

INNOVATION AND CHANGE – CURRENT CHALLENGES FOR THE COMPANIES IN THE CONSTRUCTION INDUSTRY

Postdoctoral student, **Iuliana SCĂRLĂTESCU (TALMACIU)**

“Valahia” University of Târgoviște, Romania

Email: iuliana_talmaciu@yahoo.com

Abstract: *Globalization, competition and technological progress directly influence the performance and development of an organization. Increasingly competitive markets emphasize the need to innovate and increase the ability of organizations to adapt to change, and the maturity of markets and shorter product life cycles bring to the fore the ability to create new business models, products, services and processes. In our opinion, the way in which innovation evolves at the level of companies is undergoing fundamental changes. The emergence of digital technologies gives innovation a more collaborative character and a more open to the international space. The purpose of this paper is to study the attitude of employees in the field of construction regarding the capacity for innovation and change of the companies in which they work.*

Keywords: *innovation, change, change capacity, construction industry.*

JEL Classification: *O30, I74.*

1. Introduction

The literature on innovation and change is vast, with various aspects of the process of organizational change being widely debated in recent decades. However, we can say that the opportunity to deepen the research topic is given by the complexity of organizational changes, the dynamism of the current socio-economic environment and the transformations that have taken place and take place every day.

„The environment is evolving fast with multiple technologies advancing rapidly and also startups in different regions constantly challenging the status quo. This new paradigm requires excellent execution capabilities as well as the ability to spot opportunities as they emerge” (Joost, 2020).

Although it is widely accepted that organizations face major changes in the marketplace and competitors and need to react quickly to survive, many of them fail. Statistics show that the average life expectancy of a company does not exceed 40 years and it is reduced due to the inability of the organization to transform and adapt quickly enough. To meet these challenges, organizations need to adopt an increasingly open attitude towards innovation and change.

The term "innovation" is widely used, being used with various meanings. Although the literature on innovation is very rich, it cannot be said that there is a unanimously accepted definition that fully clarifies this term. In a broad sense, innovation defines the introduction of the new to achieve useful results. Innovation is a broad concept that has been defined using several approaches. It is a process by which companies add value by successfully exploiting a new idea for the benefit of a part or an entire business, industry or nation. Innovation is recognized as an essential process for business success, ensuring growth, sustainability and competitiveness. Innovation is also an essential process for meeting the dynamic needs of the individual and facing new societal challenges.

According to the authors Bala K., Madhavi D. (2017), innovation is a complex process, which evolves from an idea but which “must be obvious as a complete invention, as a prototype or working model, before being adopted for a profitable implementation”.

Due to the complexity of the innovation process and the diversity of its emergence, it has been necessary to adopt some conventions in order to ensure operational definitions that can be used in the analysis of innovation. According to the OSLO Handbook, developed by the Organization for Economic Cooperation and Development (OECD) in

2018, “innovation is the implementation of a new or significantly improved product (good or service, or process), a new marketing method, or a new organizational method”.

Innovation is the process by which, based on new ideas - responding to societal or economic needs and / or demands, new products, services, technologies or organizational models are generated that are successfully introduced to existing markets or are able to create new markets, thus bringing benefits to society.

Innovation is frequently approached systematically and involves initiative, science, technology, management.

In the common perception, innovation is associated with technical progress, which has been the engine of society's development over time. However, innovation is not limited to the creation of new products and technologies (technical innovation), but has multiple materializations, both within organizations and in society. Although most applications in the field of innovation have been in the form of new products and technologies, the valences of innovation are broader. There is widespread recognition that new ideas can transform any activity, any part of the value chain, with products and services representing only the visible part of the iceberg.

The major role that innovation has in the progress of society is highlighted by Hamel G. (2012) who considers that "our existence is due to innovation, the human species exists due to the four billion years of genetic evolution". In his opinion, “our prosperity is due to innovation. Technological development has led to spectacular revenue growth and institutional innovations (capital markets, company law and patent protection have paved the way for economic progress, facilitating trade, capital formation and entrepreneurship)”.

In a highly competitive economic environment, innovation is considered a strategic engine in increasing competitive advantage. It increases sustainability, productivity, growth and business competitiveness. Innovation becomes a continuous process of learning, searching and exploring this result in new products, new techniques, new forms of organizations and possibly new markets. However, the growing dynamism and turbulence of the environment requires a new look at innovation. Therefore, companies need to have capabilities that allow innovation to be effective. The importance given more recently to knowledge management is increasingly emphasized.

Change is not only an inevitable step in a company's growth process but also a catalyst for its long-term evolution, provided it is managed efficiently. The literature presents some models that try to assess how prepared an organization is for change, but, as Weiner B. (2009, p. 29) states, “unlike the preparation of individuals for change, that of organizations has not yet been the subject of in-depth theoretical research or empirical studies.”

An organization's ability to adapt to change has been widely recognized as playing a key role in a company's success or failure and is a key component of the organizational learning process. It is obvious that the world is changing and the changes are happening with or without our will. The choice is between diminishing or producing change. We believe that what Charles Darwin said about the evolution of species "Neither the most beautiful nor the smartest will survive but the one that will adapt the fastest to change" is also valid for the current economic, political and social environment and can be applied and in the case of organizations. The ability to adapt to future changes must be developed and encouraged by using all the opportunities that arise from past and present changes. Although the term "adaptation to change" is often used, most of the time organizations and their members are not fully aware of what it means and the implications it has. In order to have positive results in implementing change management, sufficient attention must be paid to the question "how can change management be effective if the organization is not prepared for change?" (Combe, 2014, p.14)

2. Characteristics of innovation and change in construction

Innovation in the construction industry is generally seen as restricted because often the same solutions and materials are used, with little variation, on already known topics.

While most industries have undergone fundamental changes in recent decades, the construction industry has been reluctant to embrace digital innovation.

As construction is a core sector of an economy, it is constantly looking to adopt innovations and implement new solutions, which generally focus on reducing its impact on the environment, improving productivity and reducing costs.

The construction sector is frequently affected by imposed or necessary and planned changes.

Table 1. Sources and impacts of changes in construction projects

Stage	Stakeholder	Types of changes	Impacts	Actions
Specification	Owner/Client/User or architect	Changes to requirements including specification, scope of projects, design brief, etc.	Changes in design and construction processes	Carefully provide detailed specification documents before bidding.
Design	Design/engineering Consultant	Incomplete/inconsistent drawings; design error/defect; design change; omissions of site conditions and buildability; changes in codes and regulations	Rework of design and drawing; rework in construction; change orders	Better control of design versions, drawings; site investigation; consider buildability in design
Construction	Contractor/sub-contractors	As-builts not confirm with as-design; quality defect; unanticipated site conditions; value engineering; materials or equipment not available; inclement weather	Rework; change orders; changes in design	Quality control; site operational control; coordinated documents and drawings; daily logs

Source: Hao, Q., Shen, W., Neelamkavil, J. and Thomas, J.R., 2008. *Change management in construction projects*. International Conference on Information Technology in Construction, Santiago, Chile.

Although it is widely accepted in the literature that innovation is a major factor in the development of the construction sector, according to the European Construction Sector Observatory. Integrating digital innovations in the construction sector, published in March 2019, IT expenses incurred by construction companies do not exceed 1% of the total and only agriculture and hunting seem to spend less. As a result, labor productivity in the construction sector has risen only slightly, to a quarter of the rate of production in the last two decades, and may lag behind in the race for innovation. This does not mean, however, that there is no useful innovation for this sector. Experts recommend “construction information modeling (BIM)”, “object internet”, “3D laser scanning and component printing”, “big data analysis”, “augmented reality”, “drones” as some examples of innovations that could had a major impact on the construction sector. These are largely innovations from other industries, but could help the construction sector build faster, better and cheaper, while maximizing resource use and increasing the profitability of construction companies.

At European level, the most important part of the construction sector is represented by SMEs, which account for about 80% of turnover. Companies with less than 250 employees represent 99% of the total in this sector, while the smallest companies, with less than 49 employees, have a share of 98%. The report published by Eurostat in June 2020,

which examines the evolution of the European construction sector in March and April 2020, shows that construction work fell by 14.6% month-on-month in the Eurozone and by 11, 7% in the European Union. The most important decreases were registered in France (-32.6%), Spain (-26.3%) and Slovakia (-10%). Another study, conducted by Euler Hermes and quoted by Forbes, shows that the construction sector in Europe has been severely affected by the coronavirus pandemic and expects an increase in insolvencies by 14-24% in 2020. Analysts expect the number of insolvencies to register an increase of + 24% in Spain, + 19% in France and the Netherlands and + 15% in Italy and the United Kingdom. At European level, the construction sector already accounts for 20% of total insolvencies. The Covid-19 crisis has exacerbated the vulnerabilities of SMEs and large companies are not immune either, even if for the time being they have resisted the changes better.

In the case of Romania, the construction sector accounted for 4% of GDP and contributed 0.8% to economic growth in the first quarter of this year, which was 2.4%, according to data released by the Ministry of Finance. According to the latest data from the INS, the volume of construction works (as a seasonally adjusted series) decreased in May by 2.2% compared to April 2020 but was 14.3% above the level of May 2019.

Analyzing from the perspective of demand, the construction sector has performed better than expected in recent months, given the pandemic context. The increase of over 22% in the volume of construction works in the first five months of 2020, corroborated with positive developments in all segments is a reason for optimism. The largest increases, of at least 50%, were recorded for major repair and maintenance projects.

By construction objects, in the first 5 months of 2020 (compared to the same period in 2019) there is an advance of engineering constructions of 39.4%, followed by the increase of residential buildings of 20% and non-residential buildings of 8.4%.

By structural elements, in the first 5 months of 2020 (compared to the same period in 2019) the volume of current maintenance and repair works increased by 64%, that of capital repair works by 50% and that of new constructions by 11%.

On the other hand, in May 3,062 building permits were issued for residential buildings, increasing by 34% compared to April 2020 but by 26% below the level of May 2019. In the first 5 months of 2020, a total of 13,997 building permits for residential buildings, down 15% compared to the same period in 2019.

An analysis published by KeysFin predicted that the turnover of the local construction market will register a slight increase, compared to 2019 (when it reached 89 billion lei) and will reach in 2020 approximately 90 billion lei. In 2018, the turnover of the local construction market (building construction, civil engineering and special construction works) was 84.4 billion lei. Popescu R., managing director of KeysFin, appreciates that “although the most important companies in the construction industry, from the point of view of turnover, contract large infrastructure projects, it is important to mention that the industry is not only based on them, and medium and small companies that deal with the construction of residential complexes, office buildings or other civil constructions, add up to an important value of the total ”.

According to the results of the research *Assessment of the impact of COVID-19 on the economic environment in March and April 2020*, conducted by the National Institute of Statistics, the impact of the COVID-19 epidemic on the volume of activity in the construction sector in Romania has two characteristics:

- on the one hand, the uncertainty of business evolution is increasing with the extension of the time horizon;
- and, on the other hand, the increase in the share of businesses that are affected by the restriction by more than 25% of the volume of activity or their closure. The share of agents who cannot estimate the evolution of the activity volume increases from 21.6% in

March to 33.1% in April 2020, by reducing the share of those who did not estimate an impact or estimated an impact of up to 25% of the activity volume. Of the economic agents that were able to estimate an impact of the COVID-19 epidemic on the volume of activity in April 2020, 61.4% predicted a reduction in the volume of activity by more than 25% or the closure of activities while in March their share was 39.2%.

In line with trends in other countries in remote work, the office construction segment had the lowest growth rate at the structural level, only 4% in the first 5 months, and the pace is expected to slow as projects started before the pandemic spreads and are completed.

Eurostat states that the only EU Member States in which construction works increased in August 2020 compared to August last year are Romania (12.4%) followed by Slovakia (4.8%) and Finland (2.2%).

While in Romania, construction works registered a double-digit increase, in the euro area construction works recorded an annual decline of 0.9% in August, while in the EU they registered a decrease of 1.5 %.

In August 2020, compared to the previous month, construction works increased by 2.6% in the euro area and by 2.4% in the European Union. In this case, too, Romania is among the countries where construction works recorded the largest increases, from one month to another, with an advance of 0.9%, along with France (4.9%), Slovenia (2.4%), Hungary (1.9%) and Portugal (1.8%).

Optimistic forecasts show that the construction market in our country still has a chance to grow, but this depends on the social, economic and fiscal measures adopted at national level.

3. Research results

The research aimed to highlight the perception of innovation and change of members of organizations in the construction sector in Argeş County. Another goal involves identifying the views and attitudes of employees on various organizational issues, such as: perception of the need for change, willingness to participate in the change process, the role of innovation in facilitating the implementation of organizational change and perception of innovation capacity and adaptation to change of the analysed organizations.

The questionnaire used in the quantitative research was completed by 108 people employed in three companies operating in the field of construction in Argeş County. Among the participants in the study, 68 are men, representing 63% of the respondents and 40 are women, respectively 37%. Among the respondents, 48% are between the ages of 40 and 49, about 26% are between 50 and 59 years old, while 22% of the respondents are between 30 and 39 years old. Most respondents have higher education, 70.4% have a university degree and 22.2% also have a postgraduate degree. The number of employees with high school education was the lowest and represents 7.4% of the total.

Analyzing the answers from the questionnaires, it was observed that almost half of the respondents are older than 5 years in the company, while 37% are in the range of 1-5 years spent at the current job and 14.8% of respondents have less than one year from the time of employment in the current position. The questionnaire was completed by employees from all hierarchical levels. Thus, 11% of respondents hold top-management positions, 33% are middle managers and 56% are employed in executive positions.

As a result of the data processing, we found that most employees, namely 70.3%, are informed about the company's position on the construction market and know its strengths compared to competing companies and consider that the company where they work "is flexible and can easily adapt when the situation requires it".

Respondents are open to accepting changes in the companies they work for because 88.9% appreciate that they are welcome and associate the change with the development and improvement of the company's situation. In this sense, 92.6% of respondents appreciate the speed with which small projects are implemented and 81.4% the speed with which decisions are made within the company.

However, most employees believe that changes need to be made with caution. Thus, only a third of them (33.4%) consider that major changes would be required and the percentage of those undecided is significant, 29.6%.

Also, only a little over half (55.5%) of the respondents consider that changes are opportune, as long as the company's activity is carried out in good conditions and only 44.4% believe that changes would be indicated in times of crisis.

The majority of employees (74%) state that they understand the importance of innovation in order to ensure the company's competitiveness and, respectively, its adaptation to change and 62.9% appreciate the fact that managers clearly present the objectives of the innovation strategy. As a result, most respondents (59.2%) are concerned with finding new solutions to existing problems, 74% aim to improve products and processes within their company and 70.4% associate innovation with the creation of new products and processes. However, there is a high percentage of undecided employees (25.9%), which shows that managers must insist more on the importance of the innovation process in the smooth running of the company's change activity.

About 70% of employees appreciate that they are encouraged by the company's management to present new ideas, meant to achieve a beneficial change, but only 44.4% of them believe that the company's reward system really supports innovation.

Following the analysis of the answers obtained, it resulted that 74% of respondents agree that the organizational structure of the company meets the requirements to support the innovation process, 64% appreciate that the company has projects that facilitate the development and implementation of new ideas but only 59 % believes that the company has a clear system for choosing innovation projects and that all departments are involved in product and process innovation.

In the context of the current competition in the construction market, the main goal of the innovation activity within companies is to attract customers and, at the same time, to satisfy their needs and expectations in the best conditions. 81.4% of respondents stated that customer needs are constantly assessed and the company takes into account their opinion in creating, developing and improving new projects.

In order to develop new processes, products and services, the companies to which the questionnaire was applied also collaborate with other companies, in this case with companies specialized in advanced technologies or in specialized knowledge, which is recognized and appreciated by 74% of respondents. The same cannot be said about collaborating with academia and research centers, as three-quarters of respondents say that companies do not use their experience to develop knowledge in order to innovate new technologies and products.

In order to maintain and increase the performance of the analyzed companies, only 29.6% of respondents consider that the company they work for organizes meetings with representatives of other companies and 44.4% believe that improving innovation management is achieved by systematically measuring the results obtained.

In order to stay on the market, it is necessary that the activity of change through innovation in construction companies has a permanent character. There is a need for constant evaluation of the results obtained through innovation, both internally and externally. In the analyzed companies, 85.1% of the respondents consider that they learn more from mistakes by reviewing projects.

Following the analysis of the data from the questionnaires, we found that we have a significant difference regarding the respondents' opinion about the importance of the capacity to adapt to change and that regarding the magnitude of the changes that are needed in the companies in which they work. They believe that change should only be made if it is absolutely necessary and they want change to not be a major one.

The inaccuracies between the answers to some questions come from the fact that the concern of managers to make employees understand and accept the need for changes in times of crisis is relatively low as the percentage of those who do not know this concern is significantly 40.8%.

4. Conclusions

We appreciate that in the companies where the research was carried out, it is necessary to orient towards an open innovation. This involves involving a greater number of actors in the innovation process, including from outside the company (consulting firms, research centers, universities, etc.), creating an innovation-friendly regulatory environment and an integrated system of innovation and organizational change. We believe that the implementation of the mentioned aspects can contribute to a sustainable innovation manifested through ecological growth, eco-innovations, clean-tech, sustainable energy, material and energy efficiency, circular economy, present and future challenges for the construction sector.

In the process of innovating their products / services and processes, companies operating in the field of construction must also pursue the impact on the environment and society. We appreciate that their goal must be to follow the best path to a more sustainable future and it depends on how resources are managed today.

Innovation is a main engine of the transformation of the organization and its adaptation to the requirements of the contemporary economy.

Most companies do not have a culture of innovation that favors the introduction of change in the organization, more often there is a strong resistance from staff and sometimes from managers. The results of an organization's innovation process should provide a competitive advantage; this should help the organization to grow and better achieve or exceed its strategic objectives.

In these times of uncertainty, an increased focus of companies on innovation is needed to define the future of the construction industry and become stronger in the long run. Past experience shows that those companies that invest in innovations during an economic crisis benefit from them in the recovery phase. As such, the ability to innovate continues to be a key factor in economic success.

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