



Assessment of the state of preparation of construction entities in the Silesian region for the use of BIM technology in public procurement

Jacek Nawrot¹, Adam Kysiak²

ABSTRACT:

This work attempts to determine the state of preparation of construction entities in the Silesian region to use BIM technology in public procurement. The conditions affecting the scope of BIM use were identified and then, based on a survey, it was determined to what extent they were met in the surveyed entities. Based on the research conducted, it can be concluded that the state of implementation and use of BIM among the respondents is unsatisfactory. Less than 20% of respondents declare full implementation and use of this technology, the rest do not use it at all or use it occasionally. Knowledge of this technology and the ability to use BIM tools are also poor. Less than half of the respondents assess their skills in this field as at least sufficient, and only about 1/3 have access to programs working in the BIM environment, which translates into a small number of projects implemented using this technology. Positive information in the context of introducing the obligation to use BIM in the public procurement sector in 2030 is the period of BIM implementation declared by the respondents in the entities in which they are employed. The vast majority of respondents believe that a period of 3 years would be sufficient to fully implement this technology.

KEYWORDS:

BIM technology; public procurement; Silesian region

1. Introduction

BIM (Building Information Modeling) technology is increasingly used in the investment process at the design, construction and operation stages of building structures [1-3]. This also applies to the public procurement sector. Poland, as a member of the European Union, is subject to EU directives [4, 5], which allow solutions for the use of BIM technology, provided that universal access to electronic data modeling tools is ensured. Based on these regulations, the Act [6] provides for the possibility of the contracting authority to require the preparation and presentation of offers using electronic construction data modeling tools. This provision became the basis for introducing the requirement to use BIM technology when developing design documentation for construction works in some tender procedures, although the number of these procedures is relatively small. This is due to, among others, insufficient knowledge of BIM, lack of experience in its use, high implementation costs, lack of market maturity for BIM implementation, etc. [7, 8]. The document organizing issues related to the preparation and implementation of investments based on BIM technology in Poland is the draft of Polish BIM standards – BIM Standard PL [9]. It was developed in cooperation with the Polish Association of Construction Employers, the Polish

¹ Czestochowa University of Technology, Faculty of Civil Engineering, ul. Akademicka 3, 42-201 Czestochowa, Poland, e-mail: jacek.nawrot@pcz.pl, orcid id: 0000-0002-9581-1388

² Czestochowa University of Technology, Faculty of Civil Engineering, ul. Akademicka 3, 42-201 Czestochowa, Poland (student)

Association of Construction Engineers and Technicians, the Association of Polish Architects, representatives of Polish construction companies and experts from the ECCBIM Foundation as a BIM manual for the management of construction investments, primarily in the public sector, and as they emphasize the authors of this study themselves, it is still a project, and the completion of the standardization process and widespread implementation of BIM in Poland is expected for 2025. In turn, according to [10], the requirement to use BIM in public procurement is to be obligatory from 2030.

To assess the degree of preparation of enterprises and institutions participating in the investment process for the use of BIM technology in the public procurement sector, a survey was conducted among active construction engineers associated with the Silesian District Chamber of Construction Engineers.

2. Goal and scope of work

The aim of the work was to prepare Silesian enterprises and institutions that are used in the natural environment to use BIM technology in public hazards. We cooperated with the Silesian District Chamber of Construction Engineers, conducting a survey among its members (active construction engineers). The survey was anonymous and was conducted in Seawater in 2023 in electronic form (Google forms). Respondents answered the questions by selecting one of the answers, with the option of selecting "I don't know". 175 people participated in the survey.

Since the respondents included companies and institutions that correspond to the declarations of non-participating respondents and do not involve participants in tender procedures as part of public activities, the responses they participated in were not included in the safe study. To the question "Does your company/institution, as part of its activities, participate in/plan participants in/supervise the proceedings in tenders for construction works, held on the basis of the Law on the Application of the Fundamental Principle?", 110 people responded. Depending on the type of function performed in the investment system, respondents were assigned to particular interest groups (Fig. 1). The group in the surveyed sample consisted of projects (45%) and contractors (39%), additional places were taken by institution employees (9%) and property managers (7%).

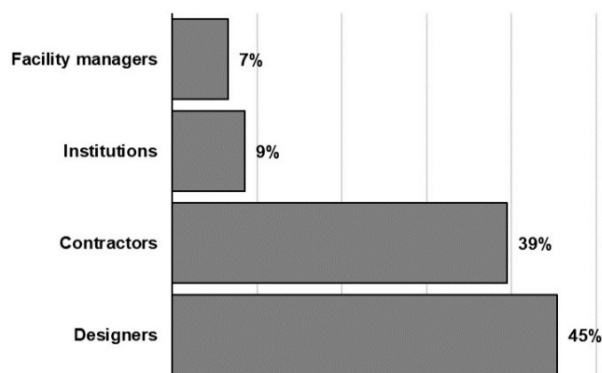


Fig. 1. Structure of respondents participating in the study

3. The research results

The factor determining the use of BIM in public procurement by individual participants of the investment process is, first of all, knowledge of this technology. Over 51% of respondents describe their level of knowledge in this field as insufficient and only 20% as at least good (Fig. 2).

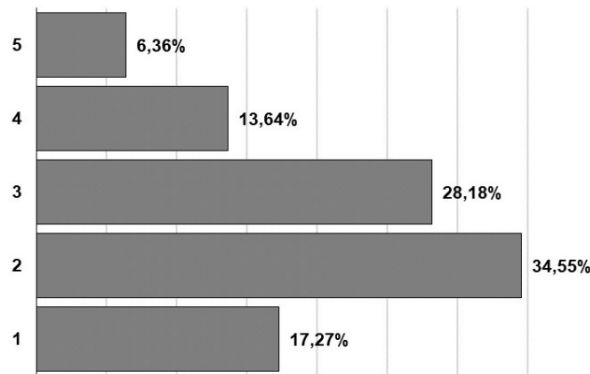


Fig. 2. Declared knowledge of BIM technology

Another important issue is access to BIM software. Only less than 33 % of construction engineers participating in the study have the opportunity to use BIM software as part of their professional activities, 62 % do not have such an opportunity and approximately 5 % do not know whether such software is available in the entities where they are employed (Fig. 3).

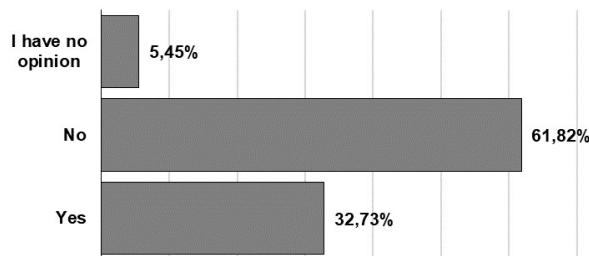


Fig. 3. Availability of BIM software

An important element in the widespread use of BIM in public procurement is the experience of individual stakeholders in the implementation of projects developed and implemented using this technology. Most respondents do not have such experience, and only over 7 % of respondents have the share of tasks carried out based on BIM exceed 50 % (Fig. 4).

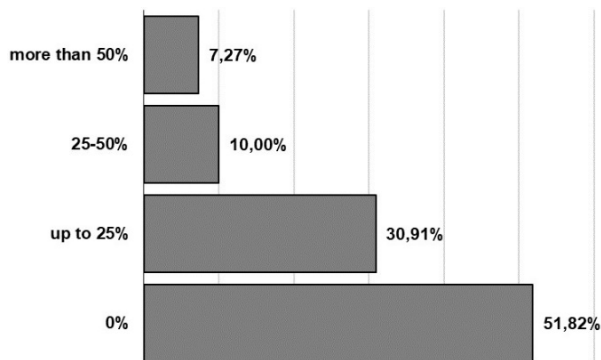


Fig. 4. Share of projects implemented using BIM

Only 19 % of respondents declare full implementation and use of BIM in the entities they represent, 81 % do not use this technology at all or use it occasionally and describe the state of its implementation as insufficient (Fig. 5).

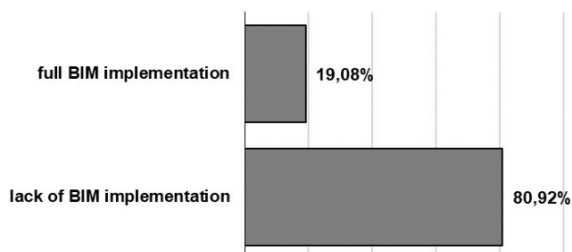


Fig. 5. Level of BIM implementation

Due to the small scope of work carried out using BIM, an important factor enabling the introduction of the requirement to use this technology in the public procurement sector is determining the time necessary to implement BIM in entities that have not yet used it. The vast majority of respondents (approx. 57 %) indicated a period of up to 3 years as sufficient to implement BIM in the companies or institutions where they are employed (Fig. 6).

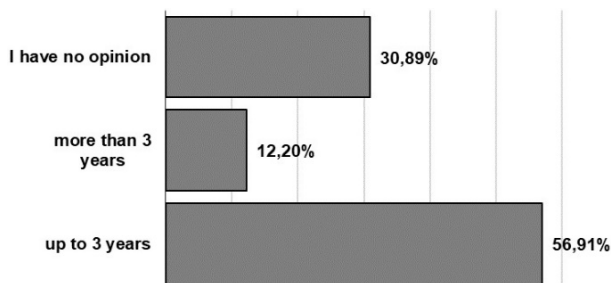


Fig. 6. Estimated BIM implementation time

4. Conclusions

The level of preparation of construction entities in the Silesian Voivodeship for the implementation and use of BIM in the public procurement sector is unsatisfactory. Only 19 % of respondents declare full implementation and use of this technology, 81 % do not use it at all or use it occasionally. One of the reasons for this state of affairs is the insufficient level of knowledge related to this technology – less than 49 % of all respondents rated their knowledge of BIM as at least satisfactory. Another is the lack of appropriate software in the entities represented by the respondents. Only approximately 33 % of respondents have access to programs working in the BIM environment. This translates into a small number of projects implemented using this technology and, consequently, little experience in the construction industry in using BIM. Therefore, investments are necessary both in the purchase of software, which often entails the need to modernize the computer infrastructure, and in the training of management and employees.

If the schedule for introducing the obligation to use BIM in public procurement is maintained [10], there are approximately 6 years left to take actions to adapt to these requirements, and individual stages will be introduced successively so that in 2030 the requirement to use BIM will be in force. all public contracting entities. According to the majority of respondents, the required period necessary to implement BIM in the entities where they are employed is 3 years, therefore

taking the previously mentioned actions in the near future gives an opportunity to adequately prepare for this obligation. However, it should be remembered that efficient use of new tools also requires gaining some experience in this area, so entities that start this process earlier will be in a better situation.

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Ocena stanu przygotowania podmiotów budowlanych regionu śląskiego do stosowania technologii BIM w zamówieniach publicznych

STRESZCZENIE:

Podjęto próbę określenia stanu przygotowania podmiotów budowlanych regionu śląskiego do stosowania technologii BIM w zamówieniach publicznych. Zidentyfikowano warunki mające wpływ na zakres stosowania BIM, a następnie na podstawie badania ankietowego określono, w jakim stopniu są one spełnione w badanych podmiotach. Na podstawie przeprowadzonych badań można stwierdzić, że stan wdrożenia i stosowania BIM wśród ankietowanych jest niezadowalający. Pełne wdrożenie i wykorzystywanie tej technologii deklaruje niespełna 20 % respondentów, reszta nie korzysta z niej w ogóle lub korzysta okazjonalnie. Słaba jest również znajomość tej technologii oraz umiejętność posługiwania się narzędziami BIM. Niespełna połowa respondentów ocenia swoje umiejętności w tej dziedzinie w stopniu co najmniej dostatecznym, a tylko ok. 1/3 ma dostęp do programów pracujących w środowisku BIM, co przekłada się na niewielką liczbę projektów realizowanych z wykorzystaniem tej technologii. Pozytywną informacją w kontekście wprowadzenia obowiązku stosowania BIM w sektorze zamówień publicznych w 2030 roku jest deklarowany przez ankietowanych okres implementacji BIM w podmiotach, w których są zatrudnieni. Zdecydowana większość respondentów uważa, że okres 3 lat byłby wystarczający na pełne wdrożenie tej technologii.

SŁOWA KLUCZOWE:

technologia BIM; zamówienia publiczne; region śląski