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Management and strategic efficiency of construction companies

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Professional paper

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Management and strategic efficiency of construction companies

Over the past two decades, Croatian construction companies have been undergoing intensive dynamic changes caused by political and economic influences on the construction market: privatisation of state-owned companies, opening of Croatian market, vigorous post-war reconstruction activities, intensive construction of motorways, etc. Such turbulent changes have influenced construction companies in a variety of ways. A number of Croatian companies that used to be dominant have disappeared from the market. Some companies have transformed their management and construction processes. The Balanced Scorecard model for shaping and implementing business strategies of construction companies is presented in the paper.

Ključne riječi:

strategy of construction company, balanced scorecard, success indicators, strategic initiative

Stručni rad

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Menadžment i učinkovitost strategije graditeljske tvrtke

Hrvatske graditeljske tvrtke zadnjih 20-ak godina prolaze kroz intenzivne dinamične promjene uvjetovane političkim i ekonomskim utjecajima na graditeljskome tržištu kao što su proces privatizacije državnih tvrtki, otvaranje hrvatskog tržišta, intenzivna obnova u ratu porušenih objekata ili intenzivna izgradnja autocesta. Takve turbulentne promjene utjecale su na graditeljske tvrtke na različite načine. Neke, prije Domovinskog velike hrvatske tvrtke nestale su s tržišta, a neke su transformirale menadžment i provedbu procesa građenja. U radu je prikazan Balanced Scorecard, model pristupa oblikovanju i provedbi poslovne strategije graditeljske tvrtke.

Ključne riječi:

strategija graditeljske tvrtke, Balanced Scorecard, mjerila uspjeha, strateška inicijativa

Fachbericht

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Management und Effizienz bei Strategien für Bauunternehmen

Kroatische Bauunternehmen durchgehen in den letzten 20 Jahren intensive dynamische Veränderungen, die auf politische und ökonomische Einflüsse im Bauwesen zurückzuführen sind, wie z.B. den Prozess der Privatisierung staatlicher Unternehmen, die Öffnung des kroatischen Marktes, die Wiederherstellung im Krieg zerstörter Objekte oder den intensiven Ausbau von Autobahnen. Diese turbulenten Veränderungen haben Bauunternehmen auf verschiedene Weise beeinflusst. Einige große kroatische Unternehmen sind vom Markt verschwunden, einige haben sich dem Management und der Bauausführung zugewandt. In dieser Arbeit wird die Balanced Scorecard als Modell zur Entwicklung und Umsetzung von Geschäftsstrategien für Bauunternehmen dargestellt.

Ključne riječi:

Strategien für Bauunternehmen, Balanced Scorecard, Erfolgsmaßstäbe, Strategieinitiative

1. Introduction

After the turbulent and sometimes painful period of transition from the 1990s to the present day, Croatian construction companies have been trying to find a way to adjust to intensive changes in their business environments, and have in the process adopted various new strategic management methods and procedures. Some construction companies have successfully transformed into modern construction companies highly competitive on construction market in the country and abroad. These companies have learned and applied, sometimes intuitively, modern business management methods and business strategies.

The aim of the paper is to present areas of strategic management of construction companies, as a basis for further systemic study in this field, in accordance with the needs for developing management practices currently applied in construction industry. An approach to the change of business strategies in construction companies, to the way of setting development objectives, and to the role and significance of design management in construction companies, is presented.

The BSC (balanced scorecard) model is presented in the paper [1]. The BSC model is a balanced scorecard or an indicator of success of a business strategy. The indicator of success is used for measuring the effects and results of strategic initiatives, as well as the results obtained by implementing an overall strategy of a company. The BSC model serves as a communication tool, a system for measuring success of strategic initiatives, and a system for strategic management of companies. The company strategy is observed through four distinct points of view, i.e. through four strategic perspectives of companies. Strategic perspectives of companies:

- financial perspective,
- investors / clients,
- internal processes, and
- development of employee knowledge.

Presentation of company strategy, as viewed from four above-mentioned strategic perspectives, to all participants in the company provides a clear image of the strategy, and thus enables its implementation and success. In addition to the Balanced Scorecard model, the following strategic tools are also presented:

- **PEST** (influence of Political, Economic, Societal and Technological environment),
- **Five competitive forces**: 1. Barriers to entry – at the access of competing companies to a new market, 2. Threat of substitution, 3. Buyer power, 4. Supplier power, and 5. Competitive rivalry – threat posed by existing competition.
- **SWOT** analyses capacity of companies S (strength), W (weaknesses), O (opportunities), and T (threats).

2. Strategy of construction companies

"The essence of formulating strategy is relating a company to its environment" [2]. The company environment is dominated by

investors, buyers, suppliers, competing companies, political and administrative bodies, and many other factors of significance to company profit.

Various authors have formulated their distinct definitions of business strategy.

Porter [2] defines the strategy as "integrated set of strategic initiatives that ensure the company's superior and long-term competitive position in the marketplace".

Leagaard et al. [3] define the strategy as "a logical set of activities, goals, means, and scenarios for implementation and achievement of results". It is further stated that "a construction company competes with its "competitors" and that the company survival depends on the capacity of its management to adjust and create management options in accordance with external influences and conditions. The area of business competition covers regional, national, and international segments of the market and, at the operational level, the strongest weapon resides in the capabilities of employees and in financial basis, and also in the capacity to cooperate at all company levels".

In the paper entitled "Implementation management models in construction companies" [4], the authors present the Balanced Scorecard model or BSC and the Excellence Model EFQM, and their use in construction companies in the country and worldwide. The BSC model is presented from the standpoint of estimating implementation of company strategy, while the EFQM is presented from the perspective of estimating success of overall operation of construction companies. The paper also provides an overview of application of these models in Croatia, with guidelines for implementation.

In conclusions of the paper "it is presented that only a small number of construction companies in Croatia uses modern implementation management models (33 %), which greatly differs from international practice (77.4 %)... and further on "Construction companies should start introducing modern implementation management systems so that they can adjust as much as possible to the increasingly present acceleration and tension in the marketplace. In this way they could compare their results with those of the competition and hence adjust their strategic goals toward realisation of an overall success of their business activities".

The strategic analysis of the Croatian construction industry at the economic branch (sector) level is presented in the paper "Strategic Analysis of Croatian Construction Industry" [5]. The analysis was conducted using the PEST model and the Porter's five competitive forces.

In the period from 2008 to 2014, participation of Croatian construction industry in national GDP fell from 7.3 % in 2008 to 4.1 % in 2014. Statistical indicators and influences by PEST model categories, and influence factors of Porter's five competitive forces, are presented.

The long-lasting crisis and reduced activity in Croatian construction industry requires companies to adopt new procedures and planning strategies that will ensure their survival and development.

Definition of the terms "building" and "construction" [7]:

The **building project** is a part of investment project (enterprise), a part of economic program (complex or aggregated project), through which realisation of material, spatial and manufacturing conditions are planned for the one-time or continuous realisation of an objective (or objectives) of an investment project over a project life cycle. The result of a building project is a (new or modified) structure having the following characteristics:

- one-time realisation
- defined location
- long life span
- numerous participants from various professions (architects, builders, survey engineers, building-installations experts, etc.)
- realisation based on order – contract

The role of construction project, being one of significant subprojects within a building project, is to materialise "in-situ" previous phases of the building project, during which phases the future significant consumption of material resources is planned.

The **construction project** (the investor's construction project) is the undertaking by which the investor's expectations are to be realised through realisation of construction works on a structure that has to meet requirements and expectations of the investor, while taking into account legislative and material limitations of the location.

The realisation project (the contractor's construction project) is the contractor's project by which the latter tries to convince the investor - by planning the realisation of works within the required, accepted or offered time, and by calculating the expected cost of specified works - that the best offer for the investor is the one presenting optimum conditions for the investor and, during realisation of works, attempts are made to realise the maximum of contractor's expectations through the use of appropriate technological procedures involving an optimum use of the contractor-owned technological and material resources.

The purpose and aim of this paper is to assist national business entities to adopt modern methods for creating company strategies, and it can also inspire further research in the development and implementation of strategies to be used by domestic companies.

The authors' interest is concentrated on construction projects, with an unambiguous relationship toward such projects. To facilitate understanding of the authors' position, the definitions of a building project and construction project are presented as follows.

The **PEST** is used for the analysis and estimation of the influences exerted by Political, Economic, Societal and Technological environment. The PEST analysis results point to the type and

intensity of negative and positive influences the environment exerts on company operations, and they represent the basis for initiating strategic initiatives aimed at achieving better company position on the marketplace.

"Five competitive forces", the Porter's model of analysing influences starts from the analysis of:

1. Barriers to entry – at the entry of competitive companies to a new market,
2. Threat of substitution
3. Buyer's negotiating power
4. Supplier's negotiating power, and
5. Competitive rivalry – threat posed by existing competition.

The result of this analysis points to the short-term and long-term business potential of a company.

The **SWOT** analyses the company's strength S, weaknesses W, opportunities O, and threats T.

The SWOT analysis is carried out by iterative processing of influences exerted on the company by external environment on the one side, and capabilities of the company's internal functions on the other.

The company's weaknesses are recognised in the parts of the company that perform their activities with substandard efficiency. The efficiency of these parts of the company must be improved. Opportunities are trends, influences, events and ideas that the company, or a part of the company, can make use of on the marketplace. Threats are possible events or influences beyond the control of the company, for which plans for elimination of unfavourable influences are made.

The analysis of Threats and Opportunities is conducted by analysis of the company's business environment and, at that, the following elements are analysed: positions and possible business moves of the investors and buyers, price limitations, occurrence of new technologies, market uncertainties, legislation, etc. The company's Strength and Weaknesses are determined by internal analysis of the company and, at that, with the focus on: company's productivity, internal cost structure, products and services, technical equipment, employee competencies, business culture of the company, etc. The analysis of external and internal influences is significant for creating a realistic image of the company's business environment and for projecting future operations of the company.

Croatian construction companies are exposed to strong pressures of the competition on the open market environment. The company competitive edge can be increased by developing the company in accordance with the international market requirements.

2.1. Balanced scorecard (BSC)

Based on the use of four strategic perspectives, the Balanced Scorecard (BSC) is a tool for presenting the company strategy, the system for measuring implementation of the strategy, and the basis of the strategic management system.

Table 1. Balanced scorecard perspectives

Perspective	Strategic initiative	Objectives	Criteria/ implementation indicators	Implementation
Financial	A	1, 2, 3	α, β, χ	
	B	4	δ, ϵ	
	C	5, 6	ϕ	
Investors/clients	D	7	η	
	E	8, 9, 10	λ	
Internal processes	F	11, 12	μ	
	G	13	π	
	H	14, 15		
Learning and employee development	I	16	σ	

A, B, C, .. - strategic initiatives; 1, 2, 3.....n - objectives of strategic initiatives;
 $\alpha, \beta, \gamma, \dots$ - indicators of implementation of a strategic initiative

The presentation of company strategies in four perspectives was developed by Kaplan and Norton in 1980s, after extensive research of strategies used by American companies which mostly shaped and monitored effects based on financial indicators. In addition to financial perspective, Kaplan and Norton also proposed non-financial perspectives: investors/clients, internal processes and development of employee knowledge [1]. They established that company assets are increasingly becoming non-material: knowledge, information, organisation, management, project management in particular. Strategic initiatives are strategic development projects selected by strategic company management, which is accompanied by continuous measurement of success gained in project implementation.

Strategic initiatives are determined by objectives, several of which can be defined for each strategic initiative. The implementation of each initiative is measured using appropriate criteria or success indicators.

The implementation of strategic initiatives is the result of multiproject management, which is conducted using appropriate project management tools in all phases of the project.

Four BSC perspectives are presented in the following Table 1:

Financial perspective

presents implementation of a company strategy, which is also presented by initiatives and implementation indicators in other perspectives (investors/clients, internal processes, learning and employee development) through the company's financial results. These are the indicators of past events, and they typically include profitability, income growth, and use of (material) assets.

Investors/clients

The investors/clients perspective presents strategic initiatives and results obtained by measuring implementation of company initiatives in establishing connections with investors/clients, understanding of needs, and fulfilment of expectations of investors/clients.

Internal processes of companies

This perspective presents key business processes in the realisation of which the company must make excellent results in creating added values for investors/clients. Due to turbulent changes in construction market and changes in the expectations of investors/clients, companies are obliged to periodically identify completely new internal processes. This can concern the use of information technology (BIM, GIS, business process management, etc.) in internal processes of companies. The Building Information Modelling (BIM) represents the information-based modelling of structures.

It is based on the computer software that processes the geometry of space, spatial relationships, analysis of views in space, geographical information, quantities and properties of construction elements with all relevant details. BIM can be used for simulation of the entire life cycle of a structure, from the planning, design, construction, to the use of the structure. BIM can be fed with data collected via sensors during the life of the structure so as to enable analysis and optimisation of maintenance activities for the said structure. The "Integrated Project Delivery at Autodesk.Inc." Harvard Business School, Case Study 2011. GIS is a geographic information system that collects, analyses and presents information about geographical location of the structure.

In construction, cooperation with supplies is a significant set of internal processes, as this cooperation is vital for an efficient fulfilment of contractor's contractual obligations.

Learning and employee development

Results obtained by the initiative and measurement of employee development and learning success constitute the foundation and are the instigators of strategic initiatives for other three perspectives as well.

Companies strategically strive toward improvement of employee skills (human capital), information systems (information technology capital), and organisational structure as needed for successful implementation (organisational capital). A strategic initiative is a project (or several projects) and is implemented through harmonisation and distribution of available resources, with simultaneous optimum implementation of several projects. Strategic balanced-scorecard (BSC) initiatives are implemented according to objectives set in advance using the multiproject management principle and, at that, selected implementation criteria - success indicators - are used to measure success during implementation and results obtained by implementation of strategic initiatives.

2.2. Objectives of strategic initiatives

Objectives of strategic initiatives are presented within four BSC perspectives. Examples of such objectives and possible implementation criteria/indicators are shown in the following table (Table 2).

Table 2. PSC objectives and implementation criteria

Perspective	Objectives of strategic initiatives	Implementation criteria/indicators
Financial	Increase in revenues Cost reduction	HRK / year Plan / realisation HRK / year
Investors / clients	Development of business partnerships Increase in market share information about current and possible future investors / clients	New investors / year % of share in construction market New investors / clients / year Processing potential investors
Internal processes	Use of IT in company operations Project management	Current use of IT applications in the company (software, hardware) Business information (BI) processing system Project success: deadlines, costs, quality
Professional advancement of employees	Development of employee skills and knowledge Knowledge management	Existing / new competences of employees Employee excellence

Well shaped strategic objectives and strategic initiatives – projects have the following properties, i.e. they have to be:

- **neutral:** with regard to selection of solutions during project implementation
- **measurable:** with regard to implementation indicators – monitoring results and measurement results gained during implementation of projects serve for making management decisions
- **realistic, achievable:** only realistic objectives can in fact be achieved
- **motivating:** project team members accept project objectives as their own objectives
- **demanding:** represent challenge for the project team
- **specific:** aimed at good-quality monitoring of project implementation [6].

These properties of properly shaped objectives can be achieved using appropriate project development tools.

2.3. Objectives matrix

One of practical tools for the definition of objectives is the so called Objectives Matrix, as shown in the following table 3. The following questions are put for every objective when defining the strategic initiative objectives: **What? Why? Who?**, and the **method for measuring initiative implementation success** is defined.

Table 3. Objectives matrix

1. PURPOSE AND MEANING Why?	2. RESULT What?
4. CRITERION OF SUCCESS Results measurement method	3. STAKEHOLDER Who?

OBJECTIVE

When individual objectives have been defined, the process continues by defining implementation priorities and the connection between individual objectives or initiatives. A special attention must be paid to mutually-dependent objectives (e.g. cost reduction – investment in development).

In the opinion of the authors, the objectives matrix is a highly efficient tool for the development of strategic objectives, initiatives and projects in construction companies.

2.4. Business processes and construction projects

According to PMBOK Guide 3rd edition, business processes are a set of interconnected activities and decisions by which materials, semi-manufactured products, energy, and information, are processed in the scope of a system / process, and are thus converted into the final product (output) and/or services of higher value that a buyer is willing to purchase on the marketplace. These business processes in a construction company can be presented (for a fictitious company) as follows:

Management processes:

- Strategic planning and implementation
- Planning and controlling costs and revenues of a company
- Business risks management
- Project management
- Business processes and decision making.

Basic business processes – support to management processes:

- Planning
- Implementation of business plans,
- Monitoring implementation of business plans,
- Implementation documents
- Preparations for construction work
- Construction
- Maintenance
- Marketing
- Procurement
- Machines and mechanical plant – operation, maintenance.

Accessory business processes – as support to management:

- Human resources: selection, positioning and development
- Finances and personnel services
- Information management: business documentation and acquired knowledge

As a part of total company management processes, project management can be divided into project management for construction projects, i.e. for the realization of contracts and orders placed by investors/clients, and project management for internal strategic development projects, i.e. for the realisation of strategic objectives. To enable better planning and control during implementation of construction projects, optimum use of resources and efficient realisation of objectives, the life cycle of a project can be divided into groups of project activities, i.e. project phases, which are implemented by means of business processes. The authors propose a general division of the construction project life cycle, as shown in Figure 1 [7].

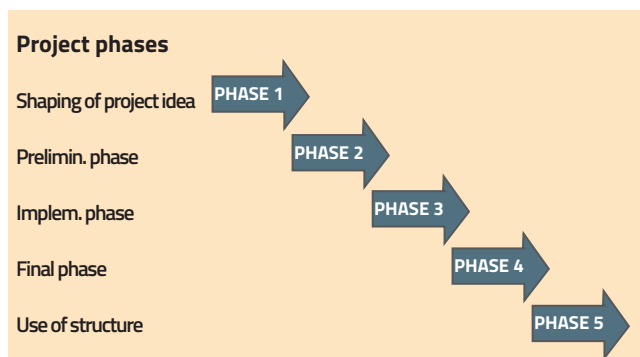


Figure 1. Phases within life cycle of a construction project

Depending on project circumstances, investors/clients and project managers will decide on the way in which they will divide phases within the life cycle of the project. Successful implementation of project management practices on internal and external projects of a company is highly significant for companies that are nowadays exposed to influences of the open and turbulent construction market.

2.5. Strategic initiatives of construction companies

Based on BSC objectives and criteria as shown in Table 2, various strategic initiatives are implemented by companies. Some of these initiatives are presented in Table 4 below. During initial opening-up of Croatian market, this market was accessed a number of powerful international construction companies (such as Bechtel, Bouygues, Astaldi, Strabag, etc.). These companies had some considerable advantages over domestic companies: easier access to low-price capital, modern construction technology, experienced managers. Using their comparative advantages - knowledge of local and regional market and a high-quality employee base - as supported by agile implementation of innovative strategies, domestic companies can change their business strategies by:

- establishing good links with other domestic companies
- strengthening their presence on domestic and regional market
- internal development
- gaining access to international segments of construction market.

In addition to the above-mentioned strategic initiatives, companies can also make use of other initiatives, depending on business conditions and trends of change in business environment.

3. Strategy implementation in construction companies

The strategy of a construction company, presented through four BSC perspectives, enables the company management to adjust business processes, and directs all organisational units of the company toward adoption of a single strategy. The company's strategic management team defines the way in which changes

Table 4. Some strategic initiatives implemented by construction companies

Perspective	Strategic initiative	Objective of the initiative	Implementation criteria / indicators
Financial	Agreeing on long-term cooperation with suppliers	Lower purchase price	Comparison of unit rates
	Long-term contracts with subcontractors	Lower subcontractor prices Lower project risks Better use of capacities	Comparison of supplier prices Comparison of realisation costs
Investors/ Clients	Conditions for entering into PPP contracts – investment co-financing	Diversification	Growth of contract value (%/year)
	Exploring market for potential new investments		
Internal processes	Planning and controlling deadlines and capacities for realisation of works	Better use of resources Completion within schedule	Comparison: planned / realised Use of capacities and resources
	Improvement of project management practices – based on excellence criteria	Better project implementation results	Criteria for estimating maturity in project management [8]
	Improving organisation of construction practices	Better results as to realisation of works	Deadlines, costs, quality by type of work
Learning and development of employees	Enhancement of employee knowledge in the use of new technologies in construction industry: IT, BIM, IoT	Increasing company's competitive edge on international market	Employee excellence

IoT (Internet of Things) is digital connection of objects equipped with digital devices, such as GPS (geographic positioning system), sensors, and/or other electronic units installed in construction machines, vehicles, etc.

(results of strategic initiatives) will influence adjustment of other organisational units.

3.1. Strategies applied by company's organisational units

Once the company strategy has been defined at the highest level, individual parts of the strategy are transferred (cascaded) and adjusted for adoption by lower organisational units, down to each and every employee. Each employee must be informed about the company strategy at his/her particular level, and is required to continuously adjust his/her business activities to this strategy.

The strategy is transferred to individual departments in form of BSE, which is adjusted to the level and role of each particular organisational unit. The implementation of strategy by each organisational unit is also measured through realisation of implementation process – by monitoring implementation indicators.

3.2. Success in strategy implementation

The implementation of the long-term strategy adopted by the company and its organisational units requires the same level of attention as is necessary during definition of the strategy [9] presented through four strategic perspectives and strategic initiatives.

The company management provides required assets and defines priorities for the realisation of strategic initiatives. To ensure successful implementation of strategic initiatives, the company defines performance incentives as a means to motivate its employees.

Due to big and rapid changes of conditions on the global, European and regional markets, the business management team guided by the company management must consider, on several occasions within each year, the company success indicators i.e. the success in implementation of necessary adjustments to the change in conditions in which the company operates.

Based on fulfilment of results of the current strategy, the company management decides on the changes and adjustments of the strategy immediately after influences

have been observed, rather than once a year based on the last-year's historic financial indicators.

4. Conclusion

The long-term business strategy and its implementation is the precondition and final result of harmonisation of business processes in a company. The success of a strategy depends on good realisation of strategic initiatives, which involves realisation of all initiatives rather than only some of them, and on mutual harmonisation of these initiatives. The company is negatively affected in case of a lack of strategic harmonisation. In addition to creative shaping and implementation of a successful strategy, there is also a permanent obligation of achieving excellence in the field of activity of the construction company, which is defined by influences of its external environment:

Clients:

- preparation of documents;
- organisation of tendering activities;
- contract award criteria (the most favourable financial offer);
- response to Contractor's requests;
- reaction to project changes and/or disturbances.

Contractors:

- organisation;
- technology;
- equipment;
- conditions for participation in a tendering activity;
- forming requests toward the Client;
- reaction to project changes and/or disturbances.

The adjustment of companies to the influences of external environment in which they operate is controlled by means of the BSC, which is a tool for shaping and managing implementation of company strategies.

The authors expect that the paper will contribute to further study in the field of implementation and development of construction management practices.

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