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**MARKET CONDITIONS, EDUCATION AND LEGISLATION
NEEDED TO PROMOTE CONSTRUCTION OF HIGH
PERFORMANCE IN ROMANIA**

BY

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Abstract. Analysis of market conditions requires a full investigation of the urban structure, defined as a system of social components, physical and economic, which is influenced in most cases by the differences due to geographical location, city size, economic activities, technologies and cultural norms. Throughout the history, the education has demonstrated the vital role for the development of civilization, culture, humanity, and to improve order and rationality in social life, to cultivate spiritual values.

Buildings are among the most important manufactured products, as they provide a safe framework for the most human activities and have the longest period of use. Therefore, any construction must meet a rich set of requirements determined by the needs of use and aesthetic ones, and their quality is assessed by the criteria stipulated in the technical regulations.

In construction, the basics that lead to the definition of performance are: user requirements, performance requirements, performance criteria, performance levels. Progress of any society is based on the major investment efforts, which contribute to the new construction, and the restoration, renovation and modernization of infrastructure and superstructure still available to that community.

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The paper presents some relevant aspects of market conditions, educational and construction legislation in Romania. Key factors nominees develops complex interdependence and promotes high performance in construction, development of technology and engineering sciences.

Key words: market conditions; education; legislation; construction of high performance.

1. Performance, Innovation and Globalization in Construction Field

The history of building technology in Romania shows an approximation of the construction to master nature through achievements of engineers: there are constructed buildings with different functions (Fig. 1), bridges (Fig. 2),



Fig. 1 – Parliament House (House of People), Bucharest, Romania
(<http://www.google.ro/imgres?imgurl=http://bucuresti.romaniaexplorer.com>).



Fig. 2 – Basarab Overpass Bridge, Bucharest, Romania
(http://www.google.ro/imgres?imgurl=http://www.evz.ro/uploads/06basarab_V...).

roads and railways (Fig. 3), canals and dams to curb the power of water (Fig. 4). Peoples made or built environment, from roads to individual buildings which are modelled by human presence (Isopescu & Țăranu, 2009).

Constructions are complex processes involving both construction professionals and government and citizens. A quality built environment resulting from an accumulation of components that make up the construction: the structure it supports, facilities and systems to help them work, materials used, and the space functionality. It is appropriate to combine traditional elements with current trends as a result of the combined creative force of human

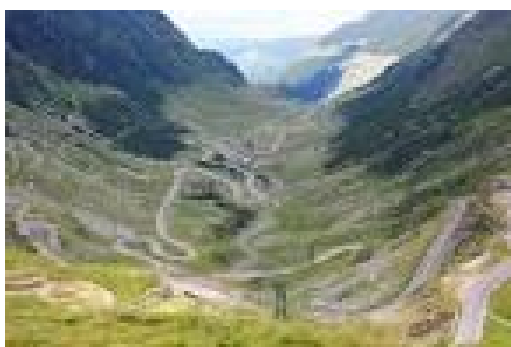


Fig. 3 – Road DN7C – Transfăgărășan Road, Romania,
(<http://www.google.ro/imgres?imgurl=http://hartaromaniei.eu/...>).



Fig. 4 – Danube–Black Sea Canal, Romania,
(<http://www.google.ro/search?q=canalul+dunare+marea+neagra...>).

interference with natural systems. The contact of innovative design capability and of appropriate technology with possible new directions for sustainable development emphasizes quality that marks a qualified environmental design and execution. In the construction industry, the basics that lead to the definition of performance are: user requirements, performance requirements, performance criteria, and performance levels. Constructions are accompanied by the performances throughout their existence, during which beneficiaries must satisfy.

Globalization, as a process of interaction and integration, requires harmonization of technical basis for the design of buildings, increased mobility of designers and/or project preparation, the removal of technical and commercial barriers in the construction industry, international regulations available for different types of structures, materials and products and ensuring the performance of materials, equipment and, in general, engineering products.

Progress of any society is based on the major investment efforts that contribute to the restoration, renovation and modernization of infrastructure and superstructure available to that society. The developed countries, towards which Romania is heading, show us that the efforts being made everywhere to achieve performance in construction leading us to

- a) education and scientific knowledge;
- b) promotion of international scientific cooperation in order to integrate the Romanian research in the fields of top contemporary science;
- c) increase the capacity and marketing performance of national construction companies;
- d) promoting appropriate legislation to stimulate economic development.

In Romania, the integration of the built environment in nature must take into account all processes such as global development and globalization, problems of sustainability, cultural identity and resistance to natural disasters. These actions toward a specific purpose, construction of high performances, will be achieved differently depending on local conditions.

2. Market Conditions in the Construction Sector

In construction, consumption plays an important role due to high volume of labour, material and financial resources, and that is a trigger and stimulating factor of the production correlated sequences (Isopescu & Țăranu, 2009). Product concept envisages all that can be offered to a market to be purchased. The marketing concept it refers to tangible items (a building, a road, a power network, a service building, etc.) and a number of issues intangible (ideas, property or intellectual property right).

The differentiate product offerings in construction can be achieved by functionality, performance, compliance, sustainability, design, maintenance or lead-time, consulting, etc. In construction field, specific orientation offer requires actions identified certainly. A special feature is determined by the application of construction technical nature, with important implications on the specific construction market. Mainly strategies refer, in addition to quality management, to source control costs through specialization in an industry that influences one component of investment costs (design, consulting, material, labour or equipment), to the promotion of new technologies and to a sustainable approach towards environment (Ghiga, 2000; Isopescu *et al.*, 2009).

In Romania these relationships are established on empirical principles, with technical background and appropriate legislation support in constant change. Free market and increased demand for construction led to a spectacular development costs, substantiated only by getting a profit.

The value of goods and services produced by an employee decisively influences both economic competitiveness of a country, and the wages of country. In this direction, Romania is the second lowest in the EU, but the progress we have made in the past 40 years in construction field are significant, (Fig. 5 – <http://economie.hotnews.ro/stiri-imobiliar-8388720...>). Overall, real productivity gains in Romania recorded between 1970 and 2010 in the industry was approximately 230%, in the construction sector was about 460% and in the agriculture sector was 266%, (<http://businessday.ro/03/2011/cum-a-evoluat-...>).

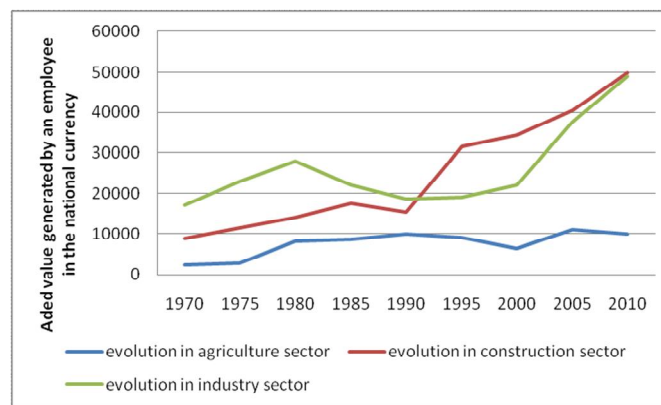


Fig. 5 – The evolution of value of goods and services produced by an employee.

The financial crisis has caused significant adjustments in this sector. Thus, according to the latest data published by the National Institute of Statistics (INS), the number of companies active in the construction sector fell 16% in 2010 compared to 2008. During the same period analyzed for the same sector, the average number of employees was reduced by 29%, turnover shrank by 21%, and gross result was plunged, -80.51% , (<http://www.wall-street.ro/articol/Companii/115628/...>). According to INS, the number of construction completed in the first three quarters of 2011 fell by -9.5% over the same period of 2010 and -23.8% compared to the first nine months of 2009. Perspectives on the evolution of this indicator in 2012 are stabilizing, given that authorized construction in the first 11 months of 2011 were down, -4.6% compared to the same period of 2010 and -17.2% compared to year 2009, (<http://www.wall-street.ro/articol/Companii/115628/...>).

In the coming years, civil engineering will be the main growth engine of the construction industry in Romania, due to infrastructure projects funded by

the European Union, (<http://www.financiarul.ro/2012/06/05/infrastructurilerutiere...>). Under these conditions it is expected that in the near future the construction sector in Romania by major EU funded projects will be a financially attractive sector. Achieving sustainability performance along with funds means creativity and competence, high quality education and proper technical regulations.

3. Education in the Construction Field

Romanian construction market, which is currently stagnating but has growing possibilities according to recent studies, is struck more strongly by the lack of skilled labour. The lack of professionals is observed in quality but also in the duration of the project implementation.

Human capital development aims to create and develop opportunities for lifelong learning to train competitive specialists and better use of the labour market in a knowledge society. Based on a simple concept – the most important resource in construction is the human resource – it highlights the significance of professional growth and for this reason should be monitored continuously improving through various forms of training aimed at

- a) developing skills and abilities;
- b) developing relationships and communication;
- c) involvement in development through involvement in scientific research.

Education and initial and further training are essential to ensure key skills, knowledge and abilities necessary for training and development of human capital stock educated and competitive in the construction industry. Full employment of labour will be done by investing in increasing adaptability, employability and entrepreneurship. In such a perspective, in construction field the educational process must be flexible and pragmatic and must meet labour market needs, regardless of skill level.

The present education strategy in Romania contains operational solutions for the period 2009...2015, to build by education and research a knowledge society, the only one that can bring sustainable development.

Promoting the four pillars of a knowledge society – education, research, development and innovation – does not only involve a priority support of construction field activities; it involves, first of all, a new range of values. In Romania a construction market based on knowledge will be developed believing in values such as: learning involves the development and modernization of institutions and technologies, research put at the service of solving the complex problems of building material and structural behaviour. This process needs to cover the following steps: to identify and analyse

environmental training requirements and the assessment of qualitative and quantitative training needs.

Research component of the educational system in Romania will be the one that can cause high-performance in construction. Along with qualified specialists, applied research represents the development environment necessary for high-level scientific creation. In 2011, in Romania, the number of employees who worked in this strategic sector (research), which is given great importance in developed economies, was 39,065 people, with 3,355 fewer than the previous year, which means a loss of 8% among researchers. In these circumstances, Romania succeeded, however, ranked 35 in the world, in terms of volume of output, measured conventionally by specialized published papers, (<http://cursdeguvernare.ro/o-analiza-a-cercetarii-romanesti...>).

Similarly, Romania takes the podium at the amount of research among countries of the region, but is placed just in last place in terms of the actual effect of the work carried out, index H (the H -index is an index that attempts to measure both the productivity and impact of the published work of a scientist), (<http://cursdeguvernare.ro/o-analiza-a-cercetarii-romanesti...> – Fig. 6). In short, in our labour is relatively more results low when it comes to fleshing findings.

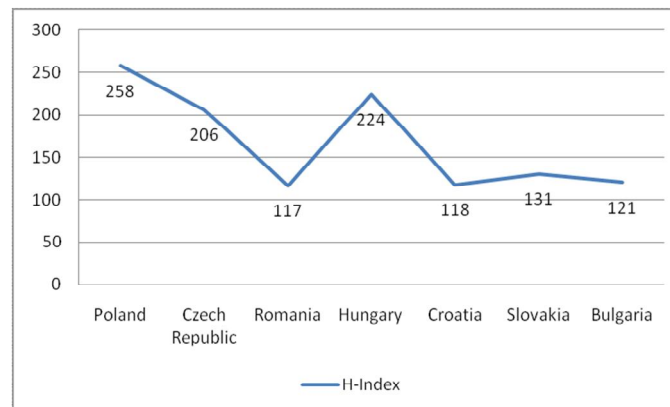


Fig. 6 – Regional rankings published papers.

These aspects should produce changes in the organization of exchange of ideas, beyond the allocated funds or facilities that Romania should provide to research and development activities. Solutions for national research infrastructures are known: an extensive cooperation with international research and integration in development and innovation international clusters. Technology transfer under a low economic level is a goal with no chance of success.

Solving the problems facing companies working in the construction industry in Romania requires broadening:

- a) the spectrum of activities of the Faculties of Civil Engineering, Building Services and Architecture;
- b) implementation in the educational process of continuous improvement programs to adult professionals;
- c) improving research institutional collaboration with other international institutions and professional associations.

4. Building Legislation in Romania

The main objectives of the European Union are promoting continuous, harmonious and balanced member countries, creating a common market, agreeing to legislation to enable the functioning of the common market and free movement of goods, persons, services and capital.

Public Works Directive, 89/440/EEC and Directive on Construction Products (CPD) 89/106/EEC (2013/C 59/01) established the principles of operation of the market in the construction and development of technical criteria and method of correlation / interpretation of laws, regulations and decrees of the member countries of the European Union. Directives importance lies in the fact that it is based on a new, modern construction of all activities, which means providing a product or group of products (materials, components, structures, construction set, plant and equipment, projects and so on) of a number of essential requirements or core requirements.

According to European Directives, in Romania, technical building regulations have been treated consistently by specialized technical committees, which, to meet the six construction requirements (strength and stability, safety of operation, fire safety, hygiene, human health, and environmental restoration, thermal insulation and waterproof, energy economy and heat retention, protection against noise), have the following obligations:

- a) technical regulations for quality assessment for construction components;
- b) technical approvals for products, processes and equipment;
- c) certification of conformity of quality products used in construction.

In Romania, at this moment, there is a legal framework for spatial and urban planning, approval and execution of construction works, construction quality assurance, materials and construction products, the state control on the observance of discipline in planning and authorization regime of construction and consistent application of legal provisions on construction quality. Following the dynamics of evolution in construction activity, recently, failures were observed in the interpretation of legal regulations in the field, but also in terms of their application.

The legal framework should be systematized in norms for urban planning and construction quality requirements, which will need to systematize

and correlate relevant provisions in a unitary structure, eliminate failures occurred so far and also to clarify the harmonizing legislation of the Romanian construction principles and EU regulations and international treaties to which Romania is a part. In addition, to unify and harmonize existing legislation, are required a number of provisions related to concept of the built environment development performance. These provisions could include

a) the certificate of conformity of construction, document that will certify compliance with the essential requirements for construction subjected to acceptance on completion;

b) elimination of discriminatory requirements that exist in legislation related to the building license between constructions built in urban and rural areas in order to achieve sustainable housing that does not endanger the lives of people and animals;

c) eliminating excessive regulation by recasting the specialized requirements in one regulatory act.

5. Conclusion

Market conditions and technical regulation existed in Romania make possible to promote the construction field to one of a high performance level, limited only by the financial resources and the labour qualification. If funding will be solved under the conditions of international agreements with the EU, through international funding coming from other sources and sustainable growth of GDP in Romania, the labour qualification process is related to education in construction field and could be improved through the following principles:

a) the formal learning which takes place after educational goals and curriculum explicitly formulated, and is intentional and involves the learner registration and certification of learning outcomes;

b) the informal learning refers to the knowledge, skills and competences acquired in the context of daily activities institutionalized in work, social and recreational, educational or acquired without a goal made explicit curriculum;

c) the non-formal learning refers to the knowledge, skills and integrated skills in the context of planned activities, institutionalized, but not explicitly formulated educational objectives and curriculum.

It is still impossible in Romania to close the gaps determined by the limited financial resources within a reasonable time if the share of research and development amounts to an order of magnitude below the EU average and not very well materialize in practice what we can get in theory with these amounts.

Collaboration in research and international sustainable development is imperative in Romania. Development of human society is achieved through quantitative and qualitative accumulation simultaneously. It is said that the

natural order is the qualitative leap that follow after a quantum leap. Quantum leap was made in Romania, now is the time for the qualitative leap that can be achieved by accepting the Romanian performance in the international scientific community.

To promote construction of high performance in Romania seems to be a dream at this moment, but I continue to hope that it's not long before the dream becomes reality.

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CONDIȚIILE DE PIAȚĂ, EDUCAȚIE ȘI LEGISLATIVE NECESARE PENTRU PROMOVAREA CONSTRUCȚIILOR CU PERFORMANȚE RIDICATE ÎN ROMÂNIA

(Rezumat)

Analiza condițiilor de piață necesită o investigație completă a structurii urbane, definită ca un sistem de componente sociale, fizice și economice, care sunt influențate, în cele mai multe cazuri de diferențele determinate de localizarea geografică, mărimea

orașului, activitățile economice, tehnologiile și normele culturale. De-a lungul istoriei, educația a demonstrat rolul său vital pentru dezvoltarea civilizației, culturii, pentru umanitate, precum și de a îmbunătăți ordinea și raționalitatea în viața socială prin cultivarea valorilor spirituale.

Clădirile sunt printre cele mai importante produse fabricate, deoarece oferă un cadru sigur pentru majoritatea activităților umane și au cea mai lungă perioadă de utilizare. Prin urmare, orice construcție trebuie să îndeplinească un set bogat de cerințe determinate de nevoile de utilizare și de cele estetice, iar calitatea lor este evaluată prin criteriile prevăzute în reglementările tehnice.

În construcții, elementele de bază care conduc la definirea conceptului de performanță sunt: cerințele utilizatorilor, cerințele de performanță, criteriile de performanță, nivelurile de performanță. Progresul oricărei societăți se bazează pe eforturile majore de investiții, care contribuie la realizarea de construcții noi, restaurarea celor declarate monument, renovarea și modernizarea infrastructurii și suprastructurii încă disponibile pentru comunitate.

Se prezintă câteva aspecte relevante ale condițiilor de piață, educaționale și legislația în domeniul construcțiilor din România. Factorii cheie nominalizați dezvoltă o interdependență complexă și promovează înalta performanță în construcții, în evoluția tehnologiei și a științelor ingineresti.

