the most rapid and unexpected developments. The wave of the existing developments at the global level has also reached Romania, even if on a smaller scale. In a digitalized and changing environment, running a business has become a viable option for human resources, providing independence and progress.

Technology, like money, has infiltrated into the everyday life of human resource, separating and creating the sensation of power to connect all these individuals together in a network that is becoming more and more extensive. The socio-economic puzzle needs to be restored in order to



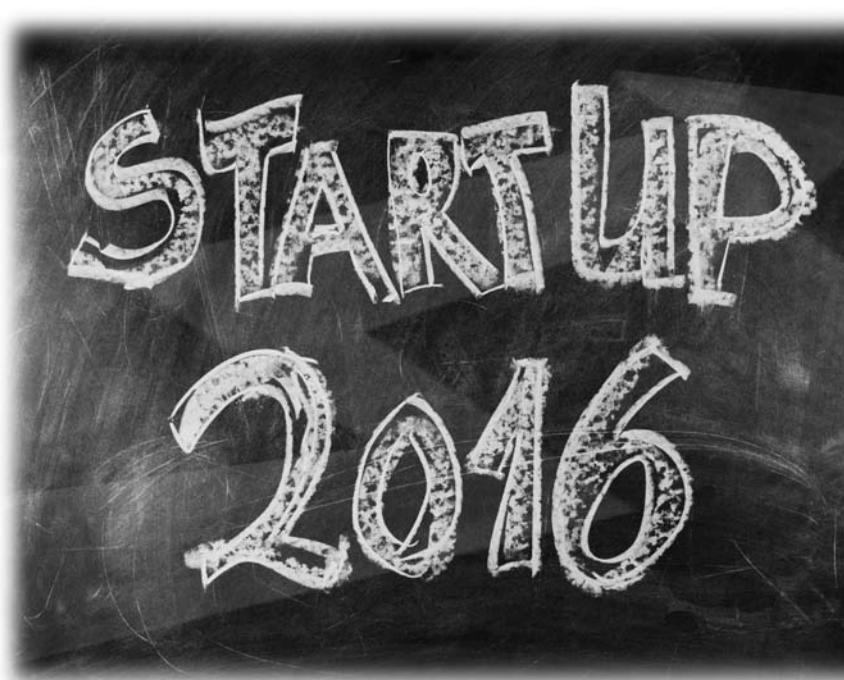
obtain a map that guides the actions of people towards a progress that is desired to be for everyone. Economy and society mean interaction and choice, even though nowadays they are carried out in a different way.

Homo oeconomicus and *Homo sociologicus* are currently intensifying the characteristics of each other in a way that escapes of our power of definition. What remains definable is what results from the pun that embraces both, *Homo ecologicus*, the human resource which should take care of the environment regardless of the economic and social decisions. As for the rest, nothing is predictable, or becomes extremely hardly predictable.

The entrepreneurship deals with this amazing rhythm of changes that affects all parts of our life. That's why we should pay a great attention to its evolution and that's why the subject should be considered very important.

Literature Review

As we have already mentioned, change is the middle name of entrepreneurship. Even if the financial environment in Romania is not the most user-friendly and stable, the number of businesses opened every year is growing. Even if due to fiscal legislation businesses cannot adapt to the impact of fiscal changes in a timely manner (Dumitru and Ionescu, 2015) an increasing number of young people dare to go down this road. Most of them see competition as the main obstacle to the development of their activity, followed by the lack of funds and expertise and bureaucracy (Nicolae, 2015). People inspired to undertake business activity by financial motives employ their own funds or loans more often – which they either have to



earn beforehand, or after the startup to repay the loans. Such perspective compels better planning and preparation of business plans (Staniewski *et al.*, 2016).

Early financial education followed by budgetary management during the tertiary education can help prevent the young entrepreneurs from failing. According to Ionescu (Ionescu, 2015) from the top management to the last hierarchical level of the company, the budgetary process must involve actively and honestly, everyone. Even if the performance of the business makes sense only if viewed from the perspective of each particular group interested in the company (Dumitru and Dumitru, 2009) this cannot be achieved in the absence of viable and affordable sources of financing. If there is a support from government or other sources, this can help people to reduce some risks and to enjoy better conditions to start a business. Nowadays, young people have various opportunities to improve their skills and get involved in entrepreneurship (Papulova and Papula, 2015).



Financial Opportunities for Startups

Satisfying needs „at one click distance” has determined a different approach to the way the value is created and, implicitly, of the way of organizing and running a business. Entrepreneurship in Romania is a topic of relatively recent analysis. The employment model is in constant change and for the young population aged 18-30 years it is becoming more and more an option for starting their social and economic life.

According to Gem 2014 National Report, Romania is an efficiency-driven economy meaning that the competitiveness is driven, among other factors, by higher education and training (GEM, 2014). The largest share of entrepreneurs in Romania is falling in the age range 25-44 years with a level of education certificated by a post-secondary degree or graduate experience. For those who have graduated high school, the percentage decreases from 33.8% in 2012, to 16.1% in 2014, taking into account that in this age category are also encountered those which choose entrepreneurship

from necessity and not necessarily from vocation.

In addition, the report highlights that in the economies with low GDP/inhabitant, the Total Entrepreneurial Activity (TEA) rate tends to be high, with a large share of necessity-driven entrepreneurship. However, among efficiency-driven economies Romania occupies the third place after Croatia and Poland, in the category of necessity-driven early-stage entrepreneurs, and the first place in the category of entrepreneurial intentions and young business entrepreneurs (GEM, 2014).

Even if entrepreneurship is an option primarily for those who have a higher level of education, we believe that the topic should also be related to a category of human resources which will become dominant in Romania within a maximum of 10 years, namely people in the range of 18-30 years: young people who didn't graduate secondary studies. The analysis of this age category, as well as its relationship with the entrepreneurial environment can be the subject of future analyses with promising conclusions.

Starting a business requires funds and the access to financial channels in Romania for young entrepreneurs is a measure of chances of spreading this sector in our country. In what follows, we'll present the main financial ways through which a young person, regardless of its level of education, can access funds and can build an entrepreneurial company.

We have identified four such sources of finance for the entrepreneurial attempts: the opportunities offered through national programs, the bank loans, the EU funds and the business angels. Only the first two will be more thoroughly presented below. The main arguments for choosing these two main ways are as follows:

- Presenting the main national sources of financing is important in order to emphasize the degree of encouragement of this area in Romania;
- Financing through business angels is difficult to quantify at this time in Romania as it is addressed to business ideas that „promise” success. Necessity-driven entrepreneurship doesn't usually make the object of such a financing source, unless the business idea is significantly valuable from the profit point of view. The only issues that were highlighted in connection with this type of financing are those caught in the GEM 2014 report according to which „informal investors are identified in the GEM countries by asking every respondent if they had made a recent informal investment in a business startup that was not their own. In Romania, 3.52% of the adult population responded affirmatively to this question in 2014, which is the third value among the efficiency-driven economies from the European Union” (GEM, 2014).

The Opportunities Offered Through National Programs

In Romania, at a national level, there is a type of financial aid called „*de minimis*”. It constitutes a support measure granted

to an enterprise, regardless its size, which does not exceed 200,000 EUR over a period of three fiscal years (100,000 EUR for any enterprise operating in the transport sector). For the purpose of aggregation in calculating the limit, it is considered only the aid granted on the basis of the „*de minimis*” regulation in the past two fiscal years and the current fiscal year.

According to the Romanian Ministry of Economy, Commerce and Business Environment, in the period March-April 2016, the Department for SMEs through the Business Policy Directorate has carried out six information sessions regarding the first four national funding programs, starting in April of this year (2016): The Trade and Services Market Program, The Woman-Manager Program, The SRL-D (Beginner) Program and The Fair for SMEs. Along with these four programs, in Romania are also operational The National Multiannual Program for the Establishment and Development of SMEs in Rural Areas and the START Program for the development of entrepreneurial skills among young people and for the facilitation of access to finance. Of these six programs, only four can be considered to be of a real interest for those who wish to engage in business and are at the beginning of the road, which will be further analyzed.

The Woman – Manager Program

This program finances the implementation of best business plans submitted by women entrepreneurs. The amount of the financial allocation grants is up to 90% of the total amount of the eligible expenditure (excluding VAT) and may not exceed the amount of 41500 EUR. Under this program can participate: small businesses, freelancers, sole proprietorships (SP) having no more than 3 years from the registration at



the Trade Registry Office having no debt at the consolidated general budget or local budgets.

At least one of the associates must be female and hold more than 50% of the shares of the company in the case of micro-enterprise, or the representative of SP or Freelancer engaged in economic activities must be female. Within the first three years of the program, the number of projects submitted has increased from 81 in 2013 to 219 in 2015, which shows a growing interest in this type of opportunities among the targeted category. Unfortunately, the available funds do not keep up with this growing demand, the financed projects being at the level of about 36.3% (28 out of 77) in 2013 and 12.4% (27 out of 219) in 2015 (until November).

The SRL-D (Beginner) Program

The declared goal of this program is to stimulate the creation of new small businesses, increase access to potential funding sources and develop entrepreneurial

skills of young people, with the aim of involving them in economic structures. The main types of facilities for the micro company SRL-D are as follows:

- a) Grants by the Department for SMEs, Business and Tourism, a non-refundable financial allowance representing not more than 50% (not more than 10000 EUR – equivalent in lei) out of the total amount of eligible expenses included in the business plan, proving the sources of co-financing;
- b) Guarantees provided by the National Fund for Loans Guarantees for Small and Medium Enterprises, for loans contracted by the SRL-D up to a maximum of 80% of the loan amount requested, within the limit of 80000 EUR (equivalent in lei);
- c) Exemption from social insurance contributions of the employers, according to the law, for revenues related to the work of not more than 4 (four) employees hired for an indefinite period;
- d) Exemption from payment of registration fees for the company.

The persons which can benefit from the provisions of the program are: individuals, referred to as novice entrepreneurs that meet cumulatively from the date of enrollment in the program the following eligibility criteria: have full legal capacity, the age is up to 35 years, have never owned and do not have the shareholder or the member status of an enterprise established in the European Economic Area; establish for the first time a company with liability insurance; have not previously benefited of funding under this Program.

For enrollment in the Program, the micro company founded by a debutante entrepreneur must meet the following conditions on a cumulative basis:



- the company is a limited-debutante one (SRL-D), who works for an indefinite period under the law No. 31/1990 and the Emergency Ordinance nr. 6 of 02.09.2011;
- it falls the category of micro-enterprises;
- it is set up by a debutante entrepreneur as the sole shareholder, or a maximum of 5 (five) debutante entrepreneur associates. The conditions for the debutante entrepreneur must be met by each of the associates;
- it is managed by the sole member, or one or more administrators from the associates;
- has as an object of activity of no more than 5 (five) groups of activity provided in the National Classification of Activities from the Economy (NCAE Rev 2).

Figure 1 presents the evolution of the number of registered SRL-D companies in the period 2013 – March 2016. As it can be observed, there is an important growing trend regarding this type of business, the number of established companies increasing from 11005 in 2013 to 29016 in March 2016.

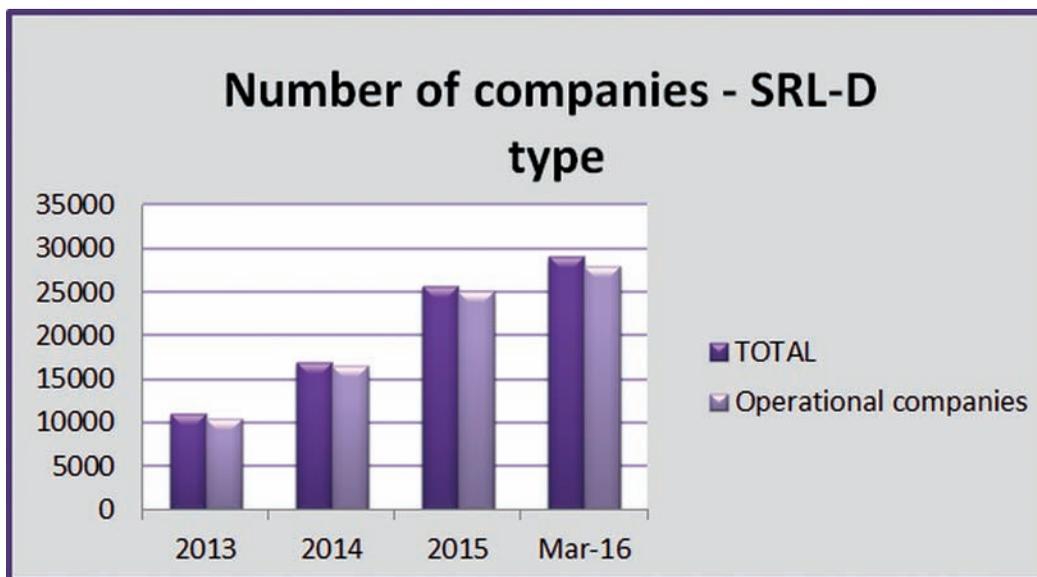


Figure 1 – Number of companies SRL-D

(Source: www.onrc.ro and author's calculus)

The START Program

This Program financed the implementation of business plans under the following conditions:

- Non-refundable Financial Allowances (NFA) represents maximum 90% of the amount of eligible expenses of the project, but no more than 120000 EUR;
- The personal contribution of the entrepreneur must be at least 10% of the eligible expenditures of the project. The

budget for the *de minimis* scheme in 2016 was 17000000 lei. Through its implementation it financed beneficiaries in 2016.

The companies that can benefit from the program must meet cumulatively from the date submitting the online business plan, the following eligibility criteria: they are organized on the basis of law No. 31/1990 and on the basis of the Emergency Ordinance nr. 6/2011; they are SMEs; they



are considered autonomous enterprises, partner enterprises, linked or single; they have full private capital; they have not received financial grants under this program in the previous years; they are registered at the Trade Register Office, have their headquarters and operate on Romanian territory; their CAEN code is eligible under this program; they have a maximum of 2 years from the registration at the Trade Registry Office; have no debt to the general consolidated budget and to the local budgets; they have not exceeded the *de minimis* aid.

The National Program for Rural Areas

The main objective of the *de minimis* scheme is stimulating and supporting the founding and the development of the economic private structures set up in rural areas by increasing the number of jobs and SMEs in rural areas, facilitating the access of SMEs established in rural areas to sources of funding, in the context of reducing economic discrepancies between urban and rural areas. The *de minimis* scheme budget for the year 2016 was 25,900,000 lei. Through its implementation in 2016 a number of 207 beneficiaries were funded, with an aid of approx. 125,121 lei per beneficiary.

The companies that can benefit from the program are trading companies, cooperative societies, including mixed artisan cooperatives societies, authorized individuals

performing economic activities independently and family businesses. They have to meet cumulatively the following eligibility criteria from the date of submitting the online business plan: they are SMEs; they have private capital; they have their headquarters and working point(s) in rural areas. Associates, shareholders or managers who have more companies may apply under this program only with one company; they are registered at the Trade Register Office and carry out activities on the Romanian territory; their CAEN code is eligible under this program; they have no more than 5 years from the registration at the Trade Registry Office at the time of submitting the electronic application for the business plan; they do not have debts to the consolidated general budget and to local budgets, for both the head office and all working points; they reinvest a minimum of 30% of their annual profit for a period of 3 years starting with the next year after receiving the financial grants; they hire a minimum one employee and they do not exceed the *de minimis* aid.

The Opportunities Offered by Banks

Bank loans are a very difficultly accessible form of funding at the beginning of running a business. In our analysis, we stopped at showcasing the funding opportunities offered to the companies by the

top 10 banks from the Romanian banking system (start-ups or companies with less than one year of functioning). As we shall see, these bank loans cannot constitute the basis of financing in early-stage projects, but rather serve to complete the necessary funds for launching the projects financed through national or EU Programs. The top ten banks in the Romanian banking system in 2015 by market share were: BCR, BRD, Transilvania Bank, Raiffeisen Bank, Unicredit Ţiriac, CEC Bank, ING Bank, Alpha Bank, Bancpost, Piraeus Bank.

Romanian Commercial Bank (BCR).

BCR grants co-financing for projects financed through EU funds. According to the bank's website (bcr.ro), the programs in which the bank is involved and can partially fund new or „young” enterprises are:

- *Credit subsidy APIA (Agency for Payments and Intervention in Agriculture)*. Features: is intended for financing the necessary working capital for carrying out the current activities, up to the moment of actual payments made by the APIA; eligible beneficiaries may be corporate or micro clients, PFA, individual enterprises, family enterprises, other legal beneficiaries of APIA subsidies/national transitional aid which own a collateral deposit account assigned in favor of the Bank where is going to collect the

amounts relating to the subsidies; they carried out activities in the agricultural sector for at least 12 months preceding the loan request; the loan can be a maximum of 80%-90% of the amount receivable from APIA, depending on the applicable convention signed between BCR and APIA.

- *Loans from the EIB (European Investment Bank)*. Features: financing current activity and investment projects; loan period: minimum 2 years; eligible beneficiaries: SMEs, large enterprises and municipalities/other public entities; the maximum value of the EIB loan for SMEs and large enterprises implementing projects of not more than 25 mils. EUR can be a maximum of 100% of the loan amount offered by BCR – without exceeding 12.5 mils. EUR, If the project also benefits from EU subsidies or EIB funds/other EU sources, the loan may cover up to 100% of eligible project costs, depending on the category of the beneficiary and the size of the project.
- *Funding projects (non-refundable funds)*. It is intended for: pre-financing and co-financing of eligible and ineligible expenses within grants; guaranteeing certain obligations regarding the implementation of grants; certifying the financial capacity of the client in terms of project implementation.





Romanian Development Bank (BRD).

According to the bank's website (www.brd.ro), the Credit for Investments completes the company's financial sources when they are insufficient for the realization of the investment plans of the company.

- *The Credit for Investment.* Features: financing 75% of the investment value; extended credit period of up to 10 years depending on the financed object; grace period up to 24 months. Through the investment credit can be funded: the acquisition of new equipment for the expansion or modernization of the production line; the acquisition or the construction of buildings intended for carrying out the activities of the company; renovation/modernization/expansion of the real estate; refinancing loans from other banks; refinancing investments made from the company's own sources (in the case of investment projects started not more than 12 months in advance from the loan request date); the main guarantee is financed through the investment itself, supplemented by the structure of the available customer warranties, including the warranties issued by guarantee funds.

Transilvania Bank (TB). It grants a wide range of loans for SMEs, but the beneficiaries must have worked a minimum period of 12 to 18 months, during which they have proved their effectiveness. Transilvania Bank offers to SMEs both credit lines (24 months) and credits for periods ranging between 60 and 120 months, depending on the value and the existence of guarantees. The main imposed conditions are: the company worked for at least 18 months, or for 12 months if it conducted its activity through accounts opened at TB; it records the operating profit; the company has no active records in the Central of Payment Incidents and is allowed to issue bank checks; the company does not register any suspended account; the company is financially stable. Additionally, TB provides co-financing for EU projects for which offer the following tools:

- For starting the project: Letter of comfort – requested by the Authority of Management, at the time of application for funding, or for a specified period from the date of notification regarding the project approval, for proving the financial stability of the company and the source of co-financing of the project; Letter of bank guarantee.
- For project implementation: Bridge Loan (non-reimbursable funding) to ensure the start and the implementation of the investment until the payment of the non-refundable sums; Credit for investments, which ensure the company's contribution to the project; Short-term loans for financing VAT.
- For working capital: In support of the current activity of the company after the implementation of the investment.

Agency for Payments and Intervention in Agriculture (APIA) Loan.

For an individual, the maximum amount of the loan is 90% of the subsidy receivable from APIA. Duration of loan: up to the payment of the subsidy by APIA. The way of reimbursement: reimbursement of the loan (principal and interest) will be made in full at the time of payment made by APIA. Interest rate: variable, $6M+3,75pp$, currently 6,480%. The interest rate is updated on a quarterly basis. For companies, the maximum amount of loan is maximum 90% of the subsidy receivable from APIA. The duration of loan is up to the payment of the subsidy by APIA. The minimum loan is 4000 lei.

Raiffeisen Bank. The loan products offered by Raiffeisen Bank are intended for firms wishing to develop their activity, the start-ups not being the target clients of this bank. For companies that have at least one year of existence there are available the following products:

- *Investment loan for SMEs* – intended for the acquisition of property, real estate, cars, equipment, refinancing the investments previously made. It requires the existence of the following warranties: real estate mortgage on the current accounts, personal guaranty, real estate/securities in accordance with the regulations of Bank.
- *Flexi SMEs Credit* – it may be intended for the following purposes: investments without advance, construction, renovation etc. It requires the existence of the same guarantees.

CEC Bank. It offers two types of loans that may be sources of funding for newly established companies. These are:

- *Credit for investments.* Destination of credit: the achievement of new goals and/or production capacities; completion of works relating to the investment objectives and/or manufacturing capabilities already started; development, upgrading and/or re-engineering of the investment objectives, production capacity, equipment, machines and installations, buildings and existing constructions; purchase of machinery, transport vehicles, equipment; the acquisition of buildings, constructions, production units etc.; the acquisition, development and modernization of customer activity spaces etc.; purchase of production, reproduction and work animals; setting up of wine-growing and fruit plantations or other species; refinancing loans contracted from other financial institutions; financing the expenditure relating to staff training in the case of commissioning of new investments.

Eligible customers can be any legal entity that meets the eligibility criteria established by the Bank. They are based on the absence of debts to the bank or State budget and do not require a minimum period



of existence of the company. Loan period: minimum 6 months, maximum 10 years; loan amount: maximum 85% of the total value of the investment; own contribution: minimum 15% (can be made in cash or in kind); warranties: any warranties or a mix of the guarantees accepted by the Bank.

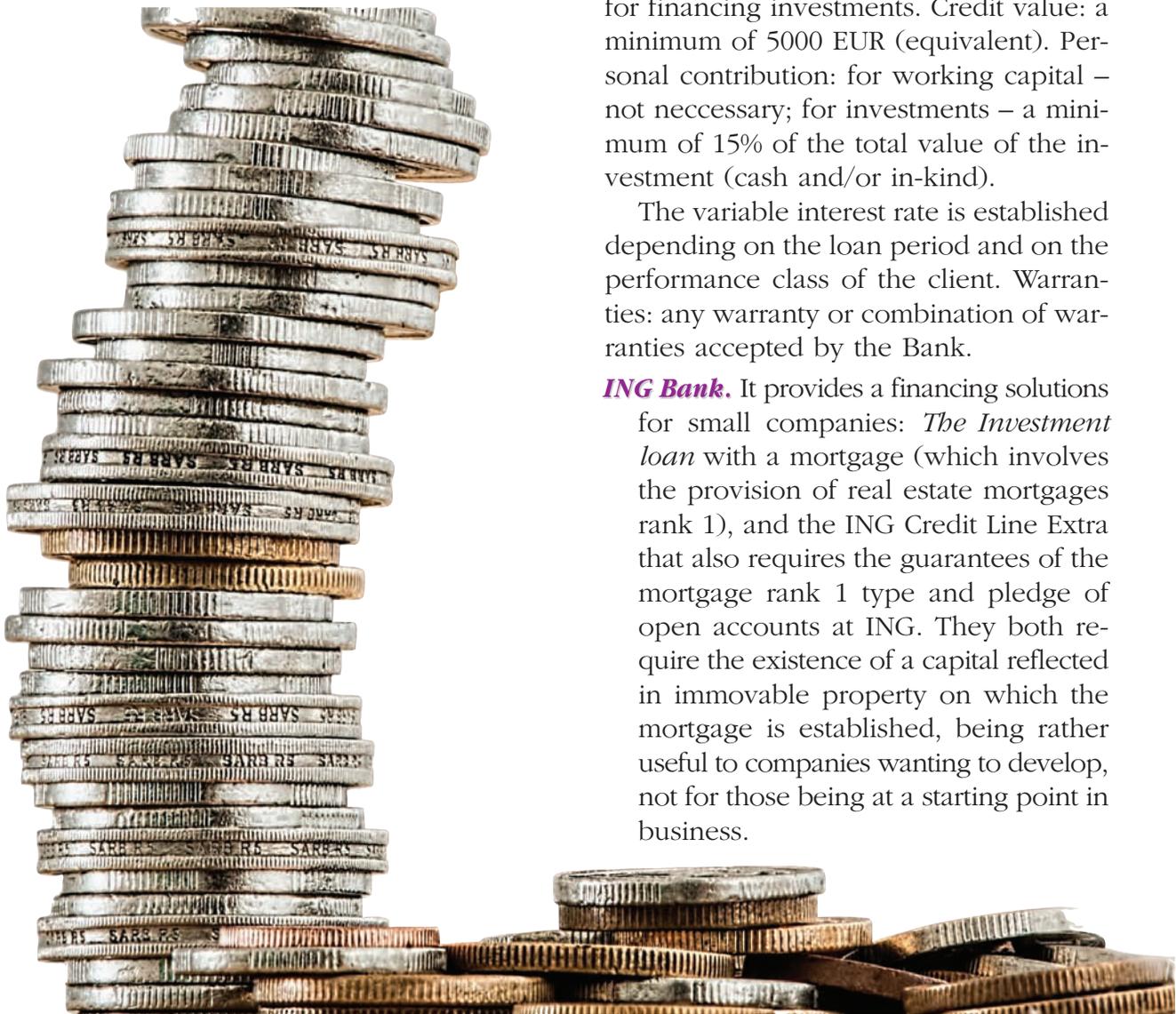
- **Independent Loan. Eligible clients can be:** authorized individuals, individual agricultural producers and individuals (or associations without legal personality) which carry out activities practicing a liberal profession without

making part of an associative form with legal personality, that fit into any of the following categories: lawyer, legal adviser, public notary, physician, veterinarian, pharmacist, nurse, chartered accountant etc.

Destination of credit: financing working capital (credit line) or financing investment for purchasing equipment, furniture, vehicles; buying activity areas; modernization of headquarters; purchase of land etc., refinancing loans contracted from other financial institutions. Loan duration: 12 months for financing working capital, 60 months for financing investments. Credit value: a minimum of 5000 EUR (equivalent). Personal contribution: for working capital – not necessary; for investments – a minimum of 15% of the total value of the investment (cash and/or in-kind).

The variable interest rate is established depending on the loan period and on the performance class of the client. Warranties: any warranty or combination of warranties accepted by the Bank.

ING Bank. It provides a financing solutions for small companies: *The Investment loan* with a mortgage (which involves the provision of real estate mortgages rank 1), and the ING Credit Line Extra that also requires the guarantees of the mortgage rank 1 type and pledge of open accounts at ING. They both require the existence of a capital reflected in immovable property on which the mortgage is established, being rather useful to companies wanting to develop, not for those being at a starting point in business.



Bancpost. The facilities can be used to cover operational and development needs of the business and can finance the purchase of equipment (both new and used) necessary for its activities.

- *The credit for business.* This loan allows the purchasing of products and services in favorable conditions, the financing of unforeseen operational expenditure, improving liquidity in case of activities with seasonality etc. The beneficiaries are small enterprises with an annual turnover of up to 2,000,000 EUR and individual entrepreneurs. Features: amounts of up to the equivalent of 250,000 EUR; the duration of the loan is not more than 5 years; granting through a current account in RON, in one or more installments; refunding by equal installments of principal and monthly payments of interest or equal installments (principal + interest) monthly or quarterly. Price structure: loan interest rate according to the Bank's interests policy; commission for approval, modification, management and early refunding of the loan; the cost of the evaluation report.
- *The loan for equipment.* The beneficiaries are small enterprises with an annual turnover of up to 2,000,000 EUR and individual entrepreneurs. Features: amounts up to 125,000 EUR; the duration of the credit is up to 7 years; equal monthly repayment in installments of principal and interest calculated at the balance, with monthly payment or equal installments (principal + interest) on a monthly basis; grace period of up to 6 months from the date of first use, with monthly payment of interest during the grace period. Price structure: loan interest rate according to the Bank's interests'

policy; commission for approval, modification, management and early refunding of the loan; cost of the evaluation report.

The other banks previously mentioned offer different business development solutions, more or less favorable, but which are not suitable for launching new projects without a financial background and proven efficiency.

Conclusions

Funding sources often represent the most important obstacle for a young person who wants to start on the entrepreneurship way. Financing solutions, even if they are seemingly varied, imply costs that a young entrepreneur cannot afford and affect his enthusiasm and courage to go ahead. The two financing solutions that we have analyzed in this article are meant to present how the public or private institutions from Romania understand to encourage this sector. The conclusions resulting from the analysis are as follows...

At the national level, there is a growing interest for the establishment of new companies through financing start-up programs. By 2015 their number more than doubled (+134%) as compared to 2013. This evolution has taken place given that the total number of individuals and legal entities registered decreased with 18,5% in 2014 as compared to 2013 and with 10% in 2015 as compared to 2013.

The funds offered through the national financing programs are often insufficient in comparison with the number of persons wishing to initiate a business. A good example of this is the number of increasingly more projects submitted in the framework of the „Woman-Manager” Program, projects

that will receive funding in an increasing proportion.

The banking sector provides financing solutions, but they are intended for the development of business projects, rather than for the initiation of them. At the same time, the costs and guarantees involved are not encouraging for young entrepreneurs. The only areas in which they are really useful are those in which the risks are greatly diminished by engaging in activities of

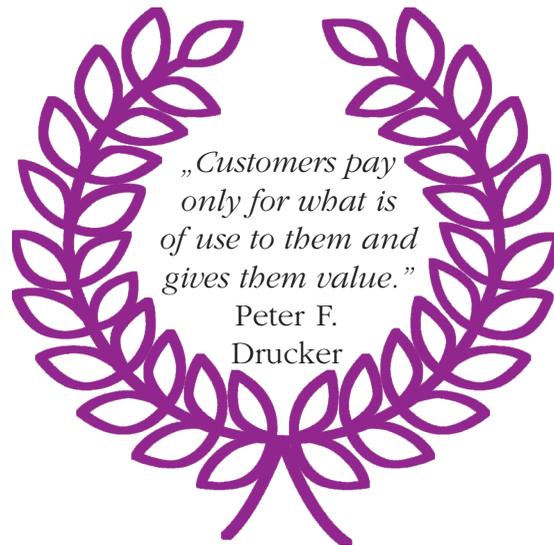
co-financing national or European projects. A business idea which has been accepted in a European project is a guarantee for any bank for the viability and effectiveness of that business.

The final conclusion which emerges from the present analysis is that from the financial point of view, entrepreneurship is a thinly encouraged field in Romania, even if it appears, at the declarative level, as a national priority.

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Generating Value Through Partnerships

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Abstract

This paper deals with the often debated topic of improving the level of collaboration between universities and industry. The analysis focuses on the situation in technical fields – automation, applied information science and control in industry. The paper describes the weak points at Czech universities with respect to contractual research, transfer of innovations to industry and preparation of graduates for work.

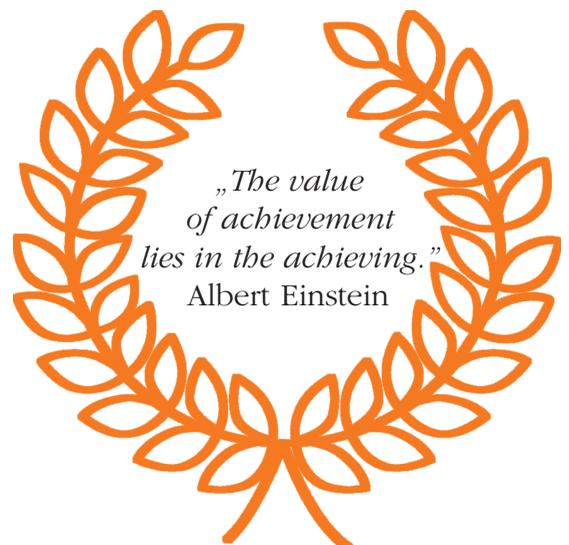
Keywords: contractual research, innovation path, EARN project

Introduction

When compared to other countries, the interlink between research and commerce in technical fields in the Czech Republic is not so extensive. The research potential of universities and their resources are not utilized to the extent they could be. Collaboration is usually not conceptually managed; individual worksites (departments, institutes, faculties) implement their own procedures. Another problem is the insufficient management of administrative procedures – numerous activities are done in an „everybody does everything” way. The analysis of the relationship between universities and industry focuses on three areas: contractual research; transfer of innovations to commercial products; preparation of graduates for their commercial application.

In the case contractual research the initiative is with the companies – they com-

mission the research assignments, they are interested in collaboration whether in the form of measurements, utilization of laboratories or equipment, or in more extensive and long-term research collaboration.



The second area – transfer of innovations – is an opposite process. The result of research at universities is a new or innovated product, service, methodology, procedure, and the university looks for a way to apply such results in industry and commerce. With respect to the preparation of graduates, the problem is the fact that graduates do not have the necessary know-how and skills which companies expect and require of their employees.

Problems of Contractual Research

Collaboration of industry and universities can be divided into the following categories: specific research assignments commissioned by companies; utilization of university resources (performance of various measurements, tests, utilization of laboratories and apparatus, performance of simulations, etc.); solving of partial assignments, alternative solutions and models for companies in the form of thesis works, internal student grants or semestral projects.

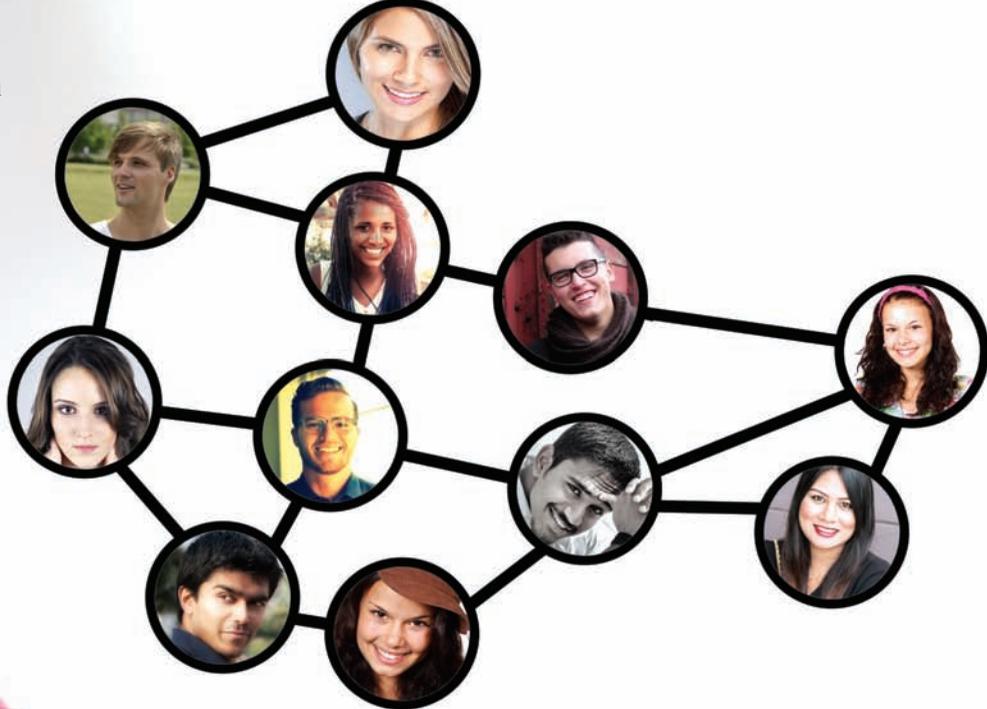
The main problem in this area is the different work philosophy at universities and industry and, therefore, dissimilar expectations from potential collaboration. Companies expect quick solutions to critical problems from contractual research (companies solve simple problems using their own resources). The notion of some companies that these activities will be cheaply and quickly provided for in the form of semestral projects or graduates' theses is a big misconception. On the other hand, university staff is usually very busy with the pedagogical work, research activities, formalization of conclusions and administrative-technical work. Therefore, it is not realistic for them to dedicate all their time, over a longer period, to a single project. Long-term projects, which adapt to the internal working organization (acade-

mic year schedule), are more suitable for universities.

Complicated administration of collaboration also poses a complication for the development of collaboration between a university and industry. The complex administrative process often deters parties from joint projects. The calculation and scope of overhead costs on the part of the university is a significant aspect in itself. The current situation means that project involving the purchase of a larger quantity of equipment and material are becoming unfeasible when overhead costs are calculated from the total amount of the contractual research and not from generated income (after deducting project costs).

Another major drawback for effective university-industry collaboration is the fact that there is no central database of university resources (available equipment, laboratory apparatus, devices, know-how and responsible and contact persons). At a global school level, there is no clear definition of procedures, responsible persons, methods of funding etc. Each university is trying to solve this problem, there are various local databases, and even whole university projects, but there is no conceptual ap-





proach and a common source for searching (publishing) information. The process of how to proceed if a commercial entity is interested in collaborating with a university (who should be contacted) is often not established and elaborated. Therefore, the university's potential may remain unexploited for the simple reason of a missing suitable contact person.

Another problem is the funding of research projects, where public research funding is available, but companies often cannot effectively use these resources. An example of cooperation where the university processed financing capacities of suitable operational programs under the EU Structural Funds for industrial enterprises is mentioned by Kušnierz (2011). Kozel (2012) describes the project where a company won the Moravian-Silesian Region innovation voucher and a university prepared a business plan focused primarily on information and system support (using the Internet and social networking for further communication between the company and its target groups). Examples of successful implementation of contract research in the field of electrical measurement and automation are shown by Kolář (2013, 2014). Other ex-

amples of contractual research cooperation between universities and industry are the SWOT analysis for Ostrava Leoš Janáček Airport described by Matušková (2014) or the Academic – Industrial Cooperation in ICT depicted by Minister (2014, 2015).

Transfer of Innovations from Universities to the Industry

During the transfer of innovations to commercial applications, the difference to contractual research is that the initiative is on the part of the university. The result of academic staff work or research project solution is a new invention, patent, innovation, methodology, prototype, applied solution. However, even the most brilliant discovery or invention will not turn into a commercially applicable solution by itself. Even in this area, there are processes which are more and less successful.

There is a difference between innovation and invention. Innovation exploits new ideas leading to the creation of a new product, process or service. The invention is useful only for the inventor. Invention transforms into innovation if the invention improves some product, process or service.

At the VŠB-Technical University of Ostrava, there is support for sourcing and transfer of innovations at the whole university level (Innovations Support Centre). However, many university staff has little or no knowledge of how to use this support and what procedures are used to transfer innovations to the industry. Recently, at the VŠB-Technical University of Ostrava, Institute of Economics and Control Systems was involved in solving the EARN international research project (European Automation Resource Network, 2011-2014), which, amongst others, included mapping of the chain of transfer of innovations to industry at various universities. The main project coordinator was the university JAMK Jyväskylä, Finland. Besides the VŠB-Technical University of Ostrava, the project included as participants Vorarlberg University of Applied Sciences (Austria) and University of Applied Sciences Esslingen (Germany). The aim was also to compare how the innovations' transfer was approached by all four project participants and to find the best possible procedure which would be universally applicable.

The innovation path in Finland is linked to the regional innovation structure, including local authorities and innovation services. The present situation is scattered: there are separate organizations and „help desks” where the innovator can turn to, but the process is not integrated into the HEI education and R&D activities.

One of the goals of the EARN project is to improve the ways of ensuring the good transfers of ideas, thoughts and innovations from the university environment into practical use in industry. The aim is achieved by creating a clear innovation process path for students and university staff by planning and using the innovation process which can vary from university to university.

The proposal of innovation chain from JAMK University, which also includes students' ideas, is shown in Figure 1. Zone 0 represents the area of academia in the specific university faculty. Zone 1 falls under a specialized department for all university activities for fostering innovations, zone 2 represents an area of commercialization of the idea.

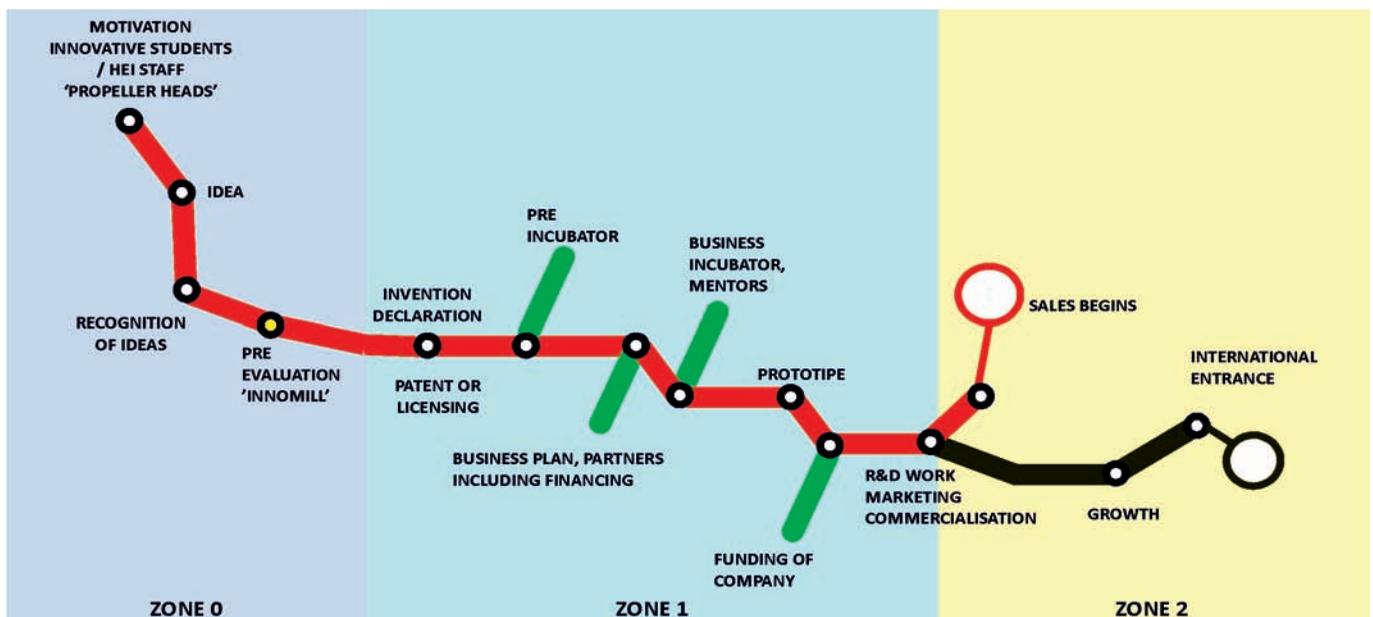
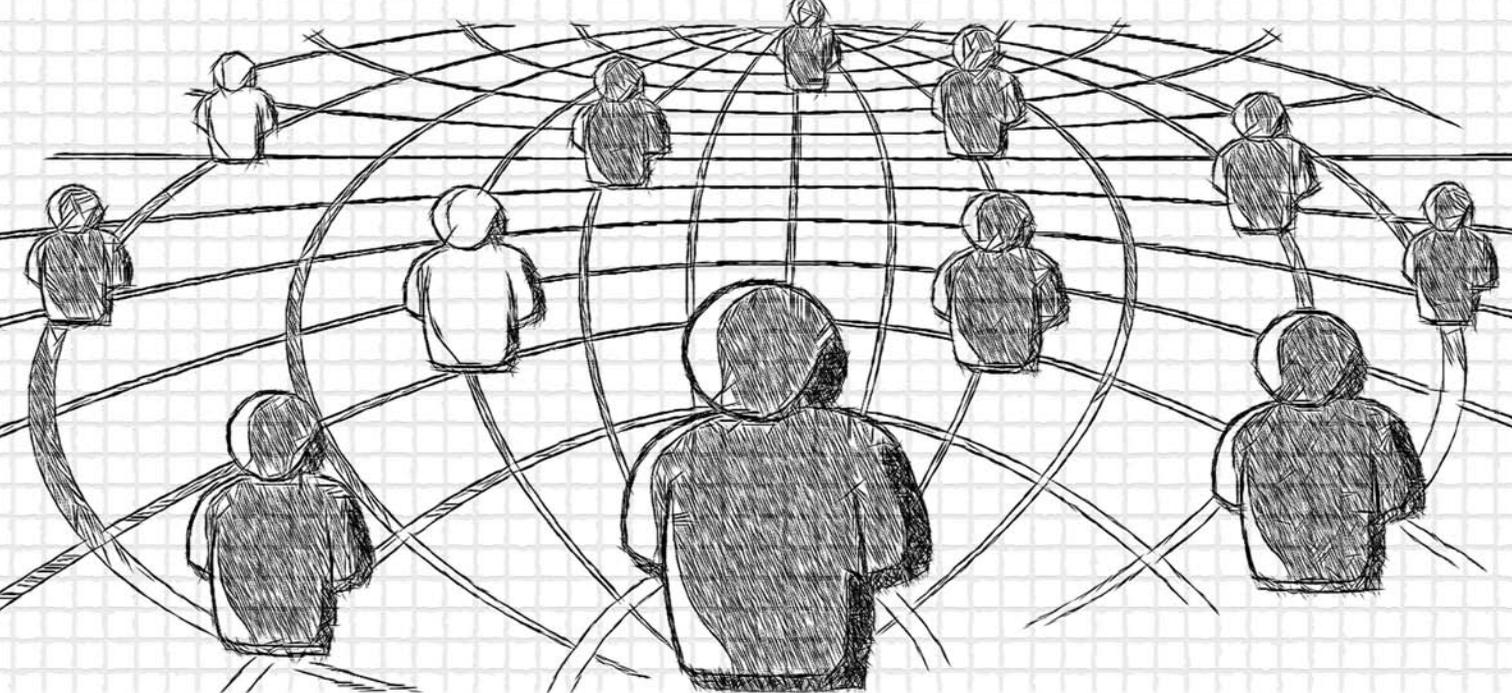


Figure 1 – *Innovation path for students and the HEI staff*



The idea of the chain is as follows. If students come up with new ideas within a project developed at the university, and an academic worker recognizes the commercial potential of this idea, s/he contacts the competent department of innovation. If the innovation has a commercial potential, the author of the idea obtains financial support from the university so that s/he can develop a functional sample. Depending on the nature of innovation, one of the following procedures is selected (marked in green color in the diagram): support of the creation of a business plan, support of setting up the person's own business (micro company) or finding a business that would be interested in the idea. The next step is to create a prototype, which in this context is understood as a product or service that is ready for commercial use. In Finland, the city also fosters collaboration between companies and the university; the city financially supports projects related to knowledge transfer from university to commerce.

The integration of education and R&D&I best practices developed in EARN project has been, or will be taken into use in partner universities. This will continue after the

project as the European Automation Resource Network (a network for resource sharing between partners – laboratories, equipment, courses or training, know-how, consulting and learning materials) and serve for both industrial companies and automation education at the universities.

Preparation of Graduates

Even though the share of the population with university education is continuously growing, it contrasts with the permanent shortage of graduates of technically focused professions. This trend is very strong, particularly in the field of automation and information sciences. As Vilamová (2012) stated, this rises emphasis on the growing complexity of competency and high specialization of staff, as well as the requirements for excellence and narrowly defined professional skills. During the communication with companies and discussions of what they expect from graduates and potential employees, certain repeating insufficiencies surfaced:

- inflexible learning plans – formal emphasis on education according to certification – resulting in slow changes,

the teaching of „obsolete” subjects and difficult application of current trends in curricula;

- lecturers who are not developing themselves – teaching procedures which are no longer contemporary, while current trends are not included in curricula;
- emphasis on memorizing and theoretical knowledge – but students don't know how to apply and use knowledge in practice;
- universities teach and practice subjects which have no practical use at the respective level of studies – e.g. emphasis on general and conceptual procedures at bachelor-degree level, without knowledge of technical backgrounds and necessary practice (an example at VŠB is the subject Systems Integration, requiring extensive cross-disciplinary know-how and experience, which is however unsuitable included in curricula in the second year of the bachelor degree);
- insufficient development of communication skills and students are not pushed to independent problems solving – students don't know how to ask questions and are passive.

In what the companies are concerned, they have unrealistic expectations and not everything is ideal in terms of collaboration with the graduates. Companies sometimes expect quick results, cheaply and with little effort, using the results of semestral projects or graduation theses of students. Companies are of the opinion that in this way they can solve their own lack of resources (and thereby a critical project situation) or some really complex problem for which they currently don't have the necessary capacity. But solving of critical operating problems is not a suitable type of work for students. Students do have a fresh approach, ideas,

they are not hindered by operating routines etc. but, on the other hand, results are limited by the academic year schedule (the graduation assignments and results contained therein are available at VŠB from April 30, i.e. the deadline for handing in assignments) and also by the abilities of the students (and therefore the risk that the students will not be able to handle some assignments).

There is also a reluctance to collaborate with universities and students during their studies, and thereby model potential future employees; companies don't want to invest energy and money in a solution without an immediate effect.

The above-mentioned problems with the education and preparation of graduates for work is also partially caused by the organization of work, where academic staff, besides research assignments and pedagogical activities, spend excess time with administrative–technical activities.

For example, the teaching of automation in specialized laboratories requires, besides actual preparation of courses, study materials and examples for practicing, time for commissioning equipment, and maintenance and service, which usually must be periodically repeated after each semester.





At Czech universities, this is done by the laboratory administrator, which is typically the academic staff providing education in the respective laboratory. However, at partnering universities in Germany and Austria, administration of laboratories and maintenance of equipment and apparatus is done by specialized staff that closely collaborates with the lecturers in preparing and implementing. The lecturer can, therefore, concentrate on teaching (research) instead of losing time maintaining equipment.

There is also a significant visible difference in the approach of foreign universities to supporting the application of results from students' graduation assignments in the commercial sector. The Department of Automation at the University of Esslingen (Germany) employs a person whose sole job is to support the commercial application of graduation assignments – whether in the form of marketing products, initiating collaboration with companies which are interested in using the results, or providing support by incorporating micro-companies, with the aim of creating functional companies based on the achieved results.

At VŠB-TU Ostrava, there is an effort to interconnect learning and practice. At the

Faculty of Mechanical Engineering teaching is guided toward creating teams for solving projects in programming (Farana, 2012, Fojtík, 2009). The idea is to offer students an alternative that will motivate them to better acquire knowledge through teamwork.

At the Institute of Economics and Control Systems we have started cooperation with the IT/ICT company ICZ a.s in project solution within the scope of the subject „Analysis and Design Systems” in 2014. ICZ defined assignments for semestral projects and provided consulting support during the solution (the students have successfully solved two projects: Desk Locator – identification of employees in the area of the company, and Employee Training Management). Another example of successful cooperation with companies engaging students is the development of drivers for Promotic SCADA system from Czech company Microsys Ltd. (currently, students solve the communication between Promotic and Arduino).

Improving cooperation between technical universities and the commercial sector is not a matter of a few specific proposals, but a long process. Nevertheless, we can give several recommendations based on a performed analysis and our experience:

- On the level of departments, an employee responsible for the communication with companies should be appointed. This worker has to be aware of the department possibilities (technical means, know-how offered, personnel structure and financial possibilities). It is also important that this function is not purely formal; the appointed worker of the department should have an inner motivation to pursue this activity. It is not always ideal to fill such a position only based on the titles and previous functions.

- The administrative process should be dealt with in case the company shows interest in contract research (i.e. it has to be established who should be contacted, what documents are to be handled, what is the approval process, how the economic aspects of the given requirement are addressed, staffing etc.).
- Similar to the partner university JAMK in Finland, it is advisable to prepare a procedure for involving students and using their ideas to be commercialized. The procedure prepared in advance should contain a well-thought way of funding, in which functional models or prototypes are created.
- It is also important to carry out the audit of staffing and workload of staff. If it is possible from the technical and personnel point of view, it is appropriate to separate the educational-research work from the work of the technical-administrative nature. In general, the scenario where everyone is doing everything should be prevented.
- If possible, manpower should be allocated for project support in case of joint projects business-university (searching possible sources of co-financing, preparation of applications for support, administrative project management).

The cooperation with the commercial sector in the area of contract research can also operate more effectively if facilities, laboratories, technical equipment, services and expertise offered to companies are audited. There is space for creating an information system that provides data related to each service, on how the service can be used, specific conditions and contacts to the responsible persons. In the framework of the EARN project, we began to create an information system accessible to the public on the Internet. Figure 2 shows groups of



services offered by a consortium of four universities for the commercial sector.

Important information for the services is: place, contact persons, description of services, customer involvement, costs, time-frame, infrastructure and references. Further information is also required depending on the type of services. Additionally, there are questions about best practices, possibilities for involving students and internationalization needs (the provision of services through an international partner). The service databank includes information about the range of services on offer, including a detailed description of the equipment and machines used, as well as short reports about current and past orders.

EARN is not the first project attempting to register university resources and efficiently transfer innovations to the industry. The purpose of this project is primarily its internationalization, collecting expertise from many countries, enhancing the utilization of resources and potential of universities on an international scale. To make this idea a success, it is essential, besides managing all processes, to provide the necessary awareness of all involved parties (universities, companies, students etc.).

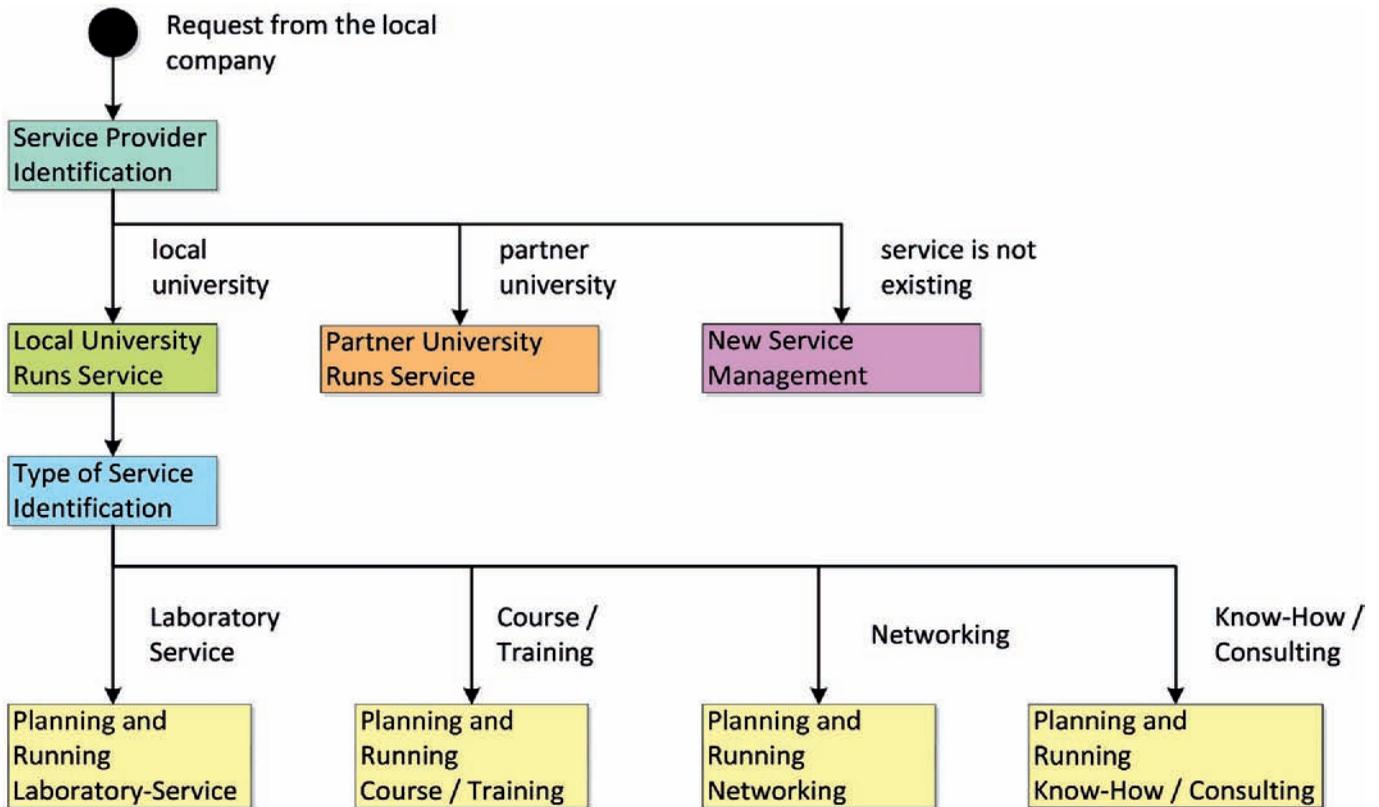


Figure 2 – *University services process map*
 (Source: Danel, Řepka and Amann, 2014)

Companies (or public institutions) can get information about services or facilities, and if they do not find the appropriate service, they can use an inquiry form. Other universities, for example, the University of Miskolc (Hungary) or WSG Bydgoszcz (Poland), have already expressed interest in the integration into the system.

Conclusion

The functioning of universities and the extent of collaboration with industry is primarily affected by financial resources. The scope of assigned resources is dictated by

economic and political factors. Similarly, certain administrative procedures are given by legislation and regulations of the Ministry of Education. However, in numerous other areas, it is possible to achieve improvements – simplification of procedures, conceptual work, working with human resources and particularly improved communication with the commercial sector. One of the goals should be to increase the involvement of commercial entities in financing research and increasing pressure on universities of applied sciences to achieve results applicable in industry.

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Value Through Continuous Improvement

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Abstract

The return on investment from Continuous Improvement (CI) activities in mining is significantly higher than in the manufacturing sector because of the size and magnitude of the issues in mining. Management says investment in CI is tiny to unveil the hidden treasure of success and sustainability. Cultural conditions that create barriers to improvement are not always obvious, but their symptoms are easily recognizable as Organizational silos, Management-Union differences, Production-maintenance conflict, lack of ownership, waiting for commands and approvals etc.

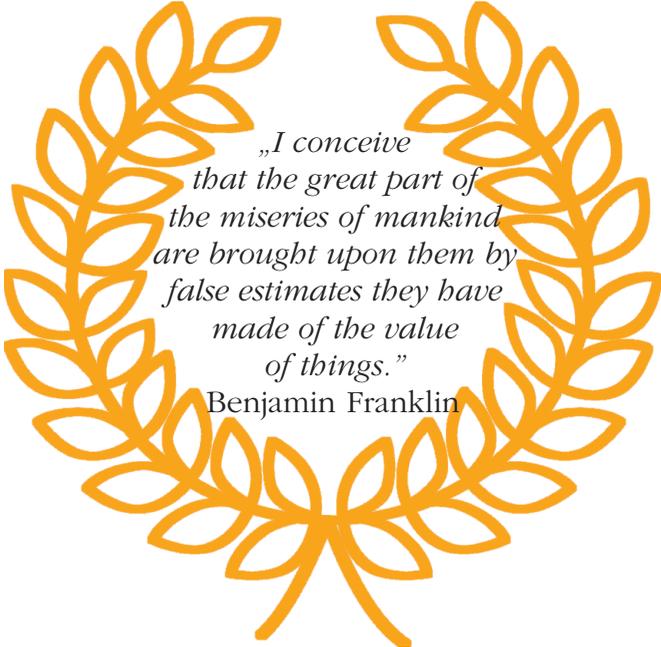
Keywords: Kaizen, continuous improvement, Six Sigma, quality, mining, SMED

Introduction

Several years ago, in his article, Kay Sever (2006) explained about a methodology that is very successful in addressing the people side of improvement, breaking down silos in an organization, improving communications, and reducing rework that occurs as a result of multiple departments executing a process. He named it Process Orientation (Sever, 2006). Process Orientation means involving and educating the employees, suppliers and customers about what the process requires and where the value is being lost so that they are able to see how they can add value, anticipate the needs and suggest changes that would help all parties meet their requirements.

To realize the power of process orientation, Kaizen approach was used to enable employees, process owners and stakeholders to „think as one mind” about maxi-

mizing the performance of jointly-owned processes. Kaizen (translated as „change for the better”) is a Japanese word for „con-



*„I conceive
that the great part of
the miseries of mankind
are brought upon them by
false estimates they have
made of the value
of things.”*

Benjamin Franklin

tinuous improvement". When used in the business sense and applied to the workplace, Kaizen refers to activities that continually improve all functions and involve all employees from the top management to the assembly line workers. It also applies to processes, such as purchasing and logistics that cross organizational boundaries into the chain. By improving standardized activities and processes, Kaizen aims to eliminate non-productive activities. Kaizen was first implemented in several Japanese industries after the Second World War, influenced in part by American business and quality gurus who visited the country. It has ever since spreading throughout the world and is now being implemented in environments outside of business and productivity (Wikipedia, 2016). In our case, we first collected data and analyzed it through management meetings to identify which mining processes to be streamlined first by applying the Pareto (80:20) Principle to prioritize and maximize the results of the Kaizen events.

Improvement Culture in Mining

The broad objective of the Kaizen was to move from the current mine culture to



self-actualization by bringing the union close to management to achieve the common goals, and remove or substantially reduce organizational silos, poor communications and resistance to change. Most impersonal ways of communicating change often prevent culture change and Kaizen will not be very effective in process improvements. So we decided to develop the ground rules first and then translate basic Kaizen principles to develop cardinal rules to fulfill our needs.

In the early stages of Kaizen event planning, we realized that people's change is as important and difficult to implement as the technological change. Lean and Six

Table 1 – *The ten basic Kaizen principles*
(Source: Adapted from Leading Edge Group, 2016)

1.	Throw out all your old fixed ideas on how to do things
2.	No blame – treat others as you want to be treated
3.	Think positive – don't say can't
4.	Don't wait for perfection – 50% improvement now is fine
5.	Correct mistakes as soon as they are found
6.	Don't substitute money for thinking – Creativity before Capital
7.	Keep asking why until you get to the root cause
8.	Better the wisdom of 5 than the expertise of 1
9.	Base decisions on data not opinions
10.	Improvement is not made from a conference room



Sigma tools like 5S, mistake proofing, visual boards, graphs, diagrams and control charts are important in order to identify and quantify improvement opportunities and to monitor change, but they will not affect a sustainable culture change unless employees understand the business requirements. The tools must go hand in hand with the behavioral change and let the employees decide which tool they choose to use to implement change.

In D-M-A-I-C (Define, Measure, Analyze, Improve and Control) terms, *Defining* the targets of the operation is a management role, and should use historic data and plant capability to define goals and objectives of the continuous improvement plan. *Measurement* and *Analysis* are typically an engineering and operations role in providing technical details to the operations team. The employees may use the tools of their choice relevant to identify and quantify improvement opportunities and to monitor change. The *Improve* and *Control* phases are driven by the ground level employees in coordination with the technical team. A technically equipped Kaizen event has better chances of success when it is focused on implementing technical solutions by the floor employees who can customize them for sustainable results.

Kaizen Events

Kaizen events are typically one week to two weeks long events in which employees are oriented to make changes and achieve improved results. Data-driven discussions are often powerful to orient employees about what their efforts are achieving on a day-to-day basis. Then ways are developed to streamline and correct their input so that the process throughput can achieve the desired results. The following activities were included in this case study's Kaizen events:

- Process orientation – Each activity of underground operation was mapped to explain end-to-end value stream to the group of frontline employees in the Kaizen team.
- Kaizen brainstorming – Using sticky notes, individuals in the group were asked what hinders them in achieving the maximum output. All similar problems on the sticky notes were combined by the group captains to create the large picture of „barriers to productivity”.
- Kaizen blitz – Issues were divided into two categories: „people-driven solutions” and „technology-driven solutions”. Engineers worked with operations and maintenance teams on measuring and analyzing issues to develop technical solutions, whereas the department manager worked with frontline employees on issues related to procedures, instructions and interdepartmental coordination. Technical problem-solving followed a sequential data-driven process, where bottlenecks were identified and solved in a continuous manner until the maximum capacity of the system was utilized.
- Kaizen solution implementation – typically, a Kaizen blitz comes up with 50 to 70 action items. These actions are pri-

oritized based on their impact and ease of implementation. Each action item is assigned to an owner and a timeline, which is monitored and coordinated by the process owner.

- Kaizen Close-Out – All the closed items are communicated to employees and results are celebrated in the Kaizen close-out meeting. The Kaizen file is submitted to the respective manager to archive the results in the lessons learned database.

Process orientation is a precursor to the Kaizen events, where the orientation of employees refreshes their memory and acts as a catalyst for transformation. Two Kaizen events based on the macro operating units of the mine site were planned. The names of the events were given after the key op-

erations units – The Underground Mining Kaizen and The Mill Kaizen.

Case Study 1 – „Road to 360” Miner Productivity

Opportunity of the Project

For the last year, the baseline of miner running minutes was 215 minutes per miner per shift. The goal of the Kaizen event was set to achieve 360 minutes per miner per shift for both development and production miners. Through Kaizen we wanted miners to understand the process, identify the root cause of the production delays and the opportunity of improvement to reach 360 running minutes for each miner (Figure 1):

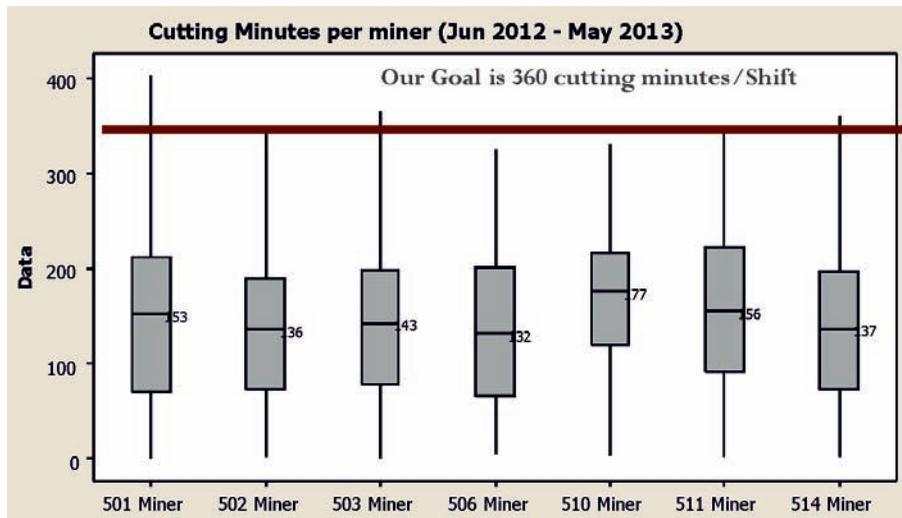


Figure 1 – *Cutting minute per miner*

The data-based discussion in the mine Kaizen started with the average ore cutting minutes recorded by each mining machine. The data was very powerful to convey to employees that their efforts are not achieving the desired results. If a machine is only working 177 minutes (approximately 3 hours), then it is resting, the 5 hours of the shift are non-productive for the mine

development. It was necessary to understand that the mine will be reasonably profitable if the ore cutting minutes reach the level of 360 minutes per shift. It looked like a very lofty target, but the resources deployed in the underground operations were capable of achieving up to 420 minutes (7 hours) in a shift.



The Kaizen event started with a dialogue about how to streamline and correct the inputs to achieve desired results. It followed all seven steps, starting with the mapping of each activity of underground operations to explain the end-to-end value stream to the group of frontline employees in the Kaizen team.

Top Findings

Very close to the expectations, the team found 8 critical issues through their brainstorming and data workout sessions. They were related to the elements of the Ishikawa (Fishbone) diagram: Man, Machine, Method, Measurement, Material and Milieu (6Ms).

- Each Miner head MPU (Motor Protection Unit) tripping caused 45 minutes downtime. Frequent MPU tripping caused delays for miner running minutes and in the long term, increased damages of the motor and gear box (Machine).
- Crews had difficulties in locating scoop, bolter, trucks and other mobile equipment at the beginning of the shift, as the cross shift communication was not effective to accurately locate the equipment. Undefined equipment ownership caused delays in getting the crew ready to perform (Method).

- All operators were called at the end of the shift for reporting at the same time. Through this method not 100% of the information was captured, and it was diagnosed as a very inefficient way of collecting shift information (Measurement).
- The Materials and Procedures for setting up the next production shift were not sufficient to enable the crew for high performance (Materials).
- The operators were not trained to analyze the equipment breakdown, which caused delays for Mechanics and Electricians to repair equipment. Mechanics had to perform the diagnosis of breakdown before arranging tools and components for necessary repair (Measurement).
- The culture of „departmental thinking“ was considered as one of the biggest barriers in reducing production delays. Each department set its own priorities, rather than working together on common priorities (Milieu).

The mine productivity was investigated from each of these six perspectives and various technical and behavioral solutions were identified. Although developing technical solutions was relatively easy, the difficult part was the implementation. One suggestion that worked for this environment was inviting retired employees, who were well respected in the mining community, to explain the technical solutions to employees. They were also brought to the minefield to achieve the 360-minutes productivity.

Solutions Completed

- The Mine Operator’s Training Manual was updated, increasing the employees’ awareness on optimizing the miner runtime without tripping the mining machine’s MPU (Motor Protection Unit).

Additionally, technical awareness was created by educating the miners on how MPU trips can cause damage to the equipment.

- There was put in place the procedure to clearly define the diesel equipment allocation with each miner, and a more defined backup plan.
- A list of trucks owned by each department was reviewed and re-defined. It was found that production needed three more trucks to ensure enough vehicles available to travel to the face of the mine.
- A new end-of-shift reporting process and procedure were adopted. All operators were required to call their Supervisors in the middle and at the end of the shift to provide shift information. This enabled the Supervisors to have all information in time to set up the next shift. Furthermore, a system of 6-6 mine production crews' duties and responsibilities was implemented to ensure the best set up and support for the day and night crews.
- A separate computer was installed in the mine Central Control Room Dispatch to display the speed of the upstream processes in the Mill/Refinery. This will allow the Mine Controller to better understand the Mill's operating conditions and the ore demand of the mill.
- New hose diameter and fitting gauge charts were given to Mine Operators to provide more information to the Me-

chanic on hose repairs. This mechanical knowledge will not only enrich the Operator's understanding of equipment maintenance, but it will also improve the reliability of the rock cutting operation.

Quick Wins

The mine Kaizen event for the mine productivity enabled the team to identify problems where solutions were quick, easy to implement and within their control. These were called quick wins because the average time of implementing a solution to quick win issues was less than a week and many small issues were solved in a short period, using available technology and routine base sustaining maintenance budget. For example:

- Ergonomic quick win – The air hoses to blow off mining machines were too short and operators were unnecessarily bending and maneuvering their bodies to clean their equipment. A hose blow-off pipe extension was designed and delivered to each mining machine running underground.
- Environmental quick win – The dust collection circuits in the mine have many flexible vent tubes which if not hung properly reduce the efficiency of picking dust from the mining face. The problem seems insignificant, but its impact is very big. A system of 6-6 mine production crews' duties and responsibilities was implemented. A friendly hook designed by a mechanical foreman in the Kaizen team worked well to win this quick task.
- Parts availability quick win – The cleaning and organization of underground part sledge (a trolley to carry parts and consumables) was not clear between the user group and the part replenishing team. Users were treating it as a „pop vending machine” where the vendor maintains the asset, but it should be the other way



around. An updated 5S sustaining plan for parts sleds was written and published by the mine Production Superintendent and the next day the ownership of these sleds were defined as a quick win.

Outstanding Follow-up Actions

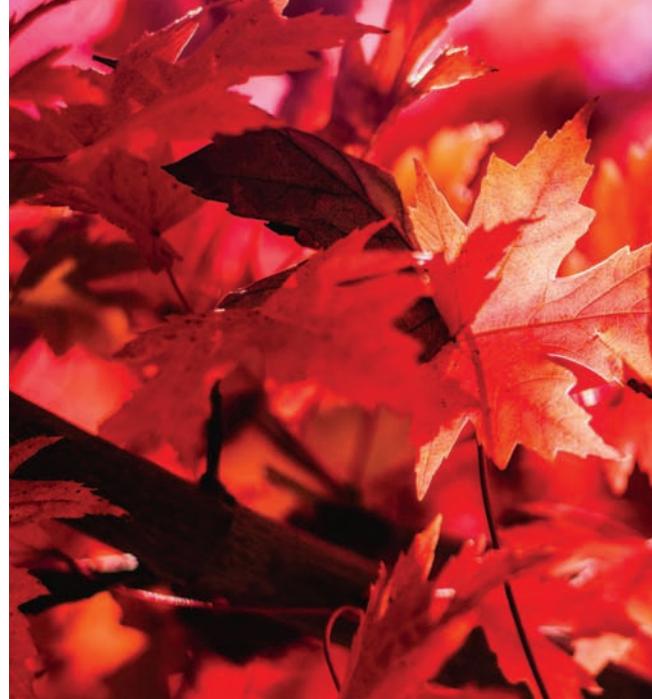
Continuous improvement is always a moving target. The more you achieve, the more improvement you create for the following day. For each sub-process, the new improvement ideas were seeded and they created avenues for future Kaizen events:

- When moved from one room to another, each mining unit requires the electric sub-station to move with it. The idea of moving a spare 5KV electric unit in advance came as a result of the SMED (Single Minute Exchange of Dies) workshop. This initiative will bring a clear outcome in terms of increasing electrical safety and reducing miner downtime.
- The success of the part sled program automatically influenced other underground maintenance shops. One of the interesting outcomes was the critical parts list generated for the diesel equipment.
- To support the part sleds program, weekend warehouse access to supervisors were granted. This helped the mining crew obtain emergency critical parts to repair equipment during the weekend when the warehouse was usually closed.
- The quality of telephone and radio communication services inside the mine was also improved through regular maintenance and upgrades.

Case Study 2 – Mill productivity improvement through quick start-up

Opportunity of the Project

Historically, mill start-up experienced extended delays (several days), significant



re-work and repair costs that ran into millions. Process engineering was generally the process owner that had to interface with multiple departments across the facility, as well as suppliers, to achieve a safe and reliable start-up. It was important to define the start-up delays to its fullest extent using the real-time data and evidence. Historical data was used to determine the baseline for the mill's operation delays in start-ups. It was felt that the mill's process was substantially delayed due to inadequate coordination between different functional departments in the mill. For example: if maintenance didn't provide clearance, the electrical department could not proceed to remove locks and safety tags. Similarly, the central control room had to wait until all the paper based clearance for the start-up was collected. Data from the last 17 TSD (Total Shut Downs) were evaluated and the average start-up was calculated to be 9 hours.

Having an extensive experience in Six Sigma, the author facilitated a cross-functional team that was in charge of the process flow for starting up after the TSD. Each team member was an „expert” in their process step, but no team member had „the



vision” of the entire process. Several team meetings were needed to define the details of each unit process. This Mill Kaizen event was focused on removing the interdepartmental process breakdowns which usually occurred as a result of outdated or incomplete information required by a downstream process. These breakdowns resulted in much of the delays, rework and excess cost for each start-up.

Top Findings

The Kaizen team assessed that they can reduce the time to peak production from 9 hours to 3 hours, which was expected to produce extra 120 product tons per TSD

(Total Shutdown Day). Checklists, new forms and new communications were designed to push the decision-making and information-gathering upstream, eliminating delays in the overall start-up operation. Several non-value-added activities were identified and removed and a future state map was conceived. The following Kaizen elements were targeted to drive change in people’s behaviors:

- Graph best and worst TSD in terms of standardization of mill startup processes across all the 4 crews in the mill;
- Coordination between maintenance and production needs major overhaul;
- Coordination between production operators and supervisors to be streamlined to remove duplicate instructions and delays;
- Process control and process safety interlocking issues come from operators, and technical solutions must be developed with them.

The Kaizen process helped to build commitment of the participating departments during the roll-out session with great success. All internal stakeholders were invited to a regional roll-out of the new process. The main goal of the roll-out session was to give stakeholders and process participants a vision of how their role impacted the entire process. This vision was the key to getting a commitment to change:

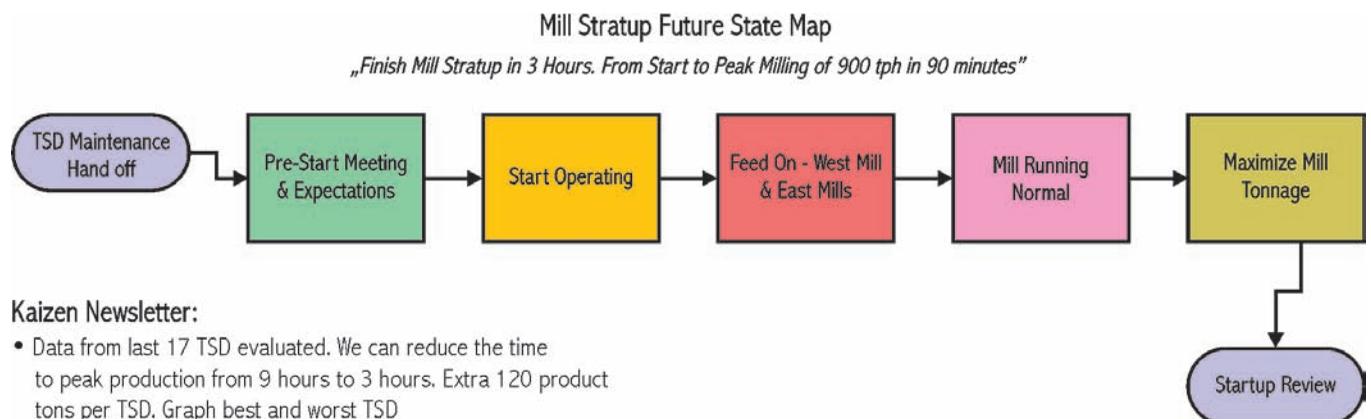


Figure 2 – Vision process of the mill future state map

Solutions Completed

The future state mapping of the start-up was completed utilizing Lean tools. The existing start-up process was laid out with all the expected activities. These activities were segregated into essential, necessary, desired and waste activities and brainstormed to combine essential and necessary activities and reduce waste activities. The desired activities were developed as best practices on which operators were trained and coached to make them a habit.

The solution came out in the form of a future state map with 39% reduction in the overall activities. For example, paper-based approvals were switched to online approvals. The future state process was piloted to see its effectiveness. In the first round, the results were very promising and there was a major breakthrough achieved in the coordination between operations and maintenance working relations. The patience of people increased and their language changed from finger-pointing to talking about solutions. All the completed maintenance work orders were communicated directly to the Lock-out Tag-out coordinator on time and the electrical and instrumentation crew handed over clearance in 2 hours of the start-up bell, instead of the historic average of 4.5 hours. The production coordinator prepared his team for Pre-Start-up Safety Review (PSSR) and the process was running in next hour. The team passed the target while the production ramp-up still to be done.

Surprisingly, this time the stress levels were down because the activities were clearly defined and things were under employees control. The mill process ramp-up historically unveiled failures and this start-up was not deemed exceptional. The supervisor ordered the control room to increase

the rate to peak production in two stages: one at 75% level and the other at 100%, in the interval of half an hour. The start-up process was modified. The results were outstanding. The power of behavior changes with changes in technology were beyond expectations:

- The peak milling rate achieved was 738 tph (tons per hour), as compared to the target of 700 tph;
- The bottleneck of tailings line was handled by operating stand-by pumps at full horsepower, without any fear of breakdowns;
- The daily average production was a little under the target of 14,500 tons. However, the start-up production exceeded to 16,800 tons the next month.

Although some of the targets could not be achieved, the causes were outside the mill's control. Since the communication was process-focused, employees were asking each other the right questions. They were resolving their departmental issues and measuring the change in their own performance. There was a change in the culture, but it was just the first step. The next step was to improve coordination with external control variables such as ore, spare and utility supplies. The mill start-up process was proven, but it needs further consolidation and practice to improve performance to achieve the moving target. Accordingly, the mill operators' training manuals were updated and employees were trained, which increased awareness of mill operators on optimizing the start-up and the run-time.

Quick Wins

Unlike Mine Kaizen, the mill team also worked on quick wins. They had 5S, visual communication, operating procedures



and technical solutions in mind and they explored these 4 areas to implement the quick wins. The summary of the quick win results is:

- 1. Equipment Labels and 5S-Implementation:** Large, clear, consistent equipment labels were posted on each mill equipment and piping. This allowed new operators and contractors to quickly learn circuits and locate equipment. Tool holder, cabinets, utility hose reels and other tools were cleaned and re-organized under the 5S-Blitz. Many obsolete and tempered tools were removed from circuits to reduce the clutter. An attempt was made to visualize the workplace using the 5S-methodology.
- 2. White Board Communication:** This communication mode worked well between inter- and intra-functional teams. Maintenance crews were able to easily figure out what clean-up operations were happening in production areas and which area needed more attention during their

shift. Production white boards displayed any immediate safety concern or urgent production focus.

- 3. Checklists and Start-up Standard Operating Procedures:** Area specific checklists enabled thorough shift changeover and robust lists helped newer operators understand circuit status. New cardinal principles for work coordination were developed. For example, the team leaders asked each member of their crew about the circuit checks. Every operator had to physically see and hand over charge to the relieving operator before leaving the plant.
- 4. New standard operating procedures (SOPs)** helped better utilize the existing circuits. New feed rate guidelines for start-up were posted where roles and responsibilities were redistributed based on functional activities. A prestart meeting was developed with new agenda and expectations.



5. DCS Programming and Technical Solutions:

The discrete programming of the control software improved operations of crushing and screening circuits where set points and start-up functions were reprogrammed. The technical solution helped central control operators to start the milling operation in the Cascade Mode (on a cascade control arrangement, there are two or more controllers of which one controller's output drives the set point of another controller. For example: a screening load controller driving the set point of a crushing flow controller to keep the level at its set point. The flow controller, in turn, drives a control valve to match the flow with the set point the level controller is requesting. Other technical solutions related to the removal of redundant interlocks and nuisance alarms were also implemented under a lean value chain investigation.

Conclusions

Continuous improvement is always a moving target. The more you achieve the more work you create for the future. This paper tested the Process Orientation view and developed Kaizen efforts in an under-

ground soft rock mining environment. It is imperative to understand the foundation of the continuous improvement program under analysis. If the process is people-driven, then the technology should also be driven by people. They should develop solutions for their work life. They should be trained and coached on Lean tools such as 5S, check sheets, spaghetti diagrams, control charts, trend graphs, root cause analysis etc., in order to identify and quantify improvement opportunities and monitor change. Those Kaizen events which start with Process Orientation have the power to deliver significant culture change, because the „people side of improvement“ weighs equally to the „technical improvement“.

The management's role in a sustainable culture change is to educate and enable employees about the upstream and downstream process requirements (what they should receive and what they should send) and choose to make those requirements a priority in their daily work and communications. Management should use historic data and plant capability to define goals and objectives for continuous improvement.

Engineers' role is to measure and analyze existing technologies and process flows. They should define process bottlenecks and provide technical solutions to frontline employees and let them drive the improvements and controls to improve processes for long-term success. A technically equipped Kaizen event has better chances of success when it is focused on improvements, and technical solutions are presented to employees who can choose and customize them for improvement and sustainability of results.

An effective Kaizen program has a strong connection with process orientation. When the process is mapped, modified and opti-

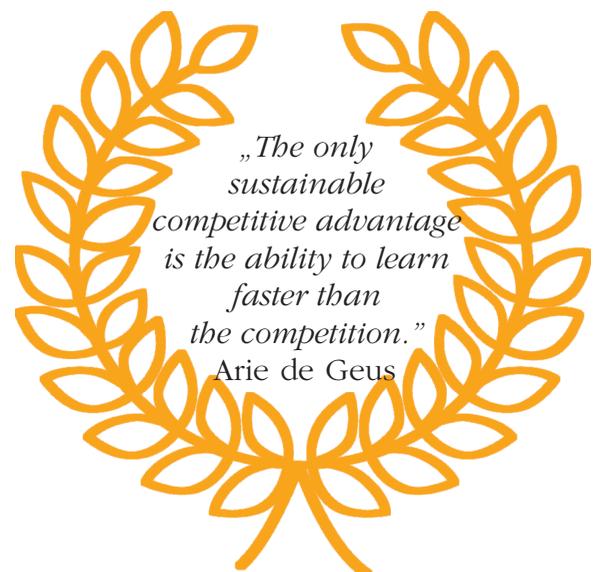
mized, it allows people to be more effective as they face uncertainty. The mining sector is known for its risks and uncertainties and in that environment the control should not be focused on people, but on results. Furthermore, the management should not just facilitate communication, it must facilitate good decisions at the lowest level of the organization by identifying when a decision to deviate from the plan is required, ensuring all data supports key assumptions and accounting for alternatives (Spindler, 2001). Lastly, management must promote

problem-solving by identifying problems through analysis by engineers and managers and by supporting informed cross-functional frontline teams to formulate solutions.

The present paper presents two case studies of successful application of the Kaizen method for the activity of a soft rock mining environment. The results showed significant improvement in terms of productivity, technical advancements, time reduction and cultural and behavioral change for the better.

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Obtained Value Through Quality Inspection

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Abstract

The design of quality-inspection procedures may be critical for short-run productions. In this paper, a probabilistic model representing the process propensity to produce defects is adopted, together with two indicators related to the effectiveness and cost of inspections. The combined use of the indicators allows to support in a practical way the selection of the more appropriate inspection procedures. A case study concerning the production of front fenders of a luxury car is extensively dealt with.

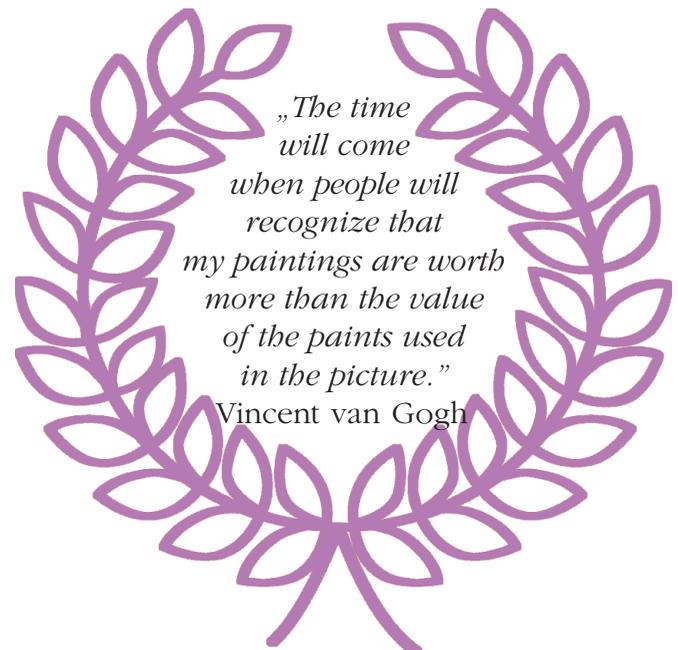
Keywords: quality inspection, short-run, inspection effectiveness, inspection cost, car fender

Introduction

The manufacturing of complex products is typically organized into several steps: acquisition of raw materials, processing, assembly, functional testing etc. Quality inspections are usually performed to check whether specifications and functional requirements are satisfied and to identify defects and/or anomalies. Inspection can be governed by strict or non-strict rules (e.g. periodic controls, fixed-percentage control etc.) and organized through well-defined or heuristic procedures.

The inspection strategies are significantly affected by the production volume. In the case of mass production, Statistical Process Control (SPC) techniques can be straightforwardly applied (Montgomery, 2013). On the other hand, in the case of productions of single units, small-sized lots (i.e. the

so-called *short-runs*) or in the start-up of a process, most of the SPC techniques are



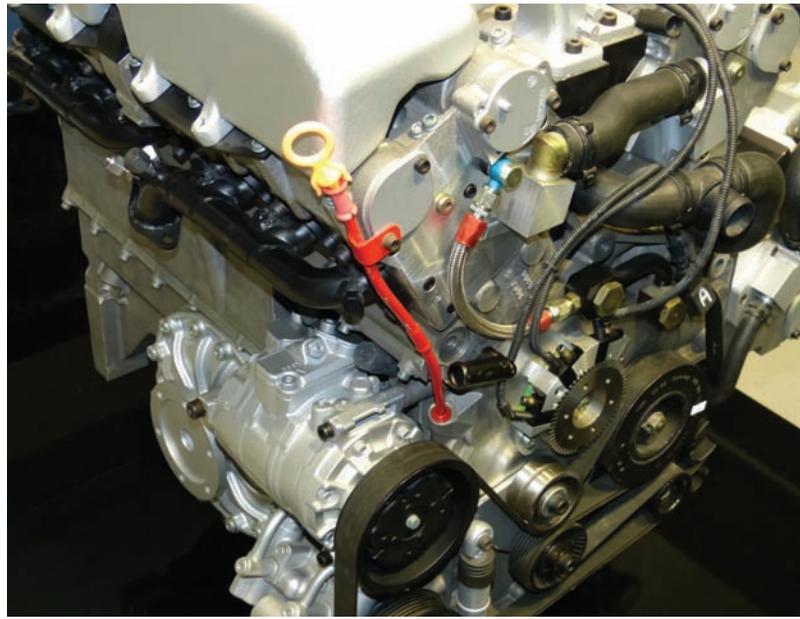
inappropriate (Del Castillo *et al.*, 1996; Marques *et al.*, 2015).

In many production environments (e.g. situations with low inspection costs, high salvage costs, high penalty costs or high defect probability) quality costs are significantly affected by inspection errors (Ballou and Pazer, 1982). The two types of errors associated with an inspection are taken into account, i.e. **(i)** the wrong rejection of a conforming unit, which is known as type-I error; and **(ii)** the erroneous acceptance of a nonconforming unit, which is known as type-II error (Mandrolì, Shrivastava and Ding, 2006).

Currently, similar approaches are mostly implemented in the software engineering field (Rawat and Dubey, 2012). In particular, probabilistic models based on Bayesian networks were proposed for software defect prediction (Fenton, Neil and Marquez, 2008). Furthermore, inspection-oriented quality-assurance strategies are mainly aimed at identifying optimal formulations (Kelly *et al.*, 2016).

The present paper analyses the quality-inspection procedures for a short run manufacturing processes exploiting some results obtained in a previous work (Franceschini *et al.*, 2016). A case study in the automotive industry concerning the production of car fenders is extensively dealt with. The adopted probabilistic model for defect prediction enables to support the design and assessment of suitable inspection procedures. In detail, the problem of comparing several possible inspection procedures is dealt with.

The remainder of the paper is organized into three sections. Section 2 illustrates the probabilistic model and its characteristic parameters and then it describes two practical indicators which depict the overall effectiveness and economic convenience of an



inspection procedure. Section 3 presents a structured case study, concerning the application of the adopted model and indicators in the short-run production of front fenders of luxury cars. Section 4 summarizes the contributions of this research, including its possible limitations.

Model and Indicators

Model assumptions and parameters

The production process is decomposed into manufacturing steps or just steps, i.e., individual operations providing an added value to the final product. The adopted model (Franceschini *et al.*, 2016) is based on the following hypotheses:

- For each step, there can be one-and-only-one defect typology.
- Defects originated in the different steps are uncorrelated.
- The occurrence of defects and that of inspection errors are uncorrelated.

Each i -th step of the production process is modelled with a Bernoulli distribution (Montgomery, 2013). Then, each step can be described through three parameters:

- p_i : probability of occurrence of the defect in the i -th step (i.e. the parameter of the Bernoulli distribution);
- α_i : probability of (erroneously) detecting the defect when it is not present in the inspection in the i -th step (*false defect* or *false positive*);
- β_i : probability of not detecting the defect when it is present in the inspection in the i -th step (*false negative*).

The index i is included between 1 and m , i.e. the total number of manufacturing steps. The three parameters are usually difficult to estimate. The first parameter concerns the quality of the process, while the other two parameters (related to the type-I and type-II errors) concern the quality of the inspection (Tang and Schneider, 1987; Duffuaa and Khan, 2005).

Model representation

The graph in Figure 1 represents a generic production process with m steps in series. More complex processes can be represented using graphs with mixed structures (in series and in parallel). Consistently with what was described before, each (i -th) step can be associated with three parameters (p_i, α_i, β_i):

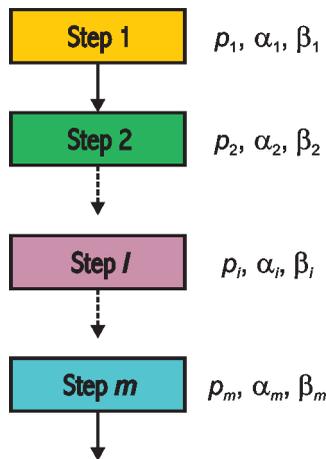


Figure 1 – Representation of a production process with m steps in series

The following probabilities can be calculated for each (i -th) step:

$$P(\text{detecting the defect in the step } i) = p_i \cdot (1 - \beta_i) + (1 - p_i) \cdot \alpha_i \quad (1)$$

and

$$P(\text{not detecting the defect in the step } i) = p_i \cdot \beta_i + (1 - p_i) \cdot (1 - \alpha_i) \quad (2)$$

where i is included between 1 and m , i.e. the total number of steps.

In the case the defect is detected, it will be *authentic* (i.e. actually present) with a probability $p_i \cdot (1 - \beta_i)$ or *false* with a probability $(1 - p_i) \cdot \alpha_i$ (see Eq. (1)). On the other hand, in the case no defect is detected, this will be the result of an inspection error (*false negative*) with a probability $p_i \cdot \beta_i$, or will be due to the real absence of any defect with a probability $(1 - p_i) \cdot (1 - \alpha_i)$ (see Eq. (2)). The above probabilities represent the „elementary bricks” for the construction of two indicators depicting the performance of the inspection procedures, which are further presented.

Indicator on inspection effectiveness

Let us consider m Bernoulli random variables (X_i), defined as follows:

- $X_i = 0$: when (i) an authentic defect is detected or (ii) no defect is present in the i -th inspection.;
- $X_i = 1$: when an authentic defect is not detected in the i -th inspection.

According to the general probabilistic model (Franceschini *et al.*, 2016), the mean total number of authentic defects which are not detected in the overall inspection procedure can be defined as:

$$D = \sum_{i=1}^m E(X_i) = \sum_{i=1}^m p_i \cdot \beta_i \quad (3)$$

The variable D provides an indication of the overall effectiveness of the inspection procedure.

Indicator on inspection cost

The total cost for inspection and defect removal related to each (i -th) step may be expressed according to the following model (Franceschini *et al.*, 2016):

$$C_{tot,i} = c_i + NRC_i \cdot p_i \cdot (1 - \beta_i) + URC_i \cdot (1 - p_i) \cdot \alpha_i + NDC_i \cdot p_i \cdot \beta_i \quad (4)$$

where:

- c_i is the cost of the i -th inspection;
- NRC_i is the necessary-repair cost, i.e., the necessary cost for removing the defect;
- URC_i is the unnecessary-repair cost, i.e., the cost incurred when identifying false defects; e.g., despite there is no cost required for defect removal, the overall process can be slowed down, with a consequent extra cost.
- NDC_i is the cost of undetected defect, i.e., the cost related to the missing detection of defects.

Apart from the estimates of the probabilities p_i , α_i and β_i , the calculation of the total cost therefore requires the estimate

of additional cost parameters. In general, c_i and NRC_i are known costs, URC_i is generally known or easy to estimate, while cost NDC_i is difficult to estimate, since it may depend on difficult-to-quantify factors, such as image loss, after-sales repair cost etc.

The total cost for inspection and defect removal related to the overall production process (m steps) can be expressed as:

$$C_{tot} = \sum_{i=1}^m C_{tot,i} \quad (5)$$

The indicator C_{tot} provides a preliminary indication of the total cost related to the inspection procedure in use. In this sense, it can be used as a proxy for economic convenience of an inspection procedure.

Practical case study

Process description and modelling

Let us now consider an automotive manufacturing process aimed at producing the front fender of a luxury car. Due to the relatively small number of parts produced over time, it can be considered a short-run production. The manufacturing process is organized into four main operations: three



welding operations in three different working locations (operations no. 10, 20 and 30) and a final activity of calibrating and assembly (operation 40). Figure 2 shows, as an example, one the welding operations (operation 30). Red circles show the corresponding weld areas.



Figure 2 – *Welding operation 30*

The two last operations involve the use of a calibrated artefact for dimensional verification of the frame geometry and then the assembly of brackets and bushings. Each of the three welding operations is preceded by a corresponding activity of

Figure 3 shows the calibrating and assembly operation (operation 40):



Figure 3 – *Calibrating and assembly operation (operation 40)*

set-up of welding parameters (operations 10, 20 and 30). Therefore, the process can be divided into seven total steps (three for set-up, three for welding and one of calibrating and assembly), as represented in Figure 4:

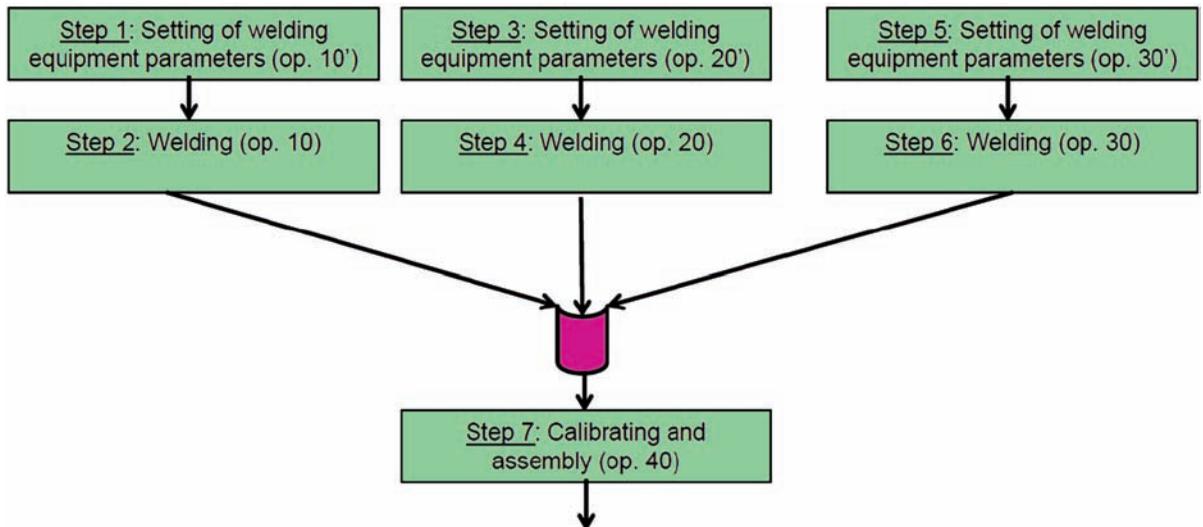


Figure 4 – *Flow chart representing the production process*

Set-up operations are in series with the relevant welding operations. The three pairs of set-up and welding operations are in

parallel with each other and followed by the (unique) operation of calibrating and assembly (operation 40).

For the same process of interest, two alternative inspection procedures are compared. In the first procedure, self-inspections are performed after welding operations (operations 10, 20 and 30) and a final

inspection is performed by an appointed staff after the calibrating and assembly operation (operation 40). Figure 5 represents the production process integrated with the first inspection procedure:

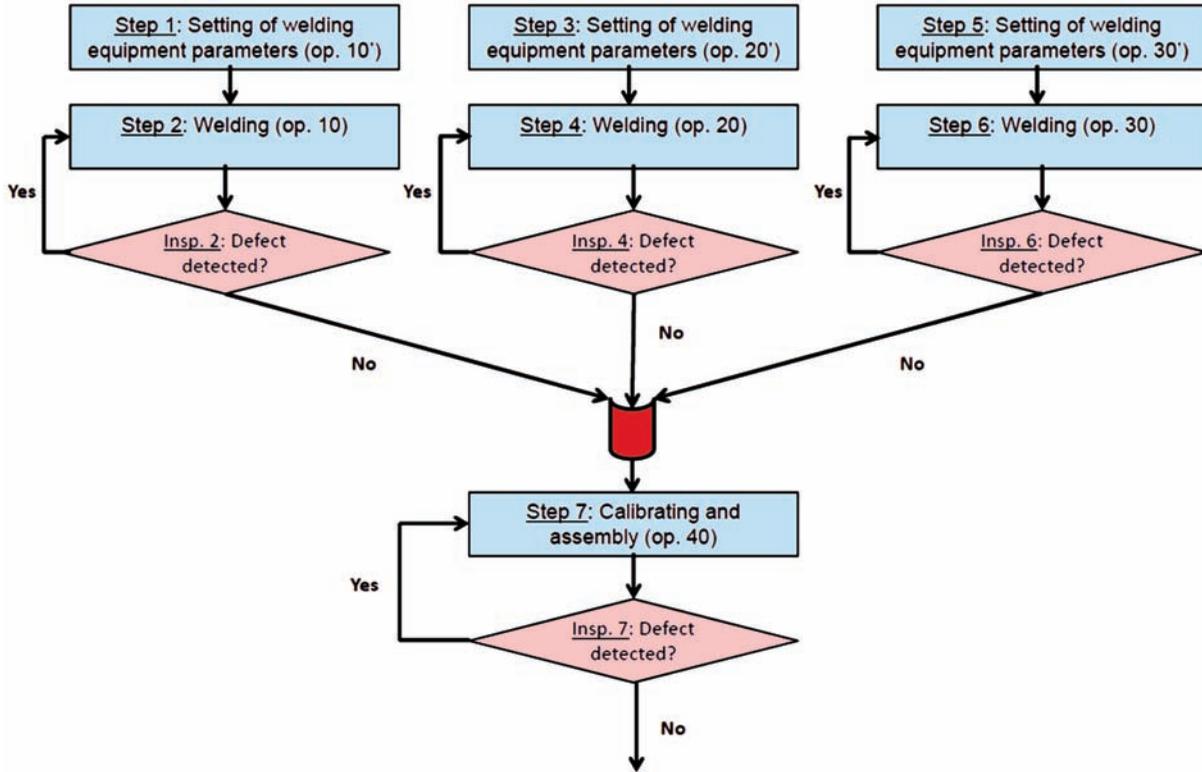


Figure 5 – *Integrated the first inspection procedure*

A self-inspection is performed after the steps 2, 4 and 6, while an inspection by an appointed staff is executed after the step 7.

In the second inspection procedure, the individual self-inspections are performed after each of the seven steps (see figure 6).



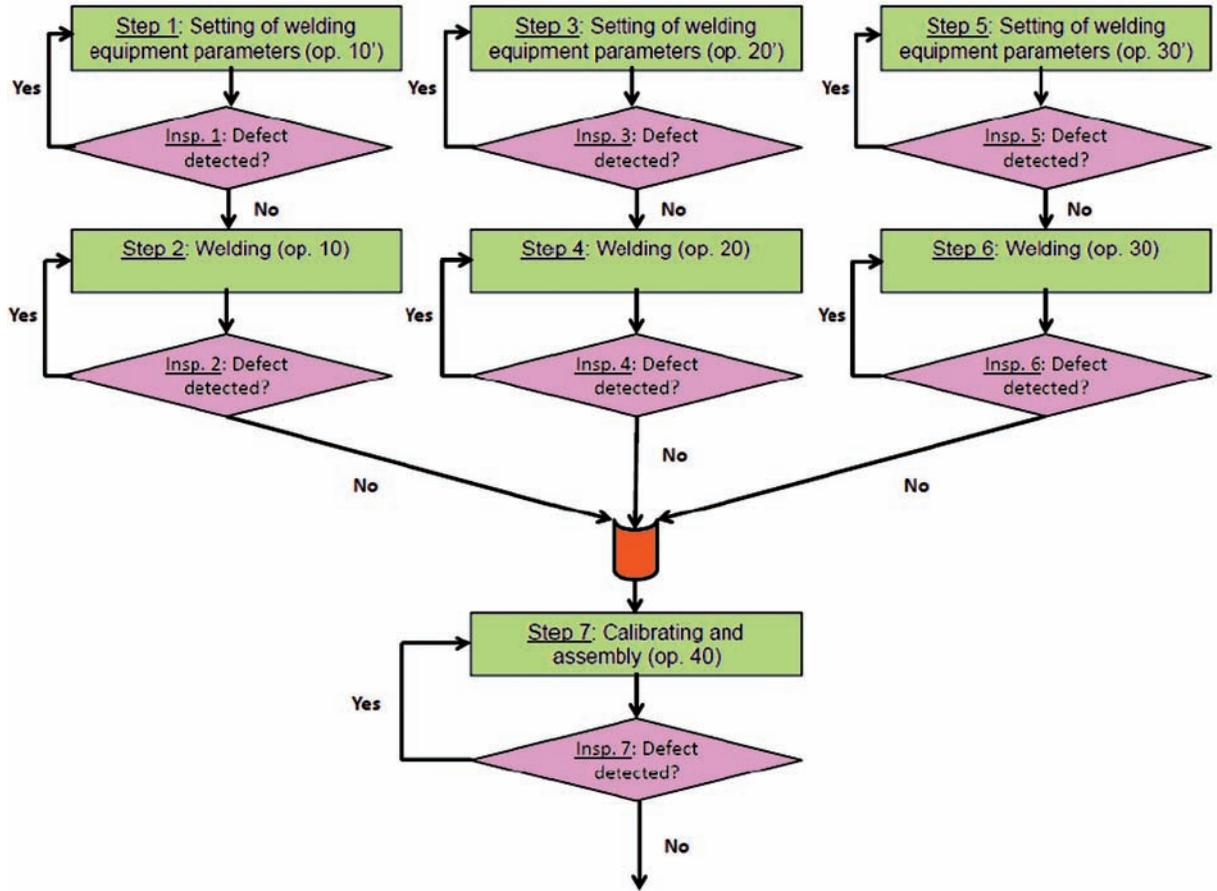


Figure 6 – *Integrated the second inspection procedure*

A self-inspection is performed after each of the seven steps. The adequacy of the inspection procedure is of paramount importance. Figure 7 shows an example of damage in a car fender due to a defect in a welding operation:



Figure 7 – *Damage in a car fender*

The frame indicates the damaged zone, while the arrow indicates the location of the defect.

Comparison of inspection procedures

The indicators previous described were applied to compare the two inspection procedures. Tables 1 and 2 report estimates based on prior experience of the indicators for each process step, considering the first and the second inspection procedure respectively. Estimates of cost parameters are just indicative because their actual values are confidential. The parameters that did not need to be estimated are italicized.

Table 1 – Estimates of parameters related to the first inspection procedure

Step no.	Operation type	p_i [%]	α_i [%]	β_i [%]	c_i [€]	URC_i [€]	NDC_i [€]
1, 3, 5	Set-up parameters	0.1	0.0	100.0	0	10	100
2, 4, 6	Welding	5.0	1.5	1.0	10	150	400
7	Calibrating and assembly	1.0	4.0	2.0	50	200	500

Table 2 – Estimates of parameters related to the second inspection procedure

Step no.	Operation type	p_i [%]	α_i [%]	β_i [%]	c_i [€]	URC_i [€]	NDC_i [€]
1, 3, 5	Set-up parameters	0.1	1.0	0.5	5	10	100
2, 4, 6	Welding	5.0	1.5	1.0	10	150	400
7	Calibrating and assembly	1.0	2.0	1.5	20	200	500

For both the inspection procedures, it is supposed that probabilities and cost parameters related to steps 1, 3, 5 and steps 2, 4, 6 are coincident, while those related to step 7 are independent. Table 3 reports the numerical values of D and C_{tot} , calculated for both the inspection

procedures, using the parameters in Table 1 and Table 2 respectively. This result shows that the second inspection procedure is, on average, significantly better, as it has lower mean total number of undetected defects (D) and total inspection cost (C_{tot}).

Table 3 – Indicators values calculated for the two inspection procedures

Indicator	First procedure	Second procedure
D	0.0047	0.0017
C_{tot} [€]	111.7	92.7

Conclusions

In the manufacturing processes, the inspection strategy is strictly related to the production volume. SPC techniques are popular for mass productions, although difficult to manage for short-run and single-unit productions. This paper examined the latter ones, adopting an overall probabilistic model for defect prediction together with two indicators for estimating the expected inspection effectiveness and cost. According to a cost-benefit logic, the combined use of these indicators makes it possible to compare two or more inspection

procedures in order to select the more effective and economically convenient for a process of interest.

An application example concerning a short-run production of front fenders of luxury cars exemplified the comparison of two different inspection procedures. The major limitation of the adopted probabilistic model and indicators is that they require the estimation of various not-so-easily-quantifiable parameters (i.e., p_i , α_i , β_i , c_i , URC_i , NDC_i). A thorough understanding of the process of interest and the expertise contributed to overcome this limitation.

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Value Through Education

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Abstract

Education is the supporting pillar of a society that wants to constantly evolve and improve. Since higher education is one of the main human resources developers, the present paper aims to elaborate a model of recovering the state's investment, applicable in higher education, taking into consideration the stakeholders' regard. The research is based on the current funding system in foreign countries and, as a proof of the current Romanian funding system's faultiness, on a set of questionnaires designed to evaluate the higher education stakeholders' satisfaction regarding this system. For a correct overview of the country's situation, the set of questionnaires has been distributed in different Romanian regions. Based on the current financing system of universities, the results gathered from the research by means of a questionnaire and other relevant studies in the field, a model of cost recovery was drawn.

Keywords: higher education, quality, refunding model

Introduction

In order to have an overview of the existing financing systems, the present Romanian and European funding system in higher education is presented. There are six types of Higher Education Institutes (HEIs) in Romania, distributed between state institutions and private institutions. Romania has reorganized its tertiary education system to conform to the European Bologna Process and since 2005, all students have been studying in programs that conform to the Bologna standards (Dincă, 2003).

The structure of Romanian university education is composed of more than 56



accredited higher education institutions, 26 accredited private higher education institutions and 6 graduate schools. The Romanian higher education system is organized on three undergraduate and post-graduate levels:

- 1st cycle – Bachelor studies; 3 years for sciences, humanities, social and economic, law, political science, fine arts and sport; 4 years for technological sciences, engineering, technical engineering, agriculture and forestry; 6 years for general

medicine, dentistry, veterinary medicine and architecture;

- 2nd cycle – Master studies – 2 years;
- 3rd cycle – Ph.D. studies – 3 years (Report Eurydice, 2014; Educational expenditure statistics).

According to the National Institute of Statistics, the total number of students enrolled in the public and private institutions is as presented in Table 1 (European Center for Strategic Management of Universities, 2010):

Table 1 – *Tertiary education institutions and students' distribution*

Do you believe that schooling expenses for students should be recovered in time?	
Teachers' answers	Students' answers
<p> ■ Yes ■ No ■ I dn/I da </p>	<p> ■ Yes ■ No ■ I dn/I da </p>

The 1991 Constitution (revised in 2003), stipulates that state education shall be free, according to the law and that the state will grant social scholarships to children or young people coming from disadvantaged families and to those institutionalized.

Approximately 64% of a public university's funding comes from the government, while 36% is raised from its own funds including fees and consulting activities, scientific research, external projects, micro production, and student accommodation (European University Association, 2013). The higher education budget is proposed by CNFIS to the Ministry of Education for the next fiscal year based on data provided by each university. Each year the government

approves the total number of study grants per study area and per university study cycle that it will fund based on the country's economic and social development requirements. Each university senate then distributes the study grants to study programs and study cycles according to its own strategy.

Though higher education is free of charge for state-funded students, the institutions may collect fees from these students for application and registration, and for the repetition of tests (European University Association, 2009).

Passing on to how other countries in Europe manage their finances when it comes to higher education, various studies de-

Table 2 – *The budget allotted funds' structure for institutional funding of state universities*

Subcomponents		2012	2013	2014
Core funding		68,00%	73,50%	73,50%
Additional funding		30,50%	25,50%	25,50%
Of which:	Additional funding based on excellence	25,00%	25,00%	25,00%
	Preferential funding of master and Ph.D. programs in science and advanced technologies, programs in international languages and PhDs in shared custody	2,50%	0,00%	0,00%
	Increasing the institutional capacity and the managerial efficiency	0,00%	0,00%	0,00%
	Higher education institutions engaging in playing an active role locally and regionally	3,00%	0,50%	0,50%
Institutional development		1,50%	1,00%	1,00%
Total		100%	100%	100%

veloped at the European Union level show the following funding modalities (Estermann, 2014; Friedman, Friedman, 1990):

Block-grant, that covers the teaching expenses (courses and seminars/practical activities), administrative and/or research expenses. The university has the freedom to decide how to use this funding, in accordance with its needs.

Line-item budgets – universities receive their funding based on cost items and/or activities. The Ministry or the Parliament decides on the allocation; universities cannot be involved in the decisions made on the allocations of this kind of incomes.

The formula-based funding (allocation) model is based on standard criteria to calculate the size of public grants allocated to higher education institutions (for teaching and/or operational activities and, in some cases, for scientific research). In practice, the formula-based funding can be split into: funding by a number of enrolled

students, the funding formula for teaching, the formula for unit cost or funding based on normative costs etc.

Studies mention two types of such models, according to the category of indicators/criteria used by the formula (Manolescu, 2009):

Input-oriented funding, using input-based formulas (such as: number of employees or their salaries, the number of employees holding a Ph.D. title, the number of Bachelor students, the number of Master students etc.); it is used most often for the funding formula applied for teaching allocations. Currently, the use of the number of teaching staff as a criterion is less important, most countries using the number of students.

Output-oriented funding, using output-based formulas (such as: number of credits accumulated by students, the number of Bachelor and/or Master graduates, graduates' employment, number/percentage of



graduates working in their specialization field etc.). This is an innovative type of funding, and it provides a much better correlation between the funding allocated and the performance expected from universities.

In practice, the funding formulas mentioned above are applied together, using input and output criteria, most often the number of students enrolled and the number of Bachelor graduates.

Performance-based funding is a way of improving the formula-based funding, by considering the university-specific performance. This funding model was designed to ensure more funding for universities showing better performance, as compared to other less performing universities.

Objective-based funding consists of targeting specific purposes which are generally aligned with the projects considered national priority by authorities and which are supported by the objectives set at the institutional level. It may be allocated through competition or directly to some institutions, following negotiations or justification of necessary expenditure.

Competitive funding is used to select and evaluate the capacity and the need to undertake specific activities so that they receive funding to achieve the specific objectives of the competition. Competitive funding is used especially for scientific research but also for funding investment or institutional development objectives.

Cost Recovery Model Development

According to Milton and Rose Friedman (1990), the problems of higher education is dual: quality and equity (Ministry of Education and Research, 2006).

Quality: Paying low tuition fees, food subsidizing and residential housing are the main reasons why many students go to state colleges and universities. Their main goal is not to find the best place where they can get a quality education, but to benefit from a convenient way of getting an education. The situation is very different at private institutions where students have to pay high fees that cover much if not most of the cost of their schooling. The money comes from parents, students' own earnings, loans, or scholarship assistance. The difference is that the students that come here are in search of high-quality education and they expect to find it because this is what they are paying for. As a result, it was statistically proven that students that enroll at private institutions and complete the undergraduate course are more numerous.

Equity – the two general justifications for using money that come from taxes in order to finance higher education are: higher education yields „social benefits” above the benefits of the students, and government finance is needed in order to promote „equal educational opportunity”. The idea that investing in providing highly trained



and skilled people is essential for the economic growth is correct, but none is a valid reason to subsidize higher education.

The promotion of „equal educational opportunity” is found as an explanation for using tax money in order to finance higher education in many researches. According to Carnegie Foundation for the Advancement of Teaching, higher education is „a major avenue to greater equality of opportunity, increasingly favored by those whose origins are in low-income families and by those who are women and members of minority groups”. In fact, persons coming from middle and upper-income families

are two or three times as likely to attend a university as others coming from lower income families. This leads to the conclusion that students coming from higher-income families benefit more from the subsidies.

Starting from the dual problem of quality and equity encountered in many countries across Europe and from the high percentage of teachers and students from Romania that agree with the fact that the schooling expenses for students should be recovered in time (Figure 1), the authors proposed a cost recovery model that could be applied in Romanian universities:

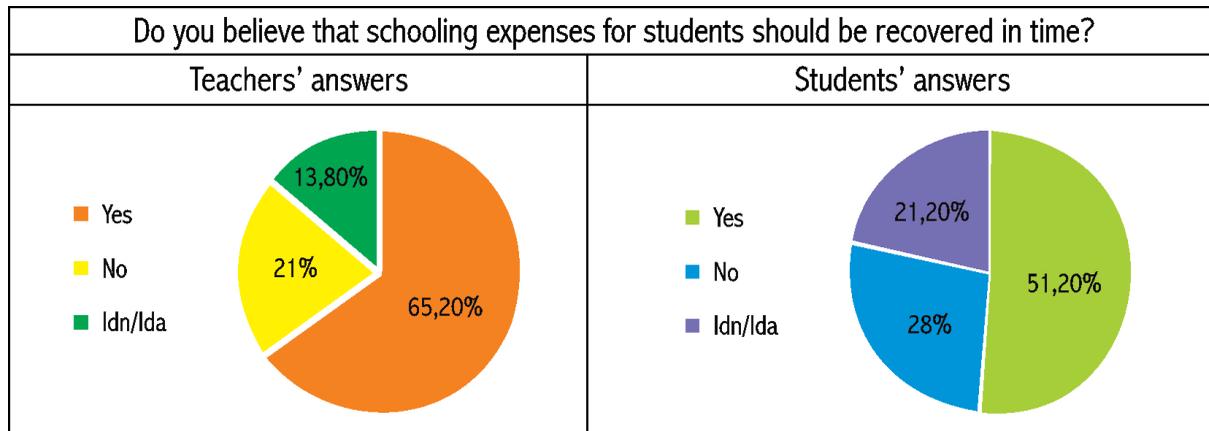


Figure 1 – Stakeholders' opinions on whether the schooling expenses should be recovered in time

In present, the state grants 4000 lei/student/year, resulting in a total of 16000 lei/student/period of bachelor degree studies (Ministry of Foreign Affairs). No amount of this money is recovered by the state. By finding a solution of refunding the state's expenses with students, the universities could benefit from additional financing

profit that can help increase the teaching quality, the stakeholders' satisfaction, the working environment infrastructure and so on. Based on how other countries in the world are managing the state university funding (Miron, 2007; Sîrbu, 2015; Stancu *et.al.*, 2011), the authors have come with the another proposal of refunding (Table 3):

Table 3 – Cost recovery options

Salary [lei]	Possible cost recovery			
Salary < 2500 lei	The state expenses won't be recovered until the graduate overcomes the salary of 2500 lei			
Salary between 2500 and 3500 lei	Grace period	2 years		
	Refund period	5 years	7 years	10 years
	Interest	4.00%	6.00%	8.00%
	Amount to refund	16322.57026 lei	16684.21769 lei	17327.07694 lei
	Amount to refund/year	3264.51 lei	2383.46 lei	1732.71 lei
	Amount to refund/month	272.04 lei	198.62 lei	144.39 lei
Salary between 3500 and 4500 lei	Grace period	1.5 years		
	Refund period	3 years	5 years	7 years
	Interest	3.00%	5.00%	7.00%
	Amount to refund	16144.43243 lei	16404.02005 lei	16800.65743 lei
	Amount to refund/year	5381.48 lei	3280.80 lei	2400.09 lei
	Amount to refund/month	448.46 lei	273.40 lei	200.01 lei
Salary > 4500 lei	Grace period	1 year		
	Refund period	1 year	3 years	5 years
	Interest	2.00%	4.00%	6.00%
	Amount to refund	16032 lei	16192.76902 lei	16485.79466 lei
	Amount to refund/year	5344.00 lei	3238.55 lei	2355.11 lei
	Amount to refund/month	445.33 lei	269.88 lei	196.26 lei

The interest was calculated using the following formula (Toma, 1996):

$$Cf = C * u_n, \text{ where } u = 1 + i \quad (1)$$

$$D = Cf - C = C * u_n - C = C(u_n - 1) \quad (2)$$

$$C = \frac{Cf}{(1+i)^n} = Cf(1+i)^{-n} \quad (3)$$

$$d = \left(\frac{Cf}{C}\right)^{\frac{1}{n}} - 1 = \sqrt[n]{\frac{Cf}{C}} - 1 \quad (4)$$

where: C – fund; Cf – final fund plus the in-

terest at the end of the period; n – period for which the interest is calculated; d – annual interest rate; i – the interest rate at a monetary unit ($d/1$), 1 Euro = 4,54 lei.

To perform a relevant simulation of the possibilities suggested for recovering the state's expenses, a sample of 100 graduates has been taken into consideration. The value of the expenses recovery for the chosen sample of students would be as follows (Table 4):

Table 4 – Recovery amount for a sample of 100 graduates

Recovery amount for a sample of 100 graduates								
2500 – 3500 lei salary			3500 – 4500 lei salary			>4500 lei salary		
5 years refund	Amount	Interest	3 years refund	Amount	Interest	1-year refund	Amount	Interest
	1.632.200 lei	32.200 lei		1.614.400 lei	14.400 lei		1.603.200 lei	3.200 lei
7 years refund	Amount	Interest	5 years refund	Amount	Interest	3 years refund	Amount	Interest
	1.668.400 lei	68.400 lei		1.640.400 lei	40.400 lei		1.619.200 lei	19.200 lei
10 years refund	Amount	Interest	7 years refund	Amount	Interest	5 years refund	Amount	Interest
	1.732.700 lei	132.700 lei		1.680.000 lei	80.000 lei		1.648.500 lei	48.500 lei

Considering a number of 300 graduates, divided into the three salary categories mentioned above, by refunding the state expenses on a medium period of 5 years, the state would benefit from an extra funding, coming from interest, equal to 120.900 lei, equivalent of 24.180 lei/year.

According to the National Institute of Statistics, a number of 95022 students graduated from college in 2015. Financially, this equals to 1.520.352.000 lei spent by the state to finance students. This represents approximately the annual loss of the state. Taking into consideration the medium 5 year recovery period, mentioned in the proposed model, the state's expenses would rise up to 7.601.760.000 lei. By applying the cost recovery model above, only for the first salary framing, the state would benefit of an approximately 7.754.745.420 lei refund, having a gain of 152.985.420 lei.

The money coming from the interest can be reinvested by the university considering

the most important needs at a given time: laboratory equipment, infrastructure, performance premium for students or teachers, courses, etc. Based on the above, the cost recovery model was drawn (Figure 2).



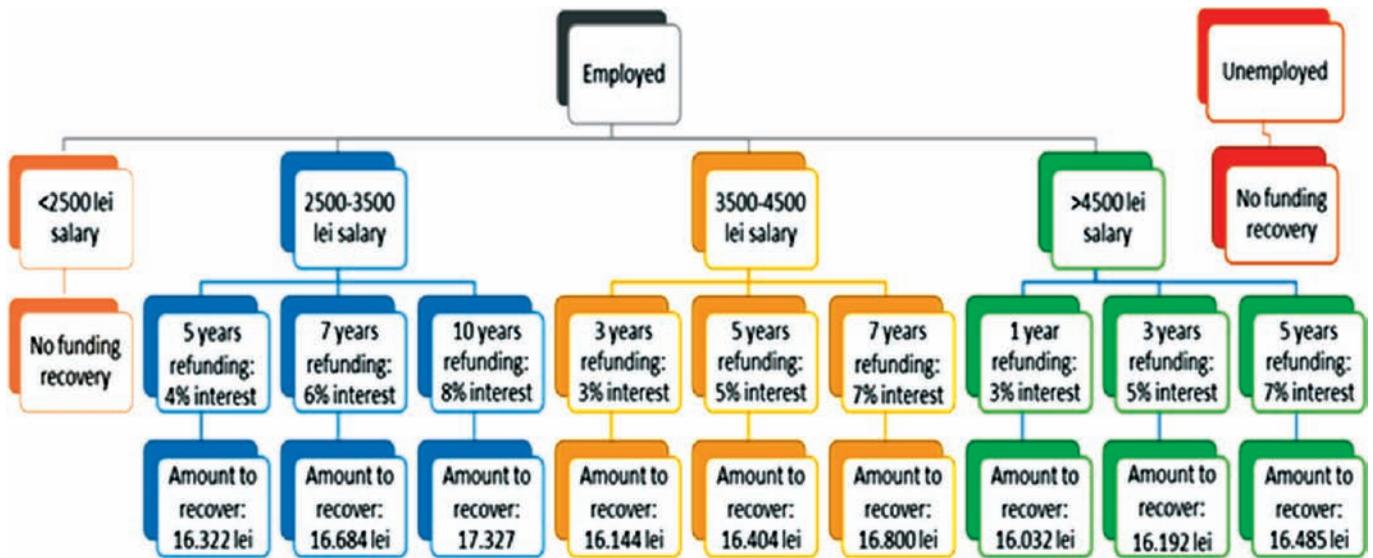


Figure 2 – Cost recovery model

Conclusions

The present paper is related to the problems that foreign countries encounter in financing state universities as well as finding new means of finance. The problem of higher education funding is trying to be solved by every country in the world. Nobody has found yet the perfect combination, but by putting together all the ideas, suggestions, models and adapting them to each country's characteristics, the present funding system can be improved.

In order to fulfill the objective of solving the higher education's two main financial matters discussed in the paper, quality and equity, the idea of recovering the state's investment in students' education came as a potential solution. Considering the suggested model of cost recovery, the interest is at an acceptable level for the graduate and at a high level of importance for a supplementary funding of the universities.

The money recovered from an employed graduate can be invested by the university

to finance another and to improve the learning environment conditions and increase the quality level of the curricula, which also raises the university's competitiveness.

The fact that everybody has the right to education is true, but this doesn't mean that it has to require public financing. If the current funding system is maintained, the long-term development cannot be sustained.

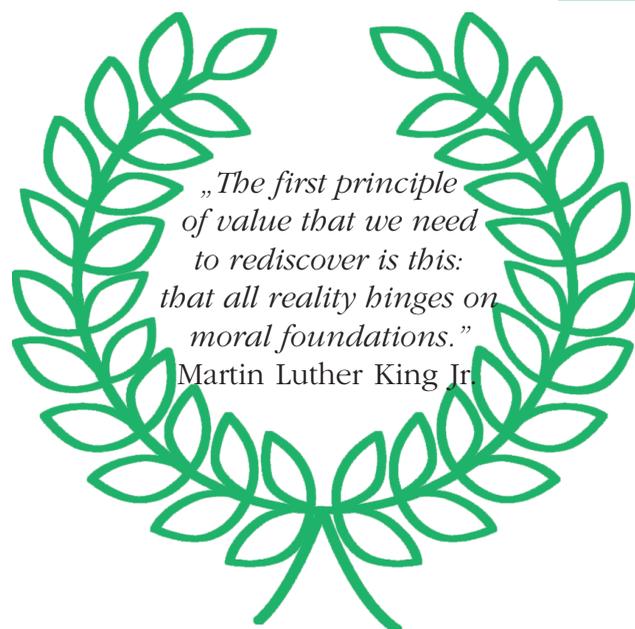
Aiding the higher education financing will also support the country's economic and social growth as well as improving the country's overall image and prestige among other countries with high, competitive educational system.

Acknowledgment

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Creating New Values Through Sport

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Abstract

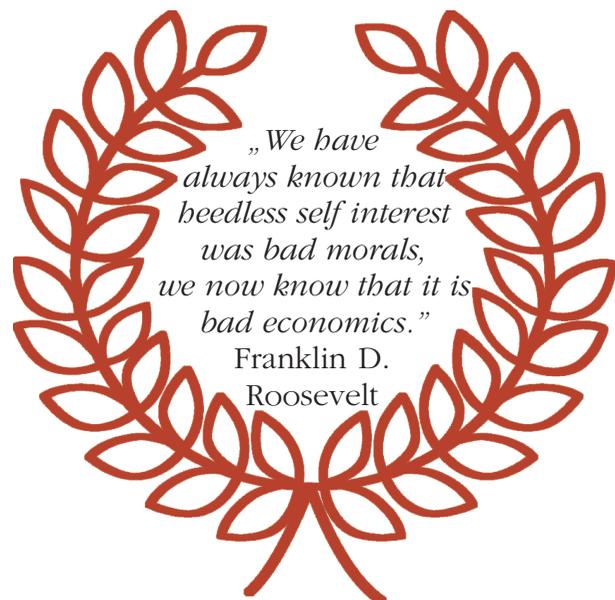
In the field of sport, operational adjustments in terms of cultural conceptual interrelations between „project”, „quality” and „management” are subject to different approaches. In order to be able to analyze an actual cultural and sports project, it is appropriate to consider that any generic project has the same basic structure and will go through the same separate stages/processes, by an own life cycle. The paper presents the features of projects subject to cultural conceptual interrelations with „quality” and „management” in the field of sport and the objectives of projects subject to the respective interrelations. There are described the objectives and the contents of the project „Sport for all”, subject to cultural conceptual interrelations between „project”, „quality” and „management”.

Keywords: project, quality, management, sport, culture.

Introduction

The project, considered as the generic element, is a temporary effort made in order to create, with limited resources, a single product or a single service, including those of cultural, sports nature. The project gathers many interdependent activities carried out according to a schedule in order to reach a certain goal/to obtain certain results in a definite period of time; project activities cease when the respective goal has been achieved.

Based on this approach, it is noted that in common organization systems from the contemporary world which is witnessing evolutions of human groups, there are





cultural conceptual interrelations between „project”, „quality” and „management” in the field of sport.

Features of Sporting Projects

The organizational structure is the key feature for designing the guiding system in the field of physical culture and sport. We should mention that from a managerial perspective, the field of physical culture and sport is guided as a whole by public, private, non-governmental and commercial organizations (Gâf-Deac, 2010).

Sports structures are specialized organizations, set up by natural or legal entities in order to organize and manage activities in the field of physical culture and sport. These are:

- Sports associations (set up by natural or legal entities, aimed at promoting one or several sports examinations, performance and participation by their members in sports activities and competitions);
- Territorial associations (set up independently or within public or private institutions, aimed at the participation of their members in local sports competitions);

- Sports clubs (sports structures having legal personality);

Sports cultural projects are single, complex activities which have certain targets and an increased degree of novelty, special organizational structures and methods and a deadline for the achievement of their goals. The intended goals can be to create a set of new values (products/structures/services/ideas etc.). The uniqueness of the results comes from a generic, feasible sports cultural project. The novel nature of the result generated involves a certain degree of the unknown, proper to any brand new action.

Recognizing the feature of „unknown” involves also the occurrence of risks, involving at least one risk factor (Costanza, 2008). The duration of a sports cultural project is limited. As projects have precise start and end time periods, certain organizational elements acquire a temporary nature, being especially envisaged in order to achieve the specific objectives. For instance, the work team of a sports cultural project is set up only for the project duration, and a number of resources and managerial responsibilities are committed strictly in connection with the project objectives.

Objectives of Sporting Projects

The goal of a sports cultural project is the result expected to be achieved while reaching the project scope and, implicitly while solving the problem. It is necessary for the goals to be quantifiable and to set time limits for their achievement.

The definition of goals of a sports cultural project has a major significance, as it depends on the formalized strategy methods used for implementation. According to the managerial theory (Ionescu, 2009), objectives should be of „SMART” type (Table 1):

Table 1 – Characteristics of objectives

S	Specific	in order to define very clearly what will be achieved
M	Measurable	the result obtained must be measurable
A	Achievable	by all team members
R	Relevant	in order to be achieved
T	Time-bound	setting a realistic deadline for achievement

In order to be able to analyze an actual cultural/sports project, it is appropriate to consider that any general project has the

same basic structure and will go through the same separate stages/processes (Marinescu, 2012), by its own life cycle (Figure 1):

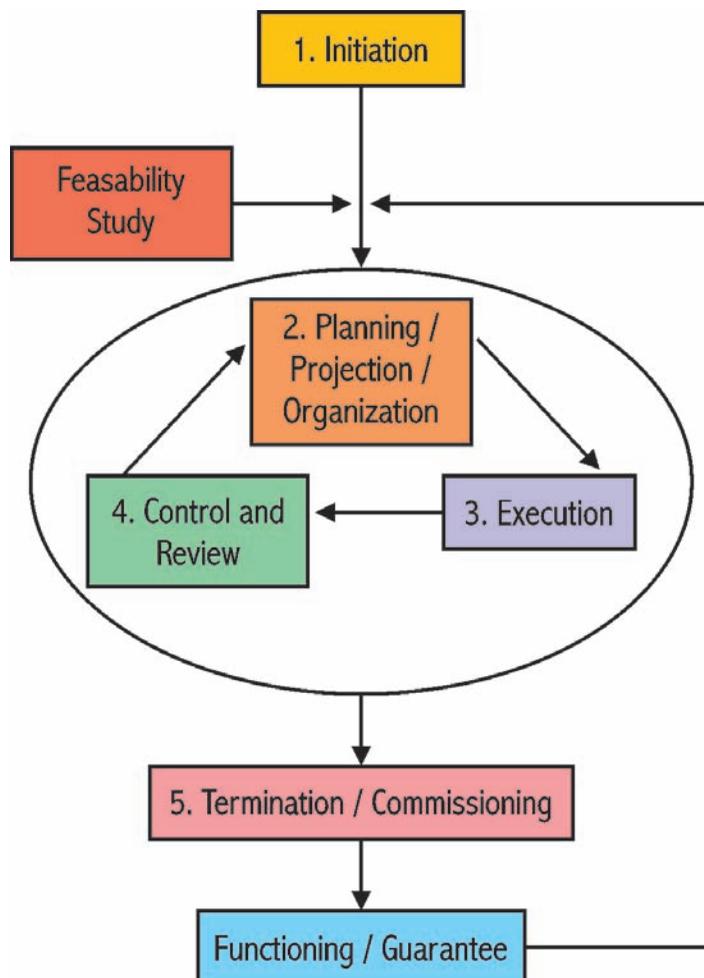


Figure 1 – Processes of a cultural sports project
(Source: AEFS Bucharest, 2011)

In order to be successfully carried out, each of the phases, stages and basic processes of a cultural-sports project needs

qualifications, features and performance of certain activities. The five stages/ basic processes of a cultural-sports project are

the following: inception; planning/design/organization; execution/building; control/review; completion/commissioning.

As an example, the issue of spare time can be found in a project describing some specific cultural conceptual interrelations between „project”, „quality” and „management” in the field of sport. The additional time can help, through being organized to the completing the ordinary activity and to the balancing, compensation of the lack of movement from the time allocated to the professional occupation.

Content of the Project „Sport for All”

The concept „Sport for all” has been established by the Council of Europe during the efforts of developing culture, being aimed at extending the benefits of the sport among a large number of people. The starting point was represented by the Declaration of human rights, stipulating the idea that each individual can develop himself/herself without any discrimination, regardless of age, sex, social status. The peculiarity is represented by the equal right of all to using the spare time in the current society.

The modern concept of education, materialized in the trends of free access to information and ongoing training, also includes the area of physical education and sport. It gradually materialized into the movement „Sport for all” thought all lifetime, meant to correlate any human being’s natural right to the movement to the social right to ongoing and universal education. The actual exerting of these rights depends essentially on the possibilities provided to people to develop and defend their physical, intellectual and moral skills.

In 1998, the Council of Europe expressed through the Charter of Physical Education

the role of sport in the society and education, and its relation to culture. The basic concepts presented as main ideals are those of the modern Olympic spirit: harmonious development of the mind, body and character, pleasure (joy) of effort, positive role models for society, preservation of universal ethics, tolerance, generosity, unity, friendship, non-discrimination and mutual respect.

In countries with a free culture, the sports activity is considered as an expression of the free and autonomous initiative of the citizens, at the same time being recognized in its social importance. Its promotion and development are therefore due to sports movement as a manifestation of the civil society. The recognized role of the state is that of creating the conditions necessary for doing sports and helping the sports movement to develop its own autonomous capacity of initiative (Foley and Hermel, 2008).



In authoritarian states, sport is considered a public service. The state undertakes the responsibility of promoting and developing the sport and in some cases, in various ways and ratios, even its management and control – within the objectives of its own sports, social and health policies.

In general, the sports movement is assigned as an autonomous function only the organization of sports competitions (officially recognized at national or international level). In countries that have adopted this model – France, Spain and Portugal – laws regarding sport determine the legal framework under which sport can take place at national level, the state prerogatives, the role of sports associations or areas of collaboration between them.

Actually, these two types of sports organization are not divergent. Often, the two cultures – „liberalism” and „interventionism” – are moderated by the consequences of various political trends char-

acterizing the run of the state. Some elements and principles are common to both systems:

- volunteerism and sports associations are considered essential for the sports promotion and development;
- one recognizes the autonomy of sports activity organization;
- one generally recognizes the need for state intervention in sport, because of the social value of sport, of significant financial resources necessary for its promotion, as well as of the important of the role that sport is supposed to play in school.

On the other hand, sport influences the nervous system and psychic life of man. Proper workout stimulates intellectual activity, generates prophylactic (preventive) and therapeutic effect, because of favorable influences on various body apparatuses and systems. Workout and sport performed on a regular basis improve movement skills, enhance capabilities, and increase the efficiency of physical and intellectual activity. Strength, resistance, practical ability are physical skills and requirements for different professions and also in life.

In this context, the spare time should be used to help, to the recovery from the effort from the usual activities, and to the balancing, compensation of the lack of movement in daily lives.

Operational adjustments in terms of cultural conceptual interrelations between „project”, „quality” and „management” in the field of sport are subject to different approaches (Marinescu, 2008):

- consolidating health and recreation with a mass character (usage of physical culture means in the collective organization of spare time, of healthy rest during the period of vacation or during non-working days etc.);





- general training approach (general physical training as activities within sections, groups and individually);
- sports approach (specialized performance of sport in sections or individually);
- professional-applicative approach (use of physical culture means in the regime of the working day and special forms of professional-applicative physical training);
- remedial and curative physical culture approach (in the system of medical measures for health remediation or of lost or reduced functions as a result of illnesses or traumas).

Physical education acquired the character of voluntary usage. But this does not mean that physical culture activity became an issue of personal excellence and lost its socially regulated forms. It is organized

within voluntary sports associations and in other forms, including state associations (physical culture in the system of scientific organization of the work, military applicative physical training etc.).

Conclusions

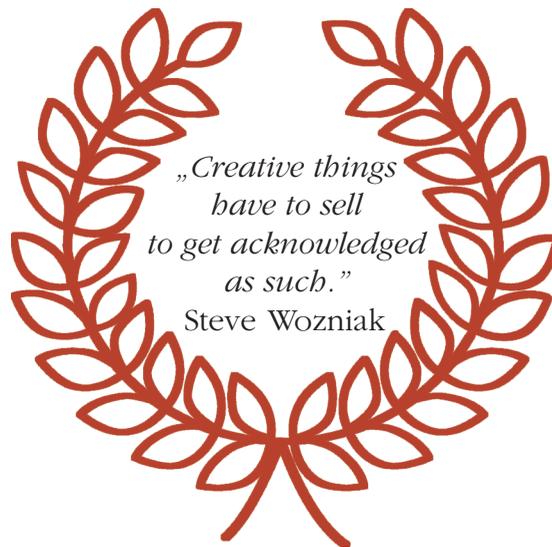
The actual guidance and the forms of usage of the physical culture depend to a great extent on the nature of their productive activities, their individual tendencies, on peculiarities of age and sex, on previous training level and health condition, and to a certain extent, also on the existing technical and material basis.

Together with the set of issues addressed by the mass physical culture movement, there is a variety of directions, means, methods and forms of organization of the activity in the field of physical education.

Using the physical culture means, there can be generated the conditions for remaking the work ability and for consolidating health, ensuring an appropriate physical and hygienic life regime, necessary for the proper functioning of the body.

Acknowledgment

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Agnieszka Misztal, Iuliana Grecu, Nadia Be

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