

## METHODS AND APPROACHES TO IMPROVING THE EFFICIENCY OF THE CONSTRUCTION BUSINESS BASED ON THE EXPERIENCE OF SUCCESSFUL COMPANIES

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**Introduction.** Given the environmental and social issues associated with climate change in the building sector, it has become imperative to adopt sustainable development strategies and practical methods to address this challenge. One of the most commonly used approaches is "green building" (GB), which prioritises energy-efficient technologies that promote sustainable development [1]. In Singapore, for example, green building is playing an increasingly important role, despite a number of problems related to an appropriate project management system [2].

In 2021, China established itself as a leading player in the global green building market with a staggering volume of more than 178 billion USD. The United States ranked second in this indicator (about 83 billion USD), and India ranked third (20 billion USD) [3]. Energy efficiency in construction plays an important role, especially in developed countries. For example, the Netherlands had the highest building energy efficiency in the world as of 2022. France ranked second with a score of 21 out of 25, while Egypt and Thailand received the lowest scores [4].

The importance of sustainable development strategies, methodologies and approaches is increasingly recognised by academics, experts and the business community. This involves taking into account economic, environmental and social aspects related to the implementation of construction projects.

**Analysis of recent research and publications.** In the scientific literature, researchers pay considerable attention to the practical application of their developments, strategies, methods, approaches to sustainable construction, in particular, green projects in the industry. Scientists identify the following problems and barriers to the implementation of this concept: lack of information and knowledge; cost, lack of incentives, demand and interest of stakeholders, ethics and rules of implementation [1].

Researchers have demonstrated that construction companies play a crucial role in ensuring sustainable development by taking responsibility for implementing energy-efficient technologies in the construction industry, minimising negative environmental impacts and maximising economic benefits. Sustainable practices in construction offer a number of benefits: in particular, effective corporate governance of environmental and social issues ensures that companies' shareholder value increases, creating value for customers. A large number of studies are devoted to the implementation of sustainable construction methods and practices [5]. For example, Hill & Bowen has developed a theoretical framework for sustainable construction, the key components of which are: environmental assessment of the project, environmental policy, organisational structure, environmental management programme, external/internal audit of environmental performance [6]. According to Trufil & Hunter, the sustainability system for small and medium-sized companies in the construction industry is used to improve performance in the following dimensions of sustainability: economic, environmental, social and operational [7]. The requirements of construction companies' clients are increasingly linked to the need to implement a sustainable development policy to optimise business processes. Accordingly, the key incentives for the integration of green building practices among stakeholders are: external factors, corporate structure, business owners, project factors, and internal factors that affect individual enterprises [8].

The study by Shen et al. [9] presents a new methodology for feasibility studies of projects in China, which includes the principles of sustainable development, given the significant scale of construction activity in the country. The authors also acknowledge that in practice, financial performance indicators are prioritised in construction, often to the detriment of environmental and social considerations [9]. In the context of efficiency, it is worth noting that the main indicators of its characterisation are production, sales, gross value added, innovation, and cost reduction. Similarly, in the foreign literature, the term "efficiency" is also used to measure the relationship between inputs and outputs, the success of transforming inputs into outputs. From this perspective, business efficiency is measured by using fewer resources to achieve the same result. It is also worthwhile to focus on the concept of business efficiency, which reflects the productivity of the cost-benefit ratio. Instead, the degree of development of an organisation's internal processes (including organisational culture, structure and community) is reflected in its level of organisational effectiveness. The latter helps to increase the organisation's efficiency in terms of management, productivity, and profitability. The dimensions of organisational effectiveness include: organisational strategy; development of the corporate structure; building a management and business system; development of corporate and service style; staff motivation; staff development and competence; company goals [10].

The last decade has seen a significant surge in the construction of sustainable buildings. There are many factors that contribute to this phenomenon, such as rising energy prices, increased cost of construction materials, and regulatory changes that stimulate the growth of the green building market. In addition, green building project management methods ensure that green building projects increase their value for clients while maintaining an acceptable level of costs [11].

Studies have shown a significant impact of the construction industry on the environment [12–14]. It should be acknowledged that, according to the World Bank, since 2003, there has been a steady increase in the share of carbon dioxide emissions from both the manufacturing and construction industries worldwide: from 16.9% of total fuel combustion to 20.3% in 2011. In 2021, the construction sector accounted for approximately 37% of emissions [15–16].

**Objectives of the article.** Given the above, the purpose of the article is to provide a theoretical and practical analysis of approaches and methods to improve the efficiency of the construction business within the framework of the concept and strategy of sustainable development. To achieve this goal, the article uses general scientific and special research methods: analysis, synthesis, generalisation, as well as the case method to describe the practice of construction companies implementing projects within the framework of sustainable development strategies. The comparison method was used to compare theoretical provisions and practical cases of companies implementing construction projects.

**The main material of the study.** The main structural components of the sustainable development strategy of construction companies are traditionally defined as economic efficiency, environmental efficiency for resource conservation and social efficiency. Within each element, the approaches and methods used by companies throughout the life cycle of a construction project are distinguished. Given the significant consumption of natural and human resources by the construction industry, initiatives in this area are aimed at implementing projects for the construction of environmentally sustainable buildings. Solar passive design, life cycle design and building design are important strategies to improve efficiency by minimising the use of non-renewable resources. Methods to minimise material loss during the construction of a building and provide opportunities for recycling and reuse of building materials also contribute significantly to improving the efficiency of resource consumption. Resource conservation defines different design approaches and methodologies, as shown in the diagram [17].

Resource saving strategies and methods in construction include:

1. Energy conservation strategies.
2. Materials conservation strategies.
3. Water resource conservation strategies.
4. Land resource conservation strategies.

As part of energy saving strategies aimed at reducing fossil fuel consumption and increasing the use of renewable energy sources, the following methods are used in the construction industry (Figure 1):

1. Choice of materials and construction methods to reduce the building's energy consumption, solar heat gain or loss: selection of materials with low embodied energy (e.g., aluminium has a very high embodied energy due to the significant electricity consumption for raw material extraction). Therefore, the design of the building will take this aspect into account and apply a broader approach to assessing energy consumption over the life cycle.

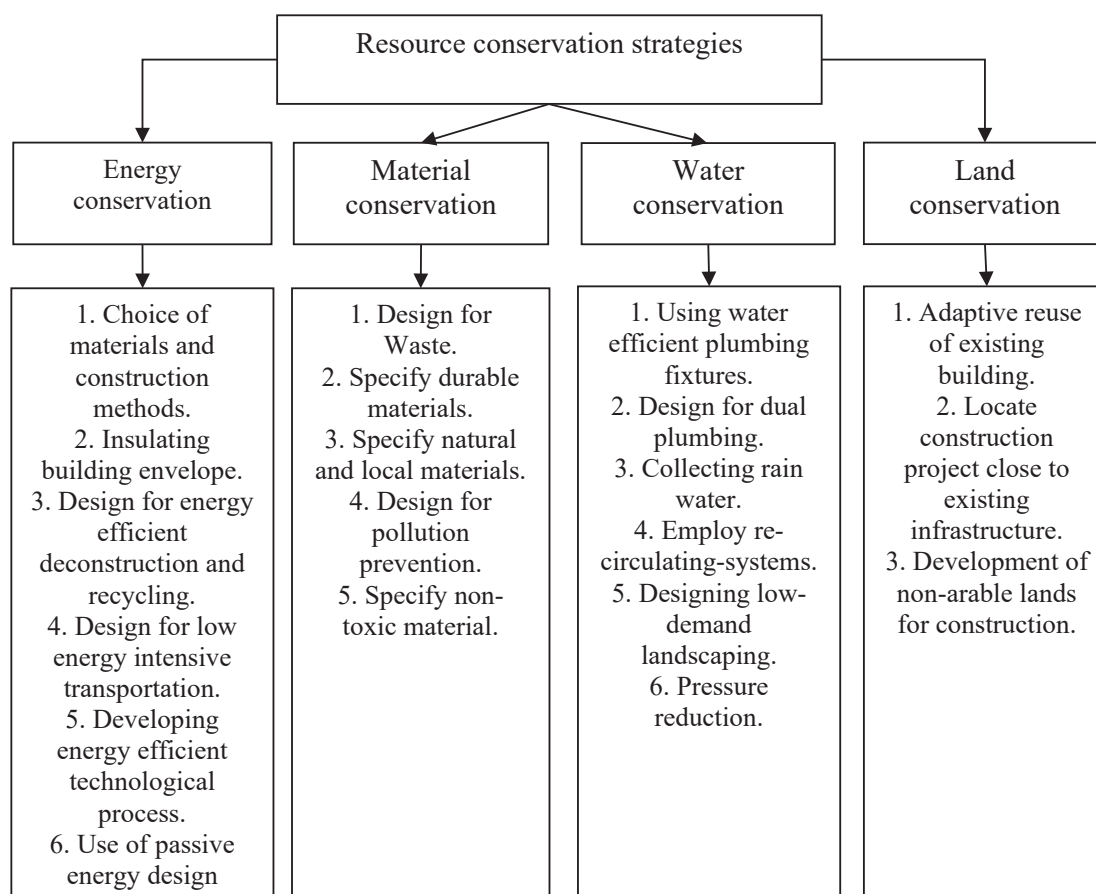
2. Insulation of the building envelope, which has a direct impact on energy consumption, effectively reduces heat loss through the building envelope by around fifty percent.

3. Design methods for energy-efficient deconstruction and recycling of materials help to save natural resources and reduce energy consumption by using non-hazardous, biobased and recyclable materials in buildings. Deconstruction design methods contribute to the realisation of building design opportunities in the last cycle of material use in construction. Thus, the transition to a construction industry in which energy consumption is close to zero is taking place.

4. Designing energy-efficient transport that reduces emissions. Low-energy building design is combined with urban design that allows for public transport and cycling.

5. Development of energy-efficient technological processes for the construction, arrangement and operation of buildings. To achieve the targeted energy consumption levels, the project team has been implementing a comprehensive approach to energy efficiency in construction processes from the outset. The use of passive energy design helps to reduce energy consumption (e.g., natural ventilation, landscaping, water bodies for evaporation and cooling).

The concept of sustainability in the construction sector ensures efficiency by reducing financial costs. Private and public sector companies invest in construction on the basis of cost estimates, with little or no consideration of O&M costs over the life of the facility. The project decision-making process involves careful selection of the project management structure, construction materials and equipment. Unfortunately, these choices can lead to mistakes that affect investment activities and the economic oversight associated with these decisions. The economic costs associated with the operation of the building should be taken into account at all stages of construction, as well as during its maintenance and support throughout the entire period of use. To ensure that financial targets are met, the concept of life-cycle costing is used and plays an important role in project estimates and financial planning. Life cycle cost analysis is an economic evaluation approach that allows to predict the costs of a building associated with its operation, maintenance and replacement. The effective use



**Figure 1. Strategies and methods to achieve resource conservation**

Source: [17]

of life cycle costing involves the application of balanced, integrated design and construction methods, taking into account environmental principles. Thus, life cycle costing is an important tool for achieving economic efficiency in construction projects. At the beginning of a project, there are three main strategies for calculating the life cycle cost: initial cost, value in use, and replacement cost (Figure 2).

The concept of sustainable development of the construction industry involves the implementation of targeted and integrated approaches to business activities [18]. Sustainable development principles are used in construction and the construction industry. For example, construction of the Volia Agro-Food Park Vinnytsia industrial park has begun in Vinnytsia, specialising in the production of intermediate and final products in the food industry, the provision of specialised services, and research and development in the agri-food sector. The Volia Agri-Food Park in Vinnytsia is being created on an area of 35.7 hectares, taking into account the principles of sustainable development, in accordance with UNIDO recommendations [19].

Since its founding in 1981 in Turkey, Onur Taahhüt has also been taking into account modern approaches to business, energy efficiency and sustainable development. The company has successfully implemented construction projects in Croatia, Ukraine, Tunisia, Moldova, Oman, Equatorial Guinea and Turkmenistan. Construction projects are implemented in the following areas: construction of dams, performance-based contracts for road maintenance, construction of bridges and viaducts, construction of buildings, landscaping and gardening, preparation of skeletal material, production of asphalt and concrete, construction of motorways/roads, infrastructure facilities, railway/tramways, and airports [20].

The company's quality policy and environmental policy provide for the implementation of systematic processes in accordance with the organisation's goals and objectives, as well as the requirements of the quality system that supports the company's strategy. In addition, quality targets are clearly defined in accordance with performance standards; employees and suppliers are encouraged to continuously improve the effectiveness of quality management, environmental and occupational health and safety systems; a service concept based on customer satisfaction and positive feedback has been developed; and the necessary resources and all types of services are provided to fully meet customer requirements within the framework of applicable laws. The

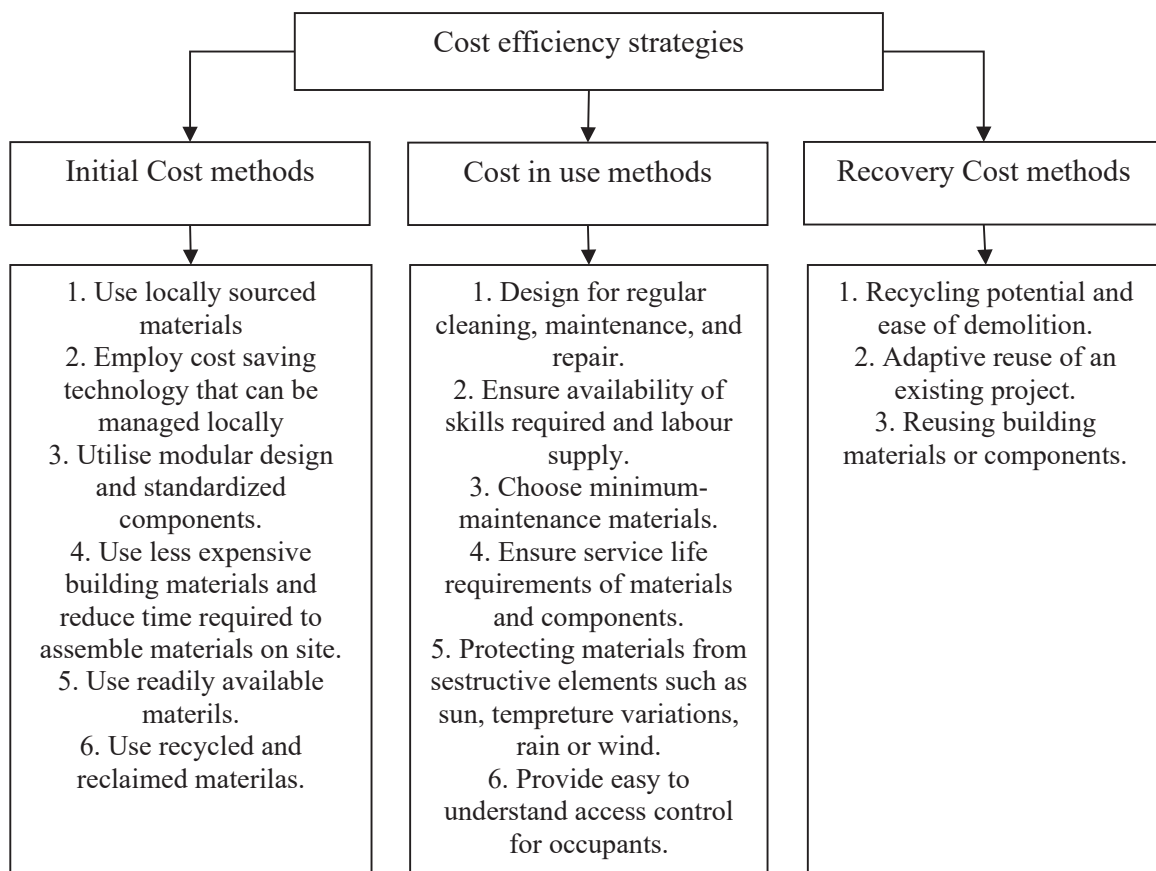


Figure 2. Strategies and methods for achieving cost efficiency in construction companies

Source: [17]

company's quality policy and environmental policy also provide for continuous improvement of customer satisfaction; promotion of personal development of employees, raising their environmental awareness and improving the quality of service; innovation, improvement of areas and critical functions of the research laboratory; continuous development measures in compliance with the norms and requirements of environmental protection policy [20].

The mission of the Italian construction company Ghella is environmentally friendly and innovative construction. The company operates internationally and implements large public construction projects, specialising in underground earthworks (tunnels, subways, railways, highways and hydraulic structures). The company operates in the renewable energy sector, implementing strategic photovoltaic and hydropower projects in Italy, Central America and the Middle East. The business philosophy is based on the well-being of society. Its activities are aimed at improving communications, ensuring freedom of movement, minimising environmental impact and optimising the use of natural resources. The company ensures the highest quality standards, introduces innovations and sustainable development and strives for continuous improvement in construction. To achieve this goal, the company uses advanced technologies and innovative construction methods, and constant-

#### Sustainable policy

##### Ethics and transcendence

1. Compliance with legal, contractual and local requirements.
2. Zero tolerance for corruption and whistleblowing channels.
3. Respect for human rights.

##### Involvement of local communities and stakeholders

1. Engage with stakeholders by actively listening to the legitimate expectations of local communities.
2. Protect and promote the well-being, human capital and environment, historical and cultural heritage.

##### Staff welfare and development

1. Ensuring health, wellbeing and safety and promoting a culture of zero harm
2. Value and promote equality and inclusiveness in the workplace and do not tolerate discrimination of any kind.
3. Develop the skills of our employees and promote a healthy work-life balance.

##### Environmental protection

1. Assess, control and reduce environmental impacts and create benefits.
2. Implement ecodesign principles in projects.

##### Supply chain engagement

1. Work with suppliers to ensure ethically and environmentally sustainable supply of goods and services.
2. Give preference to materials and services with the greatest circular economy benefits.

##### Innovation and continuous improvement

1. Foster innovation by creating a culture of sustainability integrated at all levels.
2. Strive to be at the forefront of technological, design and management innovation.
3. Continuously improve standards, policies and procedures.

**Figure 3. Key components of the sustainable development policy of the Italian company Ghella**

*Source: [22]*

ly invests in staff training [21]. As shown in Figure 3, the company's established policy includes the following dimensions: ethics and transparency; involvement of local communities and stakeholders; staff development and welfare; environmental protection; supply chain stimulation; innovation and continuous improvement.

As shown in Table 1, the company demonstrates favourable trends in revenue, earnings before interest and taxes (EBIT) and economic value of the business for the period 2020–2022. These positive results are largely attributable to effective supplier management, skilled human resources policies and sound management strategies. The organisation's sustainability strategy, together with the relevant reports, comprehensively covers information relating to its economic, environmental and social performance.

Table 1

**Analysis of Ghella's operating and financial results for the period from 2020 to 2022**

| Indicator (in thousand EUR)  | 2020    | 2021    | 2022    |
|--|---------|---------|---------|
| Income   | 525 418 | 648 045 | 859 604 |
| EBITDA (earnings before interest and taxes, depreciation and amortisation) | 58 664  | 76 429  | 88 533  |
| Economic value generated and distributed                                   | 513 228 | 631 830 | 860 010 |
| Emissions, tCO <sub>2eq</sub>  | 69.616  | 72.600  | 72.600  |

*Source: [23]*

**Conclusions.** The study systematises and generalises theoretical and practical methods and approaches to improving the efficiency of construction enterprises within the framework of the concept and strategies of sustainable development. Construction companies contribute to sustainable development by taking a responsible approach to the implementation of energy-efficient technologies in construction, minimising the negative impact on the environment and maximising economic benefits. Sustainable practices in construction offer a number of benefits, including effective corporate governance of environmental and social issues, which increases shareholder value and creates value for customers. Green building project management techniques deliver increased value to clients while maintaining acceptable costs. The construction industry is integrating strategies and techniques to conserve resources such as materials, water and land. Financial performance measurement involves the use of an economic evaluation approach based on life-cycle cost analysis, which allows for the prediction of construction costs from the operation phase to maintenance and replacement until the end of the service life. Having analysed the cases of the world's leading construction companies, it can be concluded that achieving sustainable development in the industry requires a comprehensive and targeted approach to doing business. The case of Onur Taahhüt in Turkey is an excellent example of how companies can balance economic efficiency with modern business practices, while prioritising energy efficiency and sustainability. The organisation's quality and environmental policy promotes the implementation of systematic processes in accordance with its goals and objectives; clear definition of quality objectives in accordance with performance standards; encouragement of employees and suppliers to continuously improve the effectiveness of quality management systems; development of a service concept; provision of necessary resources; and innovation. The case of the Italian company Ghella proves the effectiveness of its sustainability policy, which includes the following dimensions: ethics and transparency, involvement of local communities and stakeholders, development and well-being of employees, environmental protection, stimulation of supply chains, innovation and continuous improvement. The company's strategy and management practices ensure positive dynamics of revenues, earnings before interest and taxes, and economic value of the business, which is formed mainly by suppliers, personnel and management practices. The practical significance of the research results is to prove the efficiency of construction based on the experience of world leaders in this field. Further research in this area could include empirical studies of the economic efficiency of construction companies at both the global and local levels.

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UDC 332.83

JEL H21, Q01

**Oleg Kharit, Ph.D., JSC "Teodor", Development Expert. Methods and approaches to improving the efficiency of the construction business based on the experience of successful companies.**

The study systematises and summarises theoretical and practical methods and approaches to improving the efficiency of construction companies within the framework of the concept and strategies of sustainable development. Sustainable methods in construction provide an increase in revenues and economic value of companies, creating value for customers. Sustainable construction project management methods provide increased value to clients while maintaining acceptable costs. The construction business combines strategies and methods to save resources, materials, water and land. The financial dimension of efficiency involves the use of an economic valuation approach based on life-cycle costing, which allows forecasting construction costs from the operation phase through maintenance and replacement to the end of the service life. Based on the analysis of the cases of the world's leading construction companies, the author determines that the concept of sustainable development of the construction industry involves the implementation of a targeted and comprehensive approach to business activities. The practical significance of the research results lies in proving the efficiency of construction based on the experience of world leaders in the industry. Prospects for further research in this area are empirical studies of the economic efficiency of construction enterprises at the international and national levels.

**Key words:** construction efficiency, sustainable development policy, sustainable development, construction business, sustainable development methods.



УДК 332.83

JEL H21, Q01

**Харит Олег Михайлович, Ph.D., АТ «Теодор», експерт з розвитку. Методи та підходи до покращення ефективності будівельного бізнесу на основі досвіду успішних компаній.**

В дослідженні систематизовано та узагальнено теоретико-практичні методи та підходи до покращення ефективності будівельних компаній в рамках концепції та стратегій сталого розвитку. Обґрунтовано актуальність популяризації стійких методів у будівництві, охарактеризовано їхні переваги, зокрема ефективне корпоративне управління екологічними та соціальними проблемами забезпечує зростання доходів та економічної вартості компаній, формуючи цінність для клієнтів. Вимоги клієнтів будівельних компаній здебільшого спрямовані на вирішення потреб у впровадженні сталої політики для оптимізації бізнес-процесів. Загалом ключовими стимулами для інтеграції практики зеленого будівництва серед зацікавлених сторін є як зовнішні фактори, корпоративна структура, так і фактори на рівні проектів та індивідуальні внутрішні чинники підприємств. Методи управління проектами з екологічного будівництва забезпечують підвищення їх цінності для клієнтів з одночасними прийнятними витратами. В будівельному бізнесі поєднуються стратегії та методи збереження ресурсів, матеріалів, водних та земельних ресурсів. Фінансовий вимір ефективності передбачає використання підходу до економічної оцінки на основі аналізу вартості життєвого циклу, який дозволяє прогнозувати витрати на будівництво від етапу експлуатації, до технічного обслуговування та заміни до кінця терміну служби. На основі аналізу кейсів визначено, що концепція сталого розвитку будівельної галузі передбачає реалізацію цільового та інтегрального підходу до діяльності бізнесу. Зроблено висновок про те, що стратегії та методи управління будівельних компаній-лідерів забезпечують позитивну динаміку доходів, яка генерується завдяки постачальникам, персоналу та управлінським практикам. Практичне значення результатів дослідження полягає в доведенні ефективності будівництва на основі досвіду світових лідерів в галузі. Перспективи подальших наукових розробок у цьому напрямку передбачають емпіричні дослідження економічної ефективності будівельних підприємств на міжнародному та національному рівнях.

**Ключові слова:** ефективність будівництва, політика сталості, сталий розвиток, будівельний бізнес, методи сталого розвитку.