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Optimizing Construction Costs: Strategies for Contractors

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Abstract

The article discusses methods and principles of calculating profit in the price of construction work offers, including a risk buffer for exceeding the base scope, budget, and project time. The main part of the article consists of a list of multi-aspect recommendations developed by the author, whose implementation in the contractor's unit can contribute to increasing the profitability of the order portfolio and avoiding economic disputes with stakeholders.

Keywords: imputed profit, cost optimization, risk buffer, offer price

1. Admission

Determining the offer price for construction works at an optimal level, ensuring the acquisition of orders and the achievement of set goals (including generating a high margin and avoiding balancing on the brink of profitability), is challenging in the face of the capital intensity of construction projects and the high risk of exceeding the base scope, budget, or project time, in view of [1], [2], [3]:

- the heterogeneous nature and lack of seriality of the production process,
- the implementation of projects in a dynamic, probabilistic, complicated environment burdened with a high degree of uncertainty regarding implementation conditions (including price variability - *Fig 1* - and cyclical variability over time),
- the involvement of multiple project stakeholders, whose goals are often neither consistent nor complementary.

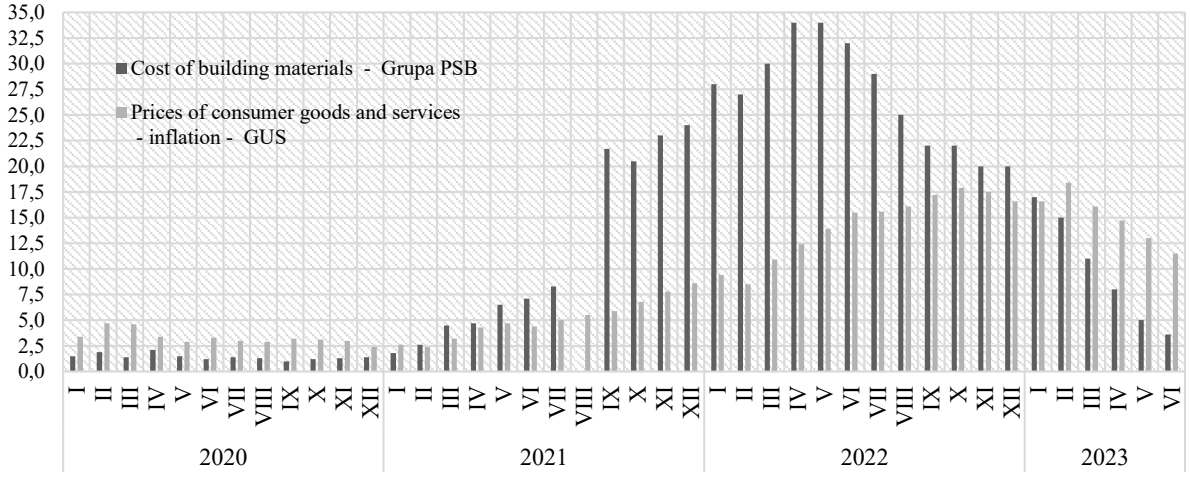

Fig. 1. The dynamics of price changes in Poland from 2020 to 2023 in a year-on-year (y/y) perspective [in %]
In-house analysis based on data from the PSB Group and the Central Statistical Office (GUS)

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2. Methods of calculating imputed profit

One of the critical tasks of the contractor creating the base budget/ cost calculation construction work offer is the correct determination of the imputed profit, i.e. the assumed surplus of revenues over the costs of performing construction works, which will cover tax liabilities to the state, expenses related to the development of the enterprise and possible losses [2], [4].
The optimal value of the imputed profit should take into account the conditions of construction works and correlate with: the probability of the materialization of the risk assigned to the contractor (an increase in the prices of construction production factors, the need to remove defects in construction works revealed during the warranty period and quality guarantee), the costs of risk prevention and the effects of the materialization of the risk [3].
The imputed profit is determined using either the preliminary (quantitative) method or the ratio method.
In **the preliminary (quantitative) method** , the imputed profit is determined in the form of a monetary amount corresponding to the annual needs of the enterprise. The calculation known as the estimate takes into account, m.in the planned turnover of the enterprise, the size of employment, the value of production assets and the applicable tax system.
In **the ratio method**, the imputed profit per unit of work is calculated as the product of the profit mark-up ratio and the sum of the costs of direct labour, the costs of renting and operating the equipment/means of technological transport and the indirect costs determined per unit of quantities/aggregate scope of basic works, according to the formula:

$$Z_j = \frac{W_Z \times (R_j + S_j + K_{pj})}{100\%} \quad (1)$$

in which the individual symbols stand for:
Z_j – imputed profit per unit of quantities/aggregated scope of basic works;
W_Z – the profit mark-up ratio, taking into account the provision for the contractor's contract risk, in %;
R_j – direct labour costs per unit of quantities/aggregate scope of basic works;
S_j – costs of rental and operation of technological equipment/means of transport per unit of quantities/aggregated scope of basic works;
K_{pj} – indirect costs (construction overheads and management costs) per bill of quantities/aggregate scope of basic works.
When determining margin ratio for the imputed profit, an individual analysis may be used, taking into account values specified in contracts or publications by various entities, including ATHENASOFT Sp. z o.o. (INTERCENBUD), SEKOCENBUD Sp. z o.o. [7], ORGBUD-SERWIS Sp. z o.o. (INFOCENBUD [8]) and Wolters Kluwer Polska Sp. z o.o. (BISTYP [9]). The quarterly journals [6], [7], [8], [9] publish minimum, average and maximum values of profit margin ratios for general construction works (investment and renovation), electrical works, sanitary works and engineering works (*Table 1*).

Table 1. Profit markup indicator nationwide, in the III quarter 2023

Type of construction works	**INTERCEN-BUD** [6]	**SEKOCENBUD** [7]			**ORGBUD-SERWIS Sp. z o.o.** [8]			**BISTYP** [9]
		min.	**med.**	**max.**	**min.**	**med.**	**max.**	
General civil engineering works	12.3	5.0	11.2	18.0	6.0	9.2	16.9	11.3
General construction and renovation works		5.0	11.6	18.0				
Sanitary installation works	12.2	5.0	11.2	18.0	5.5	9.1	16.7	
Electrical installation work	11.9	5.0	11.4	18.0	5.2	9.3	17.2	
Engineering works	13.0	5.0	11.4	18.0	5.2	9.2	18.4	
Specialist works - high standard	12.3	-	-	-	-	-	-	

Own elaboration based on [6], [7], [8], [9]

In the third quarter of 2023, the profit margin ratios across the country varied as follows [6]:

- from 5.0% to 18.0% of the sum of direct labour costs, rental costs and operating equipment and indirect costs - according to SEKOCENBUD Sp. z o.o., *Information on cost estimation labour rates and labour prices of construction equipment – IRS*,
- from 5.2% to 18.4% of the sum of direct labour costs, rental costs and operating equipment and indirect costs – according to ORGBUD-SERWIS Sp. z o.o., *Construction Price Bulletin – BCB.*

The selection of the imputed profit margin ratio at a minimum level increases the contractor's chances of recognizing its offer as the most advantageous, but it is justified only in the case of construction works in conditions that are exceptionally favourable to the contractor. The choice of the maximum imputed profit mark-up ratio is rational (avoiding the risk of oscillating on the break-even point) in the case of applying for the execution of construction works [2], [6]:

- included in a controversial project of great public interest,
- considered niche and highly complex,
- under time pressure,
- in conditions that are harmful to health, dangerous, challenging or difficult,
- requiring hard-to-access, emergency specialist equipment/means of technological transport, as well as apparatus/devices/materials for which there is a low supply,
- in the period of dynamic changes in prices and rates of factors of construction production as well as changes in administrative and economic law,
- under conditions that disrupt the economic balance of the contract parties (e.g., high contractual penalties for delays in performance, lack of indexation clauses,
- with the involvement of multiple projectstakeholders of the project, including subcontractors, for whose omissions and actions the contractor is liable to the investor as if it were its own.

3. Measures aimed at increasing the profitability of the order portfolio

In order to increase the profitability of the order portfolio and gain a competitive advantage over other market participants, the contractor should implement an effective resource and risk management system, covering the spectrum of procedures indicated in *Table 2*.

Table 2. Measures aimed at increasing the profitability of the order book [2], [3], [11]

Phase	Recommendations
Ongoing activities of the contractor	1. Entrusting the preparation of the offer and implementation of the contract to teams with complementary competences - including those with knowledge and experience in the field of: – the fundamentals of project initiation, planning, and scheduling, – frameworks for risk management, project development cycle, and sustainable development, – methods used for project planning and scheduling such as Critical Path Method (CPM), Program Evaluation Review Technique (PERT), Range Estimation, Linear Scheduling and Precedence Diagram, – technologies for planning and scheduling, such as Building Information Modelling (BIM), Virtual Reality, MS Project; 2. Investing in developing employee competences (e.g. studies, courses); 3. Implementation of quality standards (e.g. TQM, Six Sigma, ISO 9000); 4. Compliance with the policy of recording the working time of the contractor's employees; 5. Striving for optimal digitization in order to improve the circulation of information in the contractor's unit; 6. Regularly updating the database of subcontractors in order to eliminate cooperation with entities that have improperly performed the entrusted scope of construction works, services or deliveries; 7. Understanding and accepting ethics and cultural values in cooperation;

Phase	Recommendations
	8. Diversification of the order portfolio in the event of market changes affecting the contractor; 9. Strengthening trust and building a positive image, including cultivating business relationships with reliable external entities; 10. Drawing conclusions from successes and failures for the future, including eliminating bad habits. 11. Prepare a post-project report for senior management listing practices/processes that need to be improved and lessons learned that may be useful for future projects.
Bidding (tendering)	1. Asking the investor to clarify unclear provisions of the terms of reference; 2. Preceding the offer price calculation: – interdisciplinary analysis of the specifications of the contract terms, in particular: • about the material scope of construction works, • deadlines for completing milestones, • about the method of settling construction works, • about risk and its impact, • about quality guarantee and warranty for defects, • on sanctions for non-performance or improper performance of the subject matter of the contract, – conducting a visit to the construction site; – preparation of a base material and financial schedule; – conducting adequate market research, including: • to direct inquiries to the optimal number of reliable subcontractors for construction works, services and supplies, • analysis of offers from subcontractors and banks (in the case of external financing), analysis of supply bottlenecks of equipment, devices and materials, • analysis of probabilistic forecasts of CPI inflation and prices and rates of construction and assembly production factors during the period of implementation of the subject of the contract, • analysis of the impact of the announced changes in administrative and economic law on the deadline and costs of construction works; 3. Careful collection, cataloging and archiving of documentary evidence used to determine the base budget/price of the bid, in order to (i) increase the effectiveness of seeking an increase in remuneration from the investor in the event of an increase in prices and rates of construction inputs, or (ii) demonstrate to the investor that the price offered by the contractor is not abnormally low; 4. In the event of significant changes in the prices and rates of factors of construction-assembly production or the prospective forecast during the stand-still period, a re-analysis of the profitability of the contract for the offered price is carried out.
Performance of the contract	1. Negotiating the terms of contracts with subcontractors of construction works, services and supplies before signing them; 2. Optimal allocation of resources over time, including prudent spending of advances; 3. Ongoing coordination of subcontractors' work; 4. Striving for transparent and transparent information flow among stakeholders; 5. Cooperation with the investor in the performance of the construction contract, including prompt making of key decisions that have a direct or indirect impact on (i) the scope, (ii) cost or (iii) the time of performance of the subject matter of the contract (e.g. regarding the solutions of additional works necessary to start, continue or complete the works of basic works on the critical path); 6. Implementation of measures reducing the risk of non-performance or improper performance of the contract, including: – ensuring constant and effective monitoring and controlling: about the material scope, o spending costs in real time, on the quality of construction works and the supply and storage of equipment/equipment/materials/raw materials intended to be incorporated into the structure of a building,

Phase	Recommendations
	– ensuring occupational health and safety, – ensuring environmental protection, – ensuring protection of fixed and movable property, – acceleration in the event of a delay in relation to the deadlines specified in the schedule (e.g. to avoid paying contractual penalties exceeding the costs of increasing the contractor's efficiency), – searching for alternative sources of supply; 7. Documenting the causes and effects of disruptions; 8. Carefully collect, catalog and archive documentary evidence (e.g. correspondence, minutes of meetings/conferences, extracts from the description of the subject of the contract, photographic documentation) showing a cause-and effect relationship with: increase in the costs of construction and assembly production, deviations from the deadlines specified in the schedule; 9. Commencement of additional/replacement works after concluding an appropriate annex to the contract, except in critical cases when delaying their implementation may result in a threat to the life or health of persons or a threat of damage to fixed and movable property; 10. Pursuing claims from the investor and subcontractors within the time allowed.

4. Conclusions

Incorrect determination of the project's base budget may result in unprofitability and, in extreme cases, jeopardize the financial condition of the contractor. Therefore, the offer price should take into account an optimal buffer against the risk of exceeding the basic scope, budget and project time, providing the contractor security [10], [11], [12].
Regardless of this, the basis of the contractor's profitability is a multifaceted human factor, including:

- integration of resources and knowledge of the contractor's employees,
- transparency of activities,
- effective and adequate monitoring and controlling: real-time cost spending, material throughput and quality construction works and supply and storage of apparatus/equipment/materials/raw materials intended to be incorporated into the structure of the building,
- ensuring health and safety at work,
- environmental protection,
- protection of fixed and movable property.

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