

# Innovation and Dynamic Capabilities of The Construction Firm

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**Abstract:- In modern conditions the firm's innovation policy is a major factor in its sustainable development. Since its creation the theory of the company's dynamic capabilities is associated with the development of innovation as a prerequisite for realizing competitive advantages and corporate goals. Dynamic capabilities are seen as a factor for change, reconfiguration of existing resources and building new resources and competencies within the company that allow the development of new products and the development of new processes. Therefore, the purpose of the study is to reveal the role of the dynamic capabilities and the impact of the dynamic environment for the development of innovations and the realization of the company goals by developing a conceptual model: "Dynamic capabilities - Innovation in product/ process – Competitive advantage" to be applied and tested in the activities of the construction firm.**

**Keywords:-** *Competitive Advantages, Construction Market, Construction Firm, Dynamic Capabilities, Functional Competencies, Innovation, Performance.*

## I. INTRODUCTION

The innovation process in the firm is related to the development and implementation of new products/processes, the result of monitoring marketing and technological changes, the assessment of opportunities and threats, and above all the acquisition of new knowledge, integrating them with internal knowledge to find the right path and direction for development. Innovation changes demand, creates new markets, transforms relationships between customers and suppliers, but at the same time, their development is accompanied by difficulties, uncertainty, high risk and rising costs.

The development of the company today is mainly based on the development of intangible assets, and the central place in them is the ability of the company to train and generate new knowledge. New products and processes, the development of innovation are the result of new combinations of knowledge. Companies recognize the role

of creating, acquiring, and transferring knowledge as an essential element of a company's dynamic capabilities. The combination of external and internal knowledge that develops qualitative new knowledge is the basis for making an informed investment and market-oriented decision.

Since its creation the theory of the dynamic capabilities of the firm is associated with the development of innovation as the main condition for the realization of competitive advantages and performance. Dynamic capabilities are a major factor in building new company resources and capabilities to develop new products and new processes [1], [2]. In addition, they affect costs and the effectiveness of innovation through the time, speed and direction in which it develops [3]. Nevertheless, generally there is a lack of empirical research the "dynamic opportunities - innovation" link, in all markets, including construction. The construction industry is a highly competitive, dynamic industry, which should mean that the survival of businesses and gaining and maintaining competitive advantage should be realized through innovation. On the other hand, because of its specifics (object immobility, resource mobility, product complexity, market fragmentation, participation of multiple, different entities) the construction market as a whole has a bad reputation for propensity and innovation development. Under the new dynamic conditions, the basis for the development of innovative activity in the construction firm must be the development of dynamic capabilities, through the accumulation and exchange of knowledge, experience, learning, coordination and integration of the external and internal assets of the company in a new more effective way.

Therefore, the purpose of the study is to reveal the role of dynamic capabilities and the impact of the dynamic environment as a major factor for the development innovation and building competitive advantage. It includes two parts: 1) development of a conceptual model: "Dynamic capabilities - Innovation in product/process – Competitive advantage" and formulation of working hypotheses, and 2) application of the model, testing of hypotheses in the activity of the construction firm.

## II. THEORETICAL MODEL "DYNAMIC CAPABILITIES - INNOVATION IN PRODUCT / PROCESS – COMPETITIVE ADVANTAGE " AND RESEARCH HYPOTHESES

In this chapter we will develop the theoretical basis and outline: 1) a practically applicable model of building dynamic capabilities in the firm, which includes recognizable, understandable and measurable components for managers, 2) on the basis of the developed model we will define working hypotheses that will be empirically tested on the construction market.

### A. *Dynamic capabilities of second level*

Each firm performs daily activities related to the production and sale of the created product. Everyday business activity would always develop on the same scale, the company would always produce the same product, sell it in the same way, to the same customers, if dynamic capabilities did not exist. This activity of the company can be defined as its operational (functional) ability in a given combination of resources to perform functional activities related to logistics, marketing, production, etc. [4]. Therefore, functional activities ensure the operational efficiency of the company, and "dynamic capabilities are a system of capabilities of the company to integrate, build, develop, expand and reconfigure existing functional competencies into new ones that better respond to changes in the environment and will provide - effective use of company resources"[5]. From this point of view, the author defines functional competencies as zero-level capabilities that allow the company to do what it was created for and earn a living, and dynamic capabilities can be defined as higher-level capabilities aimed at "change in product, production, customer relationships, markets where the company sells" [6].

The dynamics of the external environment (market and technological) is the main factor that requires the development of dynamic capabilities and the reconfiguration of functional competencies. The main task for each company is to develop an effective system for monitoring changes in the external environment, assessing opportunities and threats to development. The monitoring involves the collection of information on changes in tastes, preferences, consumer demand, competitive actions and reactions, and the emergence and development of new technologies. The information collected in this way identifies opportunities for innovation (product and/or process) in the firm.

The basis for this is the process of assimilation, accumulation of new knowledge, skills, learning, whose source is the development of public knowledge and technology, i.e. the external environment [7]. These three components of dynamic capabilities - monitoring of market

trends, new technologies and competitors, assessment of alternatives and learning, are directly related to the dynamics of the external environment and are a function to the senior management team. They can be defined as dynamic capabilities a higher, second level which are the basis for the development of innovations and the reconfiguration of functional competencies in response to changes in the external environment. Therefore, the first hypothesis can be defined as follows:

➤ **Hypothesis 1: The dynamics of the external environment has a positive influence on the innovation activity in the firm through the mediating role of dynamic capabilities of second level.**

### B. *Dynamic capabilities of first level*

The successful innovation process and the realization of the company goals, taking into account the dynamics of the environment, necessitate changes in the organization of its activity through the process of integrating new knowledge, coordinating and reconfiguring existing resources and functional competencies. These activities build the system of *dynamic capabilities from lower, first level*. They are linked to the internal organization and are developed by expanding and improving managerial capabilities [8]. Dynamic capabilities of second level affect dynamic capabilities of first level and reconfigure business competencies to respond to changes in the external environment.

Integrating new knowledge, resources and assets [9], as a factor in changing existing functional competencies, requires collective organization and interaction. This is because new knowledge is the result of learning of individuals and therefore, they are predominantly owned by private individuals. However, they need to be integrated at the collective level, as operational capabilities are over-individual and are not related to individuals. Therefore, each firm should focus on building a collective sense and the ability to create a mechanism for integrating individual knowledge into a collective system that provides new resource configurations.

Coordination as a process is accomplished through information exchange between employees, teams, different departments, allowing the company to evaluate a resource and find a way to use it in a new, more effective way. The accumulated knowledge and experience in the company are the basis for the development of new innovative programs, actions and reconfiguration of functional competencies. The process of reconfiguration refers to the expediency, timeliness and efficiency [10] of changes in functional competencies, which create conditions for the production of new products, the introduction of new technologies and adaptation to the dynamics in the external environment, which allows us to formulate the second hypothesis:

➤ **Hypothesis 2: Dynamic capabilities of first level have a positive relationship with innovation through the functional competencies of the firm.**

*C. Functional competencies of the firm*

Functional competencies include: 1) market opportunities the company related to effective market segmentation, target market selection, advertising, customer service, logistics and flexible pricing, 2) technological and innovative capabilities that are related to the organization of the company production, its technical parameters (costs, productivity, etc.), characteristics, design of the product / process created, etc., 3) organizational and managerial competencies that create incentives, motivation of company employees. The development of functional competencies enables the company to use, transform its resources into an end result that responds to changes in demand, reduce its production costs and losses, and therefore, they develop innovation and have the potential to create competitive advantages. Therefore, the third hypothesis is:

➤ **Hypothesis 3: Development of functional competencies as a result of building dynamic capabilities of second and first level has a positive role in the development of innovation.**

The analysis and conclusions made allow the author to define dynamic capabilities as a complex, multidimensional construction of interrelated and complementary specific activities within the company, which include its ability to identify and analyze the need for change, to develop its own system of solutions for reconfiguring functional competencies, in response to changes in the external and internal environment, and to take the necessary actions to adapt to them. The components of the dynamic capabilities in this complex construction are:

1) Monitoring, 2) Evaluation of opportunities, and 3) Learning, which is a function of the entrepreneurial abilities of managers, and are defined as dynamic capabilities of second level, 4) Integration, 5) Coordination, 6) Reconfiguration, which are related to the internal organization and innovative activity of the company and are defined as dynamic capabilities of first level.

They cannot claim to be exhaustive, but they are recognizable, understandable, and the main ones that can provide the ultimate goal - reconfiguring functional competencies. Each component of dynamic capabilities is different, unique, and offers a specific way of reconfiguring functional competencies and creating new ones because of the specifics of each firm (history, experience, knowledge, organization, specialization, managerial skills, reputation).

The relationship between different levels of dynamic capabilities is accomplished through complex transformation mechanisms, converting, changing opportunities from a lower order into higher order options, and vice versa. Dynamic capabilities of second and first level help the company expand, change, and reconfigure its existing functional competencies into new, which better respond to changes in the environment and provide more efficient use of existing resources. The mechanism through which to integrate knowledge, skills and create new competences, develops and creates new strategic opportunities and resources. They are mainly related to the innovation process of the company, which allows for better coordination of different product skills and integration of the flow of technological knowledge.

Dynamic capabilities have no direct, but an indirect link with the realization of competitive advantages and performance. They are above all, organizational capabilities that can provide competitive advantages (including long-term) of the company, with one basic requirement: to apply earlier, more perceptive and more effective than managers. Their role is related to a change in functional competencies and the existing resource base, which changes the final production result and the position of the company in response to changes in the environment and ensures the building of competitive advantages. Therefore, functional competencies have a role as a mediator between dynamic capabilities and performance.

The analyzed relationships between the dynamic capabilities and innovations in a company and the formulated working hypotheses are summarized in the conceptual model "Dynamic capabilities - Innovation in product/process – Competitive advantage", which will be applied and tested in the activity of the construction firm (Figure 1):

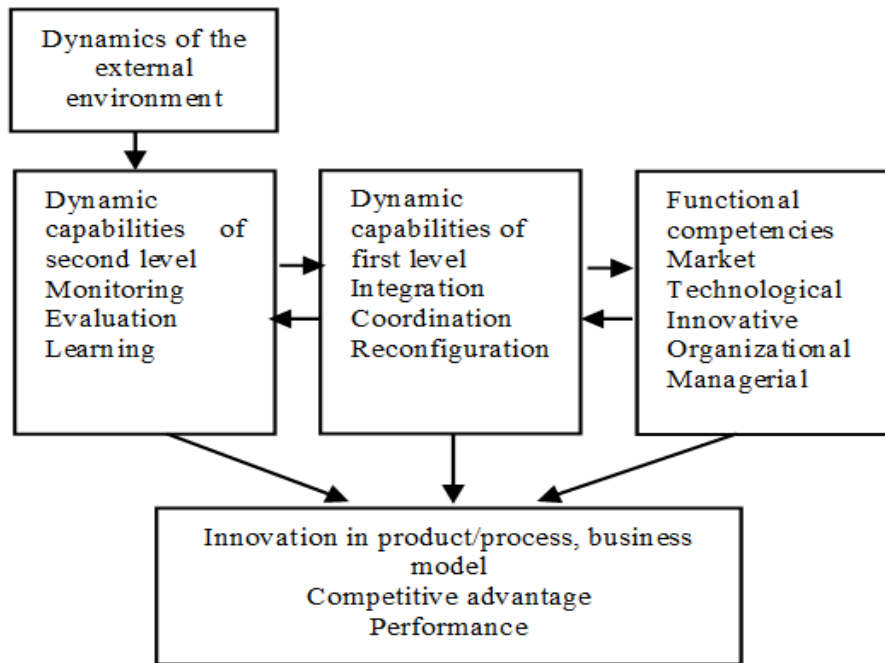


Fig. 1:- Conceptual model "Dynamic capabilities - Innovation in product/process – Competitive advantage"

**III. APPLICATION OF THEORETICAL MODEL AND HYPOTHESIS TESTING**

In this chapter the developed model is applied for analysis and evaluation of working hypotheses in the construction market. The study conducted is exploratory, looking for evidence of the link between building dynamic capabilities and the successful innovation activity of the construction firm, which will allow the realization of a competitive advantage and performance.

*A. Method and restrictive study conditions*

The empirical research was conducted on the basis of a methodology developed and applied to evaluate the innovative activity of the company in the construction market. The companies surveyed are included in the "top 20" of the construction market in Bulgaria, operate in different market segments (civil engineering market and building construction market, which are different in their characteristics - product, process and firm behavior), where they have leading market positions, have different degree of diversification or specialization, different scope of activity, different history, different business model and a different innovation strategy.

The information was collected and processed by workshops, shared opinions, evaluations, experience of managers, employees, interviews, publications and analyzes in specialized publications. A poll was also conducted, which includes questions for management to evaluate the impact of the three components - dynamic capabilities of second level, dynamic capabilities of first level, and functional competencies on company innovation and the results achieved. The study used the Likert scale (interval from one to five), which allows to express different levels of assessment and so to measure the degree,

in which the respondents express their agreement or disagreement with the formulated question.

The assessment of the impact dynamic capabilities of second level (monitoring, evaluation of opportunities and learning) on innovation is based on the responses of the management team of the company in which they describe the frequency with which they monitor and scan the external environment and introduction of new products in the given market, change in the used marketing practices, adaptation to the requirements for sustainable construction. The assessment of the impact dynamic capabilities of first level (integration, coordination and reconfiguration capabilities) on innovation is based on the expressed opinion of the management team on the role of organizational skills in effectively integrating individual knowledge into the collective (new management systems developed, new decision-making organization, maintenance of permanent customer relations, newly introduced training and qualification systems, incentive, human resource motivation) that provide the desired reconfiguration of existing functional competencies (market and technological) and the creation of new ones.

Assessing the impact of functional competencies (related to actual production) on firm innovation has a quantitative dimension. The market competences of the company are evaluated by the brand value, image, reputation of the company, reduction of transaction costs, and technological competences with reduction of costs, expansion of production scale, realization of economies of scale, etc. Innovative competences have their objective evaluation in the number of patents registered, licenses issued, degree of product renewal, etc., and organizational competences include a general assessment of managerial skills for the effective administration, coordination and control of all activities, at all levels.

The realized competitive advantage as a function of the innovation policy of the company has two different characteristics: expansion, stabilization of market positions and efficiency of the company activity, expressed in financial results (sales revenue, profit, market share, financial and economic profitability, etc.).

The implementation of these activities allows managers to analyze and evaluate the development dynamic capabilities of second and first level and the necessary reconfiguration of functional competencies, in order to implement a successful innovation policy.

#### *B. Main results of the study*

Testing the first hypothesis: **“The dynamics of the external environment has a positive influence on the innovation activity in the firm through the mediating role of dynamic capabilities of second level”** proves that the senior management team of the studied companies performs constant monitoring, scanning of the dynamics of the environment and processing of large volume of information. Managers first and foremost monitor the dynamics with which technology and demand change, the frequency with which new products are introduced to the market, and the necessary change in marketing practices used. An in-depth study of the impact of macro-factors enables the identification of new opportunities for the development of corporate innovation. In the construction market, this process involves the analysis and discovery of latent demand, the development of technology, as well as the analysis of state and regulatory mechanisms, environmental protection requirements, sustainable construction and the impact of general economic and social factors. At the micro level, the monitoring process involves an analysis of the market structure and level of competition, the strategic behavior of competitors, the ability to build vertical integrated systems, investment in research, etc. Managers believe that monitoring the environment alone is not enough as it is possible the need for change is caused and/or internal causes (dissatisfaction with the position of the company, current state of resources, etc.). The simultaneous monitoring and evaluation of the external and internal environment allows to make an assessment of the company's ability to respond to dynamic changes with the available potential, or through its development, expansion or creation of new configurations. This change is realized through the accumulation of new knowledge, skills, learning and experimentation with new knowledge that develops the innovation process in the company. The testing of the first hypothesis proves the positive influence of the dynamics of the external environment on the development of innovations in the construction firm through the dynamic capabilities of second level.

Testing the second hypothesis: **“Dynamic capabilities of first level have a positive relationship with innovation through the functional competencies of the firm”**, it is practically proven by analyzing and evaluating the systems introduced, which enhance company organization and allow the integration of individual knowledge into the

collective and coordinate the process of efficient allocation of scarce resources. The managerial skills for making effective organizational and management changes are evaluated on the basis of the known good practices, taking into account the specifics of the company and the market in which it operates. In the surveyed firms, these changes are focused on:

- Establishment of a multi-divisional structure, which requires modern organization of team work. It allows simultaneous, not consistently developing and implementing innovation.
- Decentralization of collection rights, information analysis and decision making, flexible allocation of responsibilities and tasks [11].
- Creating a decentralized company structure that allows the free movement of information from the lower units to the central unit and encourages the participation of all employees in the process of proposing and discussing ideas for improving the business activity and its future development.
- Creating the necessary coordination within the company and coordination (reconciliation) of the contradictions between different entities and the different goals of different groups and the company as a whole by building internal integrated systems of motivation and incentives.
- Learning process, absorption, distribution and integration of external and internal knowledge by qualifying the staff as a major factor in stimulating and motivating them over a long period.
- Management changes are aimed at improving connections and the relationships between managers at all levels and all company units. Realization of this task requires effective coordination of all entities in the company from “the bottom - up”, which in practice means the development and implementation of a new business model, which is a plan for organization and financial construction of the company.
- Particularly important is the creation of high loyalty and reputation of the company among its customers, by analyzing the constant flow of information from the market, processing the company's customer rating data and, on that basis, quick feedback.

Changes aimed at reconfiguring functional competencies provide the potential for purposeful, timely and effective innovation activity, which can provide change and/or introduction of a new production process and creation of a new product.

The third hypothesis **“Development of functional competencies as a result of building dynamic capabilities of second and first level has a positive role in the development of innovation”** is proved by examining the relationship between the development of business-level innovations (focused on more efficient use of resources, the introduction of new business models, the organization of new links throughout the supply chain) and the project level (related to improvement of architectural, design activities and especially important - improving the

relationships between investors, architects, designers, engineers and end clients) in a construction firm [12].

In the civil engineering market, innovations in the firms are mainly in the process development. Any change in the process can lead to the creation and development of new technological competencies of the company, which ensures its productivity and efficiency. They use new, efficient, innovative technologies and development, knowledge transformation, intangible assets that provide short terms and quality performance of the sites. The key to successful development is the development of complementary innovations and the strategy of integration and cooperation. The development of dynamic capabilities allows each firm to specialize its assets and to use them more efficiently through a new combination and sharing with specialized assets from other companies (contractors and subcontractors), which allows to achieve economies of scope and offer an integrated solution for customers. Building an efficient vertical chain is an important factor in stimulating innovation, especially "open innovation", enhancing specialization and developing technology internally and externally. The surveyed companies build integrated supply chains, in which coordination takes place, exchange of information and knowledge that maximizes value for all actors in the chain.

The surveyed companies in the building construction market mainly develop product innovations based on specific company competencies, as a condition for creating a new or changing, modifying, refining an existing product, in accordance with the needs of clients and partners of the company. Every company strives to find the optimal solution for its clients and works so that they feel the commitment of employees to each of their individual projects and the possibility of flexible solutions to every problem. Product development is closely linked to the development of market competencies - market segmentation, choice of target market, advertising, flexible pricing policy, after-sales service and consumer facilities. In recent years, companies have focused on expanding their operations in the direction of less investment in physical equipment but requiring more intangible assets, which means implementing effective, innovative technologies and developing sustainable construction. Their ambition is to implement the latest materials and technologies in construction practice on the basis of constant transformation of knowledge, exchange of information, which ensures short terms and quality implementation of objects and optimization of processes in the company.

#### IV. CONCLUSION

In the research the author analyzes and evaluates the role of the dynamic capabilities of the company as a factor for successful innovation policy. For this purpose a conceptual model has been developed and applied "Dynamic capabilities - Innovation in product/process – Competitive advantage" to study the activity of construction firms operating in different markets (civil and building construction), offering different products to

different clients. They have different innovation strategies because they have different functional competencies related to the specifics of production and product and different dynamic capabilities related to specific organization and management. The basis for testing the model, the defined hypotheses and the relevant conclusions is the information that has been collected and processed by workshops, interviews and surveys with managers, employees in the surveyed companies.

The author defines the dynamic capabilities of the company as the intellectual inputs that enhance its core business, by reconfiguring external and internal resources and competencies (newly created or acquired), which in turn exert influence, developing and creating new dynamic capabilities.

The starting point in the whole process, common to all firms, with different dynamics of the external environment is the monitoring and analysis of changes in the environment, assessment of development opportunities, the need for learning (dynamic capabilities of second level) and absorption of new knowledge, its integration and coordination in the company, which will ensure that the endpoint of this chain is reached - reconfigure functional competence (dynamic capabilities of first level) and realization of the desired results. Each component of dynamic capabilities is different, unique to each company and offers a specific way to reconfigure functional competencies (market, technological, innovative, managerial and organizational) and create new ones.

In the study the author proves:

- The firms that have well-established system of dynamic capabilities of second level (monitoring, evaluation and learning) are more prone to rapid and successful reconfiguration functional competences (market, technological, innovative, organizational), in response to the dynamics of the external environment. A well-established system of dynamic capability of first level allows more effective integration of knowledge, skills, more effective coordination of different product skills and integration of the flow of technological knowledge, which leads to the creation of new competencies and the development of innovation.

In the civil engineering market, innovation is mainly in the process and development of new technological competencies of the company, which provides increased productivity, efficiency in the company, reducing costs and realizing competitive advantages. In the building construction market, companies mainly develop product innovations based on specific company competencies, as a condition for creating a new or changing, modifying, refining an existing product, in accordance with the needs of their customers and partners. This provides building competitive advantage towards product differentiation.

- The innovation process in the studied companies involves not only investments and development of new products/processes, but also investments in the

development of intangible assets and the development and implementation of a new business model, which is a plan for the organization and financial construction of the firm. Both functions are effectively integrated within the firm organization. Each company strives to create its own, unique model by analyzing a number of alternatives and informed assumptions about the behavior of competitors, customers, expected revenue and costs, a mechanism for adapting to the external environment and the relevant solutions.

- Dynamic capabilities increase the efficiency and profitability of innovation activity. They directly influence the speed with which innovations are realized, because they allow early identification of opportunities and threats, rapid absorption and creation of new knowledge and development of new skills and abilities. The established system of dynamic capabilities in a firm leads to reduction of transaction costs, costs of knowledge acquisition and learning, as well as production costs, related to the research itself and the choice of a mechanism for reconfiguration of resources.

The proposed research and the model developed help managers understand the nature and role of dynamic opportunities for innovation and the achievement of company goals. Separation of two levels of dynamic capabilities into a common multidimensional design allows their tasks and functions to be more clearly defined. The managers must create their own rhythm, skills for their construction and development, which alone can provide an effective reconfiguration of functional competences, regardless of the dynamics of the environment, but also as a function of it.

Successful innovation policy depends very much on dynamic managerial capabilities, or the manager's ability to find the best synthesis and balance of the general characteristics of dynamic capabilities (known good practices) with the specifics of the company, which allows to provide the desired results and competitive advantages.

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