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PRICE AND QUALITY CONSTRUCTION

Ing. Markéta Frančíková¹

¹*Petržilkova 2486, Prague 5, Czech Republic, mafra80@seznam.cz, +420 724 767 132*

Abstract

The work focuses on effective cooperation and communication people of the whole construction process. The theme concerns the methodology of building information modeling (BIM), which represents better communication in the construction industry from the beginning of the project, presents higher efficiency, saving money and higher quality of construction work. The work focuses on the quality of works and their impact on the cost of construction – minimum offer price may not always be the best solution. The aim is to confirm or refute the stated assumption – 80% of clients decide the lowest price when choosing a building contractor. The processing is used empirical method - survey. Clients were divided into two groups so that the research results are objective and representative. The first group were the clients, who have more experience with construction contracts, for example city, state organizations. The second group were the clients who have less experience with construction contracts, for example housing associations and community. The result was that the hypothesis was refuted. It is interesting that both groups of clients have different results. Clients who have more experience with construction contracts, gave more importance to price.

Keywords

BIM, client, price, quality

Introduction

To execute a construction contract means in particular not to underestimate construction preparation, to monitor and keep track of the whole construction production process. The construction is demanding not only with regard to production, but also with regard to unforeseeable factors such as weather, oscillation of the prices of material, complete coordination at the construction, linking between individual processes, etc. One of the most important factors with regard to efficient construction process is communication and cooperation between the participating parties. These include the client and the designer or contractor or technical client of the contractor, construction coordinator or contractor and sub-supplier, etc. The more parties enter the construction process, the more complicated the coordination of the process and communication between the parties. In the Czech construction industry, communication takes place between all participating parties in various directions. On the other hand, abroad, communication is more systematic. Figure 1 shows the communication between the persons during construction in EU and in the Czech Republic. If communication and information exchange takes place through more persons, efficiency and responsibility for the quality of the executed work are often lost in the process.

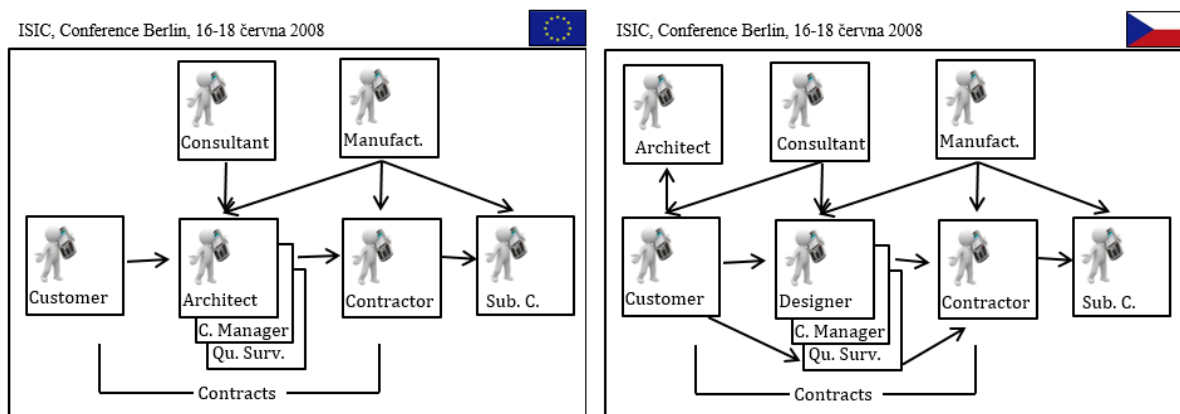


Figure 1: System in the EU and in the Czech Republic

- Procedure of the tender proceedings in the Czech Republic

The common procedure in tender proceedings for the most convenient contractor in the Czech Republic is the following: the client has the designer prepare a list of work and supplies, i.e. control budget with bill of quantities. This control budget in the form of blind budget serves as a basis for assigning the contract to potential contractors. Prior to placing a demand, the client should clarify what he expects from the contract, what does he prefer and which specific criteria will be used to evaluate the provided bids. Applicants interested in the contract shall provide prices in the blind budget with bill of quantities according to the tender documentation and submit the final price for the executed work to the Client. The benefit of this procedure is that the submitted bids are easily comparable.

- Price and quality of the executed work

For both, the client and the contractor, it is often problematic to stipulate an optimum ratio between the price and quality of the executed construction work. The client requires the contractor to execute the construction work in high quality for the lowest price. On the other hand, the contractor wants to conclude a contract for the execution of construction work that is beneficial for him. Price and quality are two completely different criteria. Unlike quality, price can be evaluated objectively. The lowest price in the offer does not mean the best and cheapest solution. On the other hand, the highest price in the bid does not mean better quality. In the construction industry, the price must be stipulated to cover all costs connected with the execution of the construction. The price of construction production is not regulated by any legal or another standard. The way we stipulate the price of the construction production is not regulated by any law. Prices are only regulated by the legislation in Act No. 526/1990 Coll., on Prices, but the current valid legislation only recommends the way of stipulating prices. Most clients evaluate the construction contract according to the selected criteria, with assigned importance.

Methodology

- Theoretical part

The system that is often used abroad and represents mutual cooperation of people, systems and business structures as part of the lifespan of the construction work leveraging the ability of all participants to optimize the results of the project is called BIM (Building Information Modelling). The purpose is to make the project execution as efficient as possible, to ensure quality, lower costs and overall sustainability in the construction.

- BIM in general

Word Building could be defined as the construction process. Building Information Modelling is a methodology that is generally usable for any construction. It is an information database that includes data from the primary proposal of construction, building administration, potential reconstruction to demolition including ecological disposal of construction material and restoration of the site to its original state. This includes all information usable during the whole lifespan of the building. All participants of the construction process contribute in the database and share information through the system. Therefore, the system is based on cooperation, data exchange, risks and responsibilities are transferred to individual participants and to various phases of the design, which should result in lower costs and lower risk. To achieve higher efficiency using the BIM model, closer cooperation between all interested parties, in particular between individual professions in preparation, with the client representatives, contractor representatives and future manager representatives is necessary. Coordination processes, i.e. data exchange, collision detection are essential for correct functioning of BIM model.

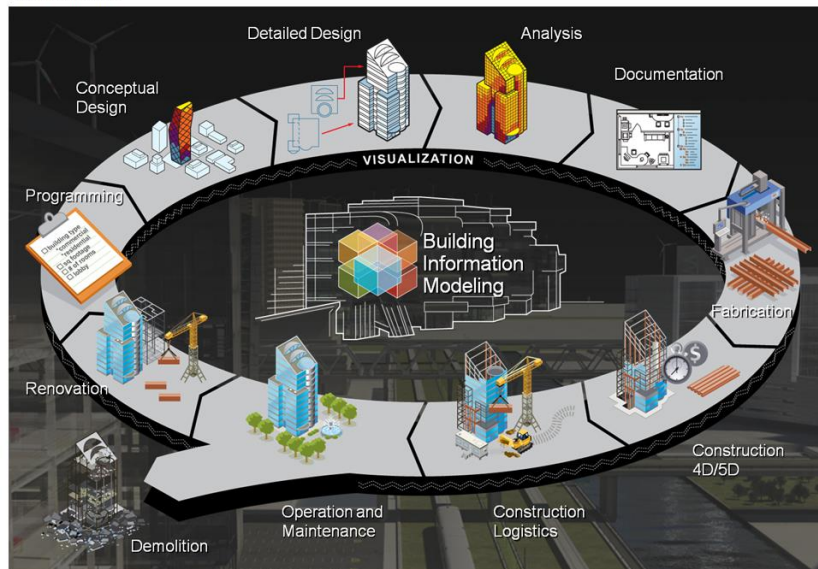


Figure 2: Building Information Modeling

- BIM abroad

One of the first states to actively use and support the BIM methodology is Finland. The Finnish government included the BIM model as mandatory in the requirements concerning the bids for the state administration. The same applies to Norway, the Netherlands, Denmark and Great Britain. All these states require the BIM methodology for the processing of public tenders. With regard to the BIM development, the Czech Republic is similar to Germany, where the BIM introduction process is slowed down due to the used German standards, strong tradition and regulation. Increasing interest in BIM can be seen not only in Europe, but also in Australia and China.

- BIM in the Czech Republic

Figure No. 3 shows the BIM development diagram. Individual levels are based on design using CAD, through the phase of defining standards and transfer to full 3D design to integrated information modelling which requires integrated data. According to this division, the Czech Republic is roughly at level 1 (Level 1 on Figure No. 3). The main reason BIM is not used in the Czech Republic (and if it is, only on a small scale) is that in the Czech Republic, there are no BIM standards for any level.

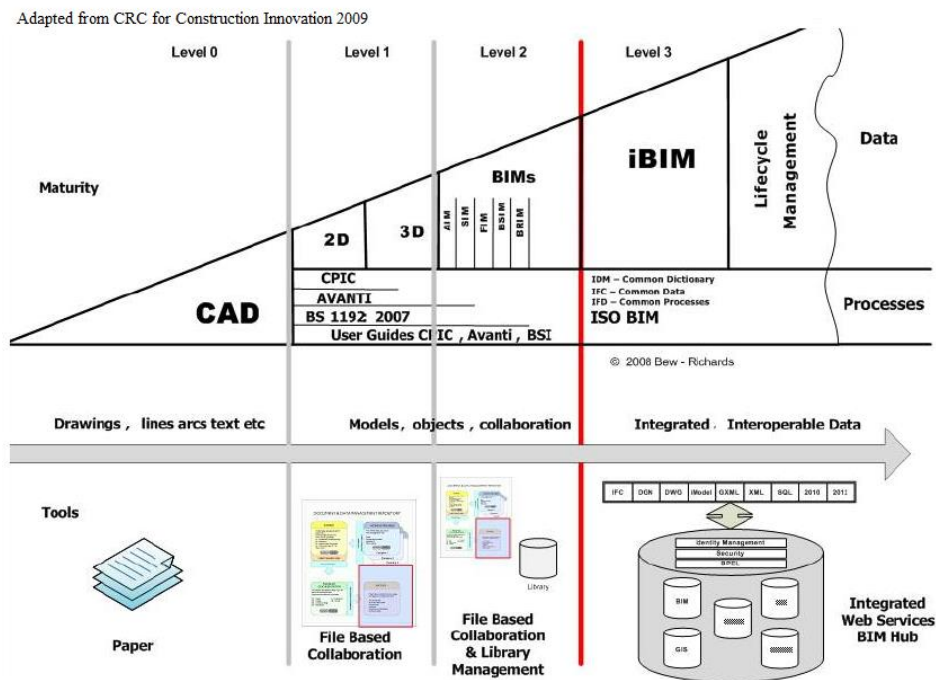


Figure 3: Diagram BIM

- Practical part

There are two groups of clients selecting the most convenient contractor of the construction according to the selected criteria with assigned importance. One group of clients are the Community of Unit Owners who do not execute reconstructions often and are not as experienced in assigning and evaluating tenders and as clients, unlike state administration and municipalities.

Group A consists of Communities of Unit Owners and group B usually consists of municipalities or state administration. For this paper, the following criteria for the selection of the contractor were chosen: price, period of construction, guarantee period, other criterion, bank guarantee. The respondents assigned importance to individual criteria subjectively, with their sum amounting to 100%. The objective is to confirm or confute the hypothesis that the clients, while selecting the most convenient contractor, based their decision on the lowest price from 80% provided the selected criteria.

Results

In order to get input data and compare them, the survey was conducted in the form of a questionnaire in both groups, A and B. The research focused on the importance of the selected criteria.

We approached 51 respondents from group A. From this group, only 13 respondents provided their feedback amounting to 25.5% success rate. We further approached 29 respondents from group B. We got back 12 questionnaires amounting to 41.4% success rate.

Tale 1: Results group A

group A	importance (%)												
criterion	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13
price	50	40	40	30	20	40	30	65	50	40	60	25	30
construction period	20	10	5	10	10	10	10	10	10	15	5	5	10
warranty	10	20	20	20	10	10	20	20	10	20	15	25	15
other criterion	15	25	30	30	50	30	20	0	10	20	15	35	40
bank guarantee	5	5	5	10	10	10	20	5	20	5	5	10	5

Tale 2: Results group B

group B	importance (%)											
criterion	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
price	50	100	70	80	70	50	50	100	50	55	65	100
construction period	20	0	0	10	10	10	20	0	10	0	15	0
warranty	30	0	30	10	10	15	20	0	20	20	10	0
other criterion	0	0	0	0	5	15	5	0	20	15	5	0
bank guarantee	0	0	0	0	5	10	5	0	10	10	5	0

Conclusion and discussion

Based on our research, we rejected the stipulated hypothesis, because for municipalities and state administration, price is important in 70% of the above-stated criteria. The Community of Unit Owners is interested in the price in 40%. This ratio between the two types of clients clearly shows that for state administration the price is the most important criterion in the selection of the contractor. For the prices bid by the contractor to be kept, it is important to not underestimate the preparation of the construction, to execute continuous checks, and manage the construction contract. In this regard, the BIM methodology already used abroad may help the state administration. Introduction of this BIM methodology would not only lead to maintaining the bidding price, but also to the execution of the construction in the required quality.

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