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LIMITS OF BID REQUIREMENTS FOR OPERATIONAL AND PROFESSIONAL TECHNICAL CAPACITY IN BIDDING PROCESSES FOR ENGINEERING WORKS AND SERVICES IN BUILDING INFORMATION MODELING (BIM) IN BRAZIL

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1. INTRODUCTION

Since the advent of Brazilian Federal Decree No. 10.306/2020, establishing the use of *Building Information Modeling* (BIM) in the direct or indirect execution of engineering works and services carried out by federal public administration agencies and entities, there has been discussion about the best way to assess the technical qualifications of bidders.

Considering the need for an isonomic, competitive bidding process with objective judgment, the requirement for technical qualifications related to a recent, innovative technology surrounded by specificities, whose mastery is not broad and general to the market[4], must be determined with caution in order to preserve the fairness of the bidding process.

[4] 59% of organizations are at early stages of BIM maturity, while only 2.51% are at a more advanced level. See: E. GIOVANNETTI-G. QUANDT-L. SANTANA, *Mapeamento Maturidade BIM no Brasil. S./l: GrantThornton*, Sienge e Agência Brasileira de Desenvolvimento Industrial, 2022.

This challenge is not unique to Brazil. From a broader point of view, European systems have confronted similar tensions between promoting technological innovation and preserving competitive access to public procurement. The European Union's Directive 2014/24/EU empowered Member States to introduce information modelling in public works since 2014, but implementation has varied significantly across countries, reflecting different approaches balancing technological advancement according to the different capacity of public administrations and economic operators in different Member States[5].

This is because, as will be demonstrated, technical requirements that are too strict or too lenient may influence the bidding process, lead to defective contracts, reduce competitiveness, and undermine the advantages of the proposals.

For this reason, this article aims to provide an overview of the technical requirements in public notices relating to Building Information Modeling (BIM), in order to establish limits and suggestions to be observed by public authorities when preparing public notices.

To this end, initially, a theoretical study will be conducted on the main concepts related to the topic, such as the public notice as a binding instrument, the qualification phase, specifically technical qualification, addressing the concepts, differences, and importance of technical-operational and technical-professional capabilities in general and, specifically, in bids for engineering works and services. Secondly, based on doctrinal and jurisprudential notes on technical requirements for tenders, the quantitative and qualitative results of the

[5] See: Art. 22, co. 4, Directive 2014/24/EU of the European Parliament and of the Council of 26 february 2014 on public procurement and repealing Directive 2004/18/EC, which states that Member States "*may require the use of specific electronic tools, such as building information electronic modelling tools or similar*" for public works contracts and design contests. Countries such as Italy, Spain, and the United Kingdom have developed detailed national frameworks that distinguish between minimum technical qualification requirements and weighted award criteria, providing instructive comparative models for Brazil's evolving approach. For an overview, see: G. M. DI GIUDA-G. M. RACCA, *From Works Contracts to Collaborative Contracts: The Challenges of Building Information Modeling (BIM) in Public Procurement* (G. M. RACCA – C. R. YUKINS eds.), *Joint Public Procurement and Innovation: Lessons Across Borders*, Bruxelles, Bruylant, 2019, pp. 223–271

empirical research carried out on a sample of 25 (twenty-five) tender notices involving BIM engineering works or services will be presented.

This made it possible to observe the most commonly used bidding modalities and evaluation criteria, as well as the main technical qualification requirements related to BIM, dividing the analysis into technical-operational and technical-professional capacity. Finally, we evaluated how technical capabilities were included in the Technical Note for evaluation purposes in those notices whose criteria were Technical and Price.

Finally, it was possible to list the main conclusions observed, as well as to provide guidance or suggestions to the Public Authorities regarding the reasonableness and limits of the technical requirements related to BIM.

2. PUBLIC NOTICE AS A BINDING CALL FOR BIDS

According to the current concept, bidding is a slow, costly, and laborious administrative process through which the Administration seeks, by means of the qualification of bidders and objective evaluation of bids - based on equality and competitiveness - to select the most advantageous bid among candidates who are able to enter into contracts, use public assets, or become public service contractors, thus aiming to serve the public interest[6].

Every bid therefore seeks, without fail, to select the most advantageous proposal for the Administration. That is, the one that best satisfies the public interest. This means that, in order to make an objective assessment of the proposals, the Administration must define the angle from which this advantage will be evaluated, that is, it must establish in the call for bids the criteria necessary for the object/product to achieve its purpose.

In addition, the principle of equality requires the Administration to set out, in the call for bids, all the conditions under which it wishes to contract. It is also necessary to

[6] A. SADDY, *Curso de Direito Administrativo*, vol. 1, CEEJ, Rio de Janeiro, 2023, p. 517.

provide a detailed description of the object of the bid, so that bidders can prepare their price proposals with full and complete knowledge of the same (Article 38, *caput,* and Article 47 of Law No. 8.666/1993 and Articles 25 and 150 of Law No. 14.133/2021).

Therefore, this means that the quantity, quality, and efficiency of the object are mandatory factors in the notice that will guide the contracting process. Thus, when preparing the notice, the Administration must specify the technical specifications of what it wants.

Once the specifications are set out in the public notice, the principle of objective judgment is bound by compliance with them (Article 42, paragraph 5, *in fine* of Law No. 8.666/1993 and Article 5 of Law No. 14.133/2021) and this is achieved by observing the principle of binding nature of the call for bids, which translates into the rule that the notice is binding between the parties and is the instrument that validates the acts performed in the course of the bidding process. It can therefore be inferred that the call for bids is the internal law of the bidding process, and its terms must be observed by the Administration and the bidders until the end of the process, since they are binding on the parties (Articles 3 and 41 of Law No. 8.666/1993 and Articles 5 and 25 of Law No. 14.133/2021). This is a principle that derives from legality, since the notice may only contain clauses that are in accordance with the law.

Because the public notice is the internal law of the bidding process, through which the intentions are expressed, the Administration, in relation to the bidders, cannot deviate from the terms and conditions proposed therein, nor can it demand or decide beyond or below the public notice, since it establishes the conditions under which bids must be prepared, and it is therefore up to the Administration to judge them in strict accordance with those conditions.

Since the notice constitutes the internal law of the tender, and the procedure to be adopted constitutes the *"rules of the game,"* it is understood that the call for bids is a pre-contractual legal act that is binding and mandatory for the participants in the bidding process. As such, it is subject to interpretation in accordance with the general principles and rules on

the matter. Therefore, the notice cannot establish requirements, especially technical ones, that go against the principles of competitiveness, economy, and equality, among others.

As this article aims to analyze the limits of technical requirements in public notices relating to Building Information Modeling (BIM), it is necessary to define the qualification phase of bids, in which such requirements are normally addressed.

3. QUALIFICATION PHASE

During the qualification phase of the bidding process, the documents submitted by bidders must be presented in accordance with the requirements of Articles 27 to 33 of Law No. 8.666/1993 and Articles 62 to 70 of Law No. 14.133/2021.

The call for bids must contain the definition of the qualification requirements according to the circumstances of each bid. The Administration, in view of the public interests involved in the procedure in question, must define what interested parties need to participate in the bid. In addition, the manner in which they must submit their documents and proposals must be established. Only with these requirements can the formal and material evaluation of the bid be carried out.

The qualification phase therefore aims to assess whether the person interested in contracting with the Administration meets the requirements and qualifications for the proper execution of the object of the bid, with the ultimate goal of ensuring the fulfillment of the obligations established in the administrative contract. This phase is mandatory, and the public agent must request documents according to the object of the bid, without imposing unreasonable or disproportionate requirements (as a guarantee of the principle of equality).

It should be noted, however, that the Administration must require the minimum possible from interested parties. In other words, it is not up to the Administration to go beyond the minimum necessary to guarantee the public interest. This means that such requirements are permissive, i.e., they are at the discretion of the Administration. It requires what it deems necessary for the public interest in the specific case.

When the envelope containing the bidders', documentation is opened, the Administration is checking whether the qualification requirements set out in the notice have been met. At this stage, the suitability of the bidders is assessed by examining the documentation relating to their legal capacity, tax compliance, technical capacity, and financial standing. For the purposes of this article, it is important to define the aspects relating to technical qualification.

3.1. Qualification and technical capacity

Technical qualification is defined as the demonstration of the skills necessary to perform the activity relevant to the subject matter of the bid and, where applicable, proof of specialized technical knowledge and operational training to fulfill the subject matter of the contract[7]. For this reason, the requirement for technical qualification must be proportional to the subject matter of the contract, limiting its restriction, in accordance with the fundamental principle of the rule of law of the Constitution (art. 37, item XXI), to the limits of guaranteeing the fulfillment of obligations[8]. Therefore, the requirement of prior performance of services with a quality superior to the object of the tender must be considered illegal[9].

Confirmation of the technical qualification of the bidder, respecting the limits of proportionality to the contractual object, is essential to ensure the proper execution of the contract to be signed by the Public Administration, and is not a mere discretionary option of the public manager[10]. If a specific contractor profile is required for the performance of the contract, it is important to ensure that the future contract is properly executed, especially in

[7] V. A. J. AMORIM, *Licitações e contratos administrativos: teoria e jurisprudência*, Senado Federal, Brasília, 2017, p. 93.

[8] R. C. L. TORRES, *Lei de Licitações Públicas Comentadas*, 3rd ed, Salvador, Juspodivm, 2010.

[9] J. C. OLIVEIRA, *Tipos de Licitação*, cit.

[10] F. D. ALVES-R. A. AMORIM-M. C. MATOS, *Nova Lei de Licitações e Contratos [recurso eletrônico]: Lei nº 14.133/2021: Debates, perspectivas e desafios*, cit., p. 312.

view of the duty of equality, which implies the duty to provide everyone with the opportunity to contract with the Public Administration[11].

José Calasans Jr. explains that technical qualification covers three aspects[12]: (i) legal qualification to perform the professional activity corresponding to the work or supply to be performed (generic capacity); (ii) aptitude to perform the activity related to the work, service, or supply sought in the tender (specific capacity); and (iii) availability of personnel, tools, and equipment adequate to properly perform the contract (operational capacity). Regarding each of these, the author explains:

O *primeiro aspecto (habilitação legal)* deve ser demonstrado com a prova de estar o licitante devidamente inscrito ou registrado no órgão fiscalizador da respectiva atividade profissional. Assim, se alguém pretende habilitar-se a uma licitação que objetiva a execução de uma obra de engenharia (um prédio, por exemplo), deve provar que é legalmente habilitado para realizar esse tipo de trabalho [...].

O *segundo aspecto (aptidão para o desempenho da atividade)* o interessado deverá demonstrar com a prova de que: (a) dispõe de equipe legalmente habilitada e tecnicamente qualificada e de equipamentos, maquinário e ferramental adequados para executar os trabalhos objetivados na licitação; (b) possui experiência na realização de trabalhos da mesma natureza ou similares. Esses dois elementos representam a qualificação técnico-profissional, que, no caso das pessoas jurídicas (empresas), resulta da qualificação dos integrantes de suas equipes técnicas.

O *terceiro elemento* da qualificação técnica consiste na prova da *disponibilidade de pessoal*, ferramental, maquinário e equipamentos adequados para bem executar os trabalhos

[11] F. D. ALVES-R. A. AMORIM-M. C. MATOS, *Nova Lei de Licitações e Contratos [recurso eletrônico]: Lei nº 14.133/2021: Debates, perspectivas e desafios*, p. 311.

[12] J. CALASANS JR., *Manual da Licitação: com base na Lei nº 14.133, de 1º de abril de 2021*, Barueri, Atlas, 2021.

licitados. Quem não dispõe desses recursos não pode ser considerado tecnicamente qualificado e em condições de ser contratado. Falta-lhe a qualificação técnico-operacional[13].

Before the advent of Law No. 14.133/2021, Law No. 8.666/1993 prohibited (Article 30, paragraph 6, of the Law) the requirement of proof of ownership and prior location of such assets, although it subjected the bidder to penalties if they declared availability that they did not subsequently prove at the right time of their use[14]. However, this exposed the Administration to the risk of, relying on the bidder's declaration, entering into a contract that could not be performed.

Still on the division presented by José Calasans Jr., we note its similarity to that made by other authors, such as Rafael Carvalho Rezende de Oliveira[15], who, however, divides generic, specific, and operational capacities as aspects belonging specifically to technical capacity:

A capacidade técnica é dividida em três espécies: (i) genérica: prova de inscrição no Conselho Profissional ou órgão de classe (ex.: se o objeto do contrato for a execução de uma obra, a empresa deve comprovar a sua inscrição junto ao CREA); (ii) específica: demonstração de que o licitante já executou objeto assemelhado (art. 30, § 1.º, da Lei); (iii) operativa: comprovação de que o licitante possui mão de obra e equipamentos disponíveis para execução do futuro contrato.

This stems from the fact that technical qualification is a genus of which technical capacity is a species. Therefore, there may be a preference for distributing generic, specific,

[13] J. CALASANS JR., *Manual da Licitação: com base na Lei nº 14.133, de 1º de abril de 2021*, cit.

[14] Ibidem.

[15] R. C. R. OLIVEIRA, *Licitações e Contratos Administrativos: teoria e prática. 9. ed. Rio de Janeiro: Forense*, São Paulo, Método, 2020.

and operational capacities as aspects of technical qualification or arranging them as aspects of technical capacity.

In both options, the demonstration of a company's specific technical capacity (aptitude for performance) is made through the presentation of a Technical Capacity Certificate. According to Judgment No. 3418/2018[16], such a Certificate is a document issued by a legal entity governed by public or private law to prove the performance of certain activities. Based on this document, the contractor must certify that the bidder has previously provided a specific good, service, or work with the desired characteristics.

Based on this certificate, it is possible to prove the technical aptitude (specific technical capacity) of a company in two dimensions: (i) technical-operational capacity: aptitude of the bidder itself (legal entity), covering facilities, equipment, work methodologies, and internal quality control processes; and (ii) technical-professional capacity: aptitude of the professionals (individuals) employed by the bidder[17].

In other words, the issuance of a Technical Capacity Certificate may: (i) prove the technical and operational capacity of the company, when issued on behalf of the bidding company; (ii) prove the technical and professional capacity of the bidder, when issued in favor of another company, but in favor of the activities provided by a professional who is part of the bidder's technical staff. It should be noted that in the second case, the certificate may be accompanied by a Technical Collection Certificate (CAT), issued by the competent body, since this type of certificate is not currently issued in the name of a legal entity[18].

[16] Federal Court of Accounts. Judgment 3418/2014, Plenary Session, Reporting Judge: Marcos Bemquerer, Session: December 3, 2014.

[17] V. A. J. AMORIM, *Licitações e contratos administrativos: teoria e jurisprudência*, Senado Federal, Brasília, 2017, p. 94.

[18] CONFEA. Conselho Federal de Engenharia e Agronomia. Resolution No. 1137 of March 31, 2023. Provides for the Technical Responsibility Note (ART), the Technical-Professional Collection, and the Operational Collection, and makes other provisions.

The existence of these two dimensions is corroborated by the understanding of the Federal Court of Auditors, according to which:

A *qualificação técnica abrange tanto a experiência empresarial quanto a experiência dos profissionais que irão executar o serviço. A primeira seria a capacidade técnico-operacional*, abrangendo atributos próprios da empresa, desenvolvidos a partir do desempenho da atividade empresarial com a conjugação de diferentes fatores econômicos e de uma pluralidade de pessoas. A segunda é denominada capacidade técnico-profissional, referindo-se a existência de profissionais com acervo técnico compatível com a obra ou serviço de engenharia a ser licitado[19]. [...]

Also other experiences in foreign countries demonstrate that BIM-specific qualifications require particular caution precisely because market maturity varies significantly. For instance, in the Euorpean legal framework, while the United Kingdom reports 73% BIM adoption among construction firms, countries like Poland show only 43% adoption, creating challenges analogous to Brazil's maturity[20]. European procurement authorities have responded by implementing graduated qualification frameworks that distinguish between mandatory minimum requirements and weighted evaluation criteria that reward superior capabilities without excluding less experienced bidders[21].

[19] Federal Court of Accounts. Judgment 1332/2006, Plenary Session, Reporting Judge: Walton Alencar Rodrigues, Judgment: August 2, 2006.

[20] See: European Innovation Council and SMEs Executive Agency (EISMEA) Unit i.02.02, EU Commission, *An analysis for the adoption of Building Information Modelling (BIM) across the EU27 for Public Sector*, June 2024, p. 171.

[21] D. MOSEY, *The BIM Management Handbook*, London, 2019, NEC4 FAC-1 Guidance Notes, pp. 45-62, analyzing graduated qualification approaches under ISO 19650 framework; P.E. GIANA-R. VORNICU, *The use of FAC-1 as a contractual integrator enhancing the use of BIM: a focus on the Liscate school in Italy*, in Revista Derecho & Sociedad, N° 55, 2017, pp. 113-123, examining contractual mechanisms for managing BIM capabilities at different maturity levels.

In public works, one of the Administration's primary concerns is whether bidders have a technical staff with sufficient qualifications to carry out the work (technical and professional capacity), which can be verified by evaluating the available professionals[22].

However, Carlos Ari Sundfeld points out that "a simples reunião caótica de profissionais, mesmo altamente especializados, não oferece garantia de que a empresa seja capaz de operar eficientemente, pois nada diz quanto a sua estrutura administrativa, seus métodos organizacionais, seus processos internos de controle de qualidade, ao entrosamento da equipe, etc."

Therefore, there is another essential piece of knowledge for management regarding bidders: they are not just qualified individuals, but a set of qualities that enable them to operate effectively. This is technical and operational capacity, to be verified by the company's previous performance[23]. The author further elucidates the application of technical and operational capacity with teachings from Geraldo Ataliba[24] on the importance of this aspect in public works contractors, which is transcribed below:

A realização de obras públicas, atualmente, requer não só a técnica e a arte – peculiares ao exercício da engenharia – *mas também um suporte empresarial compatível com as sofisticadas exigências do mundo moderno. Não basta, portanto, um quadro de profissionais para a realização de uma obra de engenharia. Há necessidade de que o trabalho – na forma do estilo exigidos pelas organizações modernas – seja cooperativo. Isto quer dizer que se haverão de combinar os trabalhos de diversos profissionais, variadas áreas, para, somados, produzirem o resultado final da obra e, no nosso caso, obras públicas.*

[22] C. A. SUNDFELD, *A Habilitação nas Licitações e os Atestados de Capacidade Técnica, Revista da Faculdade de Direito de São Bernardo do Campo*, São Bernardo do Campo, v. 4, p. 27-44, 1998.

[23] Ibidem.

[24] G. ATALIBA, *Bidding: Collection or Technical and Engineering Knowledge*, Public Law Magazine São Paulo, v. 8, no. 41/42, Jan./June, 1977, p. 127.

[...].
Não basta um excelente corpo técnico – com habilitação profissional aprimorada – para o bom sucesso de uma empresa de engenharia. É preciso que ela disponha de toda infraestrutura e de todos os elementos que podem torná-la competitiva no seu campo, à semelhança de todo e qualquer outro tipo de empresa, dos demais setores da atividade econômica.

This means that the verification of technical and professional capacity and technical and operational capacity as technical aptitude requirements is not limited to an isolated examination of these aspects, as it is the synergistic analysis that provides the best guarantee that companies are technically capable of performing the necessary activities.

It is important to note that technical requirements also serve as criteria for judgment in the bidding process: best technique or artistic and technical content and price (Article 6, item XXXVIII, subitems "b" and "c," Law No. 14.133/2021).

Bidding based on the best technical proposal will be preferred when the public interest can only be satisfied by an object with specific characteristics that are not found in most of the common services available. As a result, the notice must present the technical qualification requirements to be examined in the qualification stage, and the technical details specifically related to the object being bid on - since it is necessary to understand exactly what the Administration expects from the object and also because, if the specific characteristics of the object or product sought change, the technical requirements will also change - which will then be verified in the evaluation of the bids.

In the evaluation based on technical merit and price, the aforementioned technical issues are combined with the value of the bid. The technical and price aspects will be considered in accordance with proportions previously established in the notice. The Public Administration must establish objective scoring factors for the evaluation based on technical merit and price, in accordance with the principle of objective evaluation. The score will be obtained from the weighting of the scores assigned to each of the two criteria, with the technical proposal being evaluated first, which may represent up to 70% of the score. In

addition, proof of good performance in previous contracts with the Public Administration should also be considered in the technical proposal[25].

Article 37 of Law No. 14.133/2021 explains the procedure for judging the best technique, which also applies to the criteria for judging technique and price. Items I, II, and III of the provision detail that the decision must be made by:

I - verificação da capacitação e da experiência do licitante, comprovadas por meio da apresentação de atestados de obras, produtos ou serviços previamente realizados;

II - atribuição de notas a quesitos de natureza qualitativa por banca designada para esse fim, de acordo com orientações e limites definidos em edital, considerados a demonstração de conhecimento do objeto, a metodologia e o programa de trabalho, a qualificação das equipes técnicas e a relação dos produtos que serão entregues;

III - atribuição de notas por desempenho do licitante em contratações anteriores aferida nos documentos comprobatórios de que trata o § 3º do art. 88 desta Lei e em registro cadastral unificado disponível no Portal Nacional de Contratações Públicas (PNCP).

Thus, in these evaluation methods, the public official in charge of the tender must verify a series of characteristics of the proposals to certify the bidder's actual capacity and experience, through the presentation of technical certificates[26]. The individual's performance history in previous administrative contracts also carries extra weight, as it is also a factor in awarding points in technical and price evaluations and a general tiebreaker between bidders[27].

[25] J. M. NIEBUHR, *Nova Lei de Licitações e Contratos Administrativos*, cit., p. 140.

[26] J. M. NIEBUHR, *Nova Lei de Licitações e Contratos Administrativos*, e-book, 2. ed. Florianópolis, Zênite, 2021, p. 83.

[27] Ibidem.

Nevertheless, there are limits on technical qualification/capacity requirements. This is because the way in which these stages are conducted is crucial to the continuity of competition, so that excessive technical qualification/capacity requirements may unduly broaden competition, which may not meet the intended objectives of expediency and quality, while excessive technical qualification/capacity requirements may lead to the targeting and restriction of competition, which also subverts the purpose of the bidding procedure.

The Federal Court of Auditors has already ruled on the indispensability of qualification requirements for bidders:

Para fins de habilitação técnico-operacional em certames visando à contratação de obras e serviços de engenharia, devem ser exigidos atestados emitidos em nome da licitante, podendo ser solicitadas as certidões de acervo técnico (CAT) ou anotações/registros de responsabilidade técnica (ART/RRT) emitidas pelo conselho de fiscalização profissional competente em nome dos profissionais vinculados aos referidos atestados, *como forma de conferir autenticidade e veracidade às informações constantes nos documentos emitidos em nome das licitantes*[28].

7. A *Administração tem o dever de se proteger de interessados não capacitados a prestar o serviço ou realizar a obra objeto da licitação*. Por isso, a Lei de Licitações e Contratos prevê a fase de habilitação, na qual *os interessados devem comprovar os requisitos exigidos no edital*. Nela, a Administração deve impedir a participação daqueles sem condições de cumprir o objeto[29]".

[28] Federal Court of Accounts, Judgment 2326/2011, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: October, 02, 2019.

[29] Federal Court of Accounts, Judgment 410/2016, Plenary Session, Reporting Judge: Min. Marcos Vilaça, Judgment: Mars, 29, 2006.

Even so, the Court also imposes limits on the demand for such technical requirements:

Caracteriza restrição à competitividade da licitação a exigência, como critério de habilitação, de atestado de qualificação técnica comprovando experiência em tipologia específica de obra, salvo se imprescindível à certeza da boa execução do objeto e desde que devidamente fundamentada no processo licitatório[30].

A *inserção de cláusulas atinentes à qualificação técnica que vedem ou restrinjam a apresentação de atestados técnicos relativos a determinadas tipologias de obras ou serviços de engenharia contraria o art. 3º, § 1º, inciso I, da Lei 8.666/1993 e o art. 37, inciso XXI, da Constituição Federal*[31].

No caso de se *exigir atestados relativos a serviços específicos da obra, a instituição contratante deve se certificar de que se trata de encargo materialmente relevante*, com particularidade técnica ou executiva que o torne distinto do usualmente existente em outras obras de mesmo porte e tipologia[32].

A exigência de comprovação de capacidade técnica para a execução de parcelas de obra, para fins de qualificação técnica de licitante, que não atendem, simultaneamente, aos critérios de maior relevância e valor significativo do objeto, contraria o disposto na Súmula-TCU 263[33].

[30] Federal Court of Accounts, Judgment 134/2017, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: February, 02, 2017.

[31] Federal Court of Accounts, Judgment 1226/2012, Plenary Session, Reporting Judge: Valmir Campelo, Judgment: May, 23, 2012.

[32] Federal Court of Accounts, Judgment 2760/2012, Plenary Session, Reporting Judge: Ana Arraes, Judgment: October, 10, 2012.

[33] Federal Court of Accounts, Judgment 3148/2014, Plenary Session, Reporting Judge: Ana Arraes, Judgment: November, 12, 2014.

As José Carlos De Oliveira[34] points out, although it is normal that the quality of the service sought by the Administration leads to a decrease in the number of interested bidders, so that the bids offered can satisfy the state's needs, technical specialty criteria cannot result in the impossibility of competition, otherwise, we would be faced with a situation of unenforceability of bidding, as provided for in Article 25 of Law No. 8.666/93 (Article 74 of Law No. 14.133/2021).

When technical qualifications are required for evaluation based on technical merit or technical merit and price, the bidding notice must establish the evaluation criteria the technical requirements that bidders must meet, which must be appropriate and compatible with the intended object, in addition to assigning the respective scores, taking care not to unjustifiably impair competitiveness[35].

Technical qualification/capacity requirements, therefore, must be verified and justified, always to the extent necessary (principle of proportionality), being more or less comprehensive depending on the object to be contracted[36]. For this reason, this caution must be even more prominent when it comes, for example, to contracts for engineering works and services, whose contractual object has specific characteristics that distinguish it from other types of contracts, as will be better explained below.

3.1.1. Qualification and technical capacity in engineering works and services

In Public Administration, when considering contracts for engineering works and services, the technical qualification of the company that wins the bid is essential for the

[34] J. C. OLIVEIRA, *Tipos de Licitação*, Unesp. available at this link.

[35] Ibidem.

[36] F. D. ALVES-R. A. AMORIM-M. C. MATOS, *Nova Lei de Licitações e Contratos [recurso eletrônico]: Lei nº 14.133/2021: Debates, perspectivas e desafios*, cit., p. 312.

success of the future execution. This is why this type of contract often leads to a series of setbacks, in which the Administration, when publishing the tender notice, receives numerous requests for clarification and challenges related to the subject[37].

Although less expensive contracting is desirable and, whenever possible, should be pursued by the government, the lowest price is not always synonymous with the most advantageous proposal. In the case of engineering works and services, a given company may offer the lowest price for the execution of a project, but if it does not have sufficient technical capacity to execute the project, it may cause enormous losses to the contractor, such as failure to meet deadlines or scope, poor quality of services provided, and even abandonment of the project[38].

In practice, technical qualification through technical and professional training can be proven, for example, by requiring, in the notice that the bidder demonstrates that, on the date set for the submission of the proposal, it has a professional or professionals with a higher education degree and technical certificate(s) provided by a public or private legal entity, duly registered with the competent authorities. Technical and operational training, also by way of clarification, can be demonstrated by proving that the bidder has technical certificate(s) in their name, provided by legal entities governed by public or private law, demonstrating previous experience in the activity or activities related to the subject matter of the contract[39].

[37] C. S.ALTOUNIAN-M. A. A. FARIA, *Qualificação Técnica na Contratação de Obras e Serviços de Engenharia: Os Desafios na Definição das Exigências Corretas a fim de Evitar Restrição à Competição ou a Participação de Empresas sem Capacidade de Execução do Objeto*, Tribunais de Contas dos Municípios do Estado de Goiás, 30 set. 2020, p. 2-3. Avaible at this link.

[38] C. S.ALTOUNIAN-M. A. A. FARIA, *Qualificação Técnica na Contratação de Obras e Serviços de Engenharia: Os Desafios na Definição das Exigências Corretas a fim de Evitar Restrição à Competição ou a Participação de Empresas sem Capacidade de Execução do Objeto*, cit., p. 4. Avaible at this link.

[39] ID., *Qualificação Técnica na Contratação de Obras e Serviços de Engenharia: Os Desafios na Definição das Exigências Corretas a fim de Evitar Restrição à Competição ou a Participação de Empresas sem Capacidade de Execução do Objeto*, cit., p. 28-29.

Regarding technical prominence in this type of contract, however, with the intention of defining the requirements that may be demanded in bids, technical qualification requirements may be restricted only to the cases described in law[40]. This condition is due not only to the imperative of the principle of strict legality of Public Administration, but especially in view of the protection of the principle of broad competition and equality.

Therefore, even and especially in view of the specific requirements of engineering works and services, the legal provisions and limits established must be observed. The greater requirement for technical qualification/capacity in engineering works and services is explained by the special nature of this type of contract, which may or may not be increased in the case of ordinary or special works. To understand this, it is necessary to understand what defines an engineering work and service.

"Work" is defined as any construction, renovation, manufacturing, restoration, or expansion, carried out directly or indirectly, which requires the use of knowledge from qualified professionals (IBAOP, 2018, p. 15).

"Engineering service" is understood as any activity that requires the participation and monitoring of a qualified professional, such as repairing, installing, assembling, operating, conserving, adapting, maintaining, transporting, or even demolishing. This definition includes professional activities related to specialized professional technical services for projects and planning, technical studies, opinions, expert reports, assessments, advisory services, consulting, auditing, inspection, supervision, or management (IBAOP, 2018, p. 19).

Under the current legal regime, engineering works and services can be divided into common engineering works and special engineering works. One of the innovations brought about by the new Public Procurement Law (Law No. 14.133/2021) was to classify common

[40] F. D. ALVES-R. A. AMORIM-M. C. MATOS, *Nova Lei de Licitações e Contratos [recurso eletrônico]: Lei nº 14.133/2021: Debates, perspectivas e desafios*, Câmara dos Deputados, Brasília, 2023, p. 312.

engineering works as engineering works. For this purpose, bidding may take place without the completion of a basic engineering project (Article 18, paragraph 3), and a shorter deadline is required for the submission of proposals and bids, once the call for bids has been published (Article 55, item II, subitem 'a'[41]).

Although the new Law does not define either of these concepts, it can be argued that common works are those that are routine and represent the majority[42]. Their construction methods, equipment, and materials used for their execution are frequently employed in that region and are capable of being performed well by most of the potential bidders available. Most works must be classified as such.

Special works, in turn, according to the same author (2021, p. 216), are heterogeneous, complex works whose construction methods, equipment, and materials have been used less frequently and/or pose unusual executive challenges for their completion, sufficient to reduce the number of companies able to demonstrate experience in their execution or to require specific measurement of skill/intellectual ability for the selection of the future contractor.

For the direct and indirect execution of these engineering works and services, the use of *Building Information Modeling (BIM)* has been encouraged, as a tool to change the approach, foster collaboration, improve transparency and real-time control, and reduce litigation would strengthen the article's broader impact[43]. According to Article 3, item II, of

[41] J. M. L.VARESCHINI, *Diálogos sobre a nova lei de licitações e contratações: Lei 14.133/2021,* Pinhais, Editora JML, 2021.

[42] Ibidem.

[43] See: G. M. DI GIUDA-G. M. RACCA, *From Works Contracts to Collaborative Contracts: The Challenges of Building Information Modeling (BIM) in Public Procurement* (G. M. RACCA – C. R. YUKINS eds.), *Joint Public Procurement and Innovation: Lessons Across Borders*, cit. and G. M. DI GIUDA-V.VILLA-P.E GIANA, *Collaborative Contract With Building Information Modelling: Comparison Between Usa And European Approach*, *Resilient Structures and Sustainable Construction* (E. PELLICER-J- M. ADAM-V. YEPES,-A. SINGH-S. YAZDANI eds.), ISEC Press, 2017.

Decree No. 10,306/2020, this is a set of integrated technologies and processes that enable the creation, use, and updating of digital models of a construction in a collaborative manner that serves all participants in the project at any stage of the construction life cycle.

Rafael Carvalho Rezende de Oliveira (2020, p. 35) clarifies that the model does not, therefore, constitute a new regime for the execution of engineering works and services, but rather a coordinated and collaborative digital model that involves the participation of professionals involved in the design and management of a construction project at all stages, which ensures greater transparency and efficiency in contracting.

There is even a preference for using the model in engineering and architectural works and services. This is due to the technical qualifications required for the use of *Building Information Modeling*, which are suited to the purpose of public tenders, generating and maintaining three-dimensional information that guides the entire construction cycle[44].

Examples of instruments that can prove technical qualification in BIM are: Technical Collection Certificate (CAT); BIM certification; ISO qualification; certification issued by contractors; evidence of similar work; public tender for the development of the basic project in BIM[45]; evaluation of the quality of deliverables (BIM models) in previous projects; and availability of adequate technological infrastructure of the company[46].

[44] F. D. ALVES-R. A. AMORIM-M. C. MATOS, *Nova Lei de Licitações e Contratos [recurso eletrônico]: Lei nº 14.133/2021: Debates, perspectivas e desafios*, cit., p. 312.

[45] G. C. GONÇALVES, *Protocolo de Gerenciamento BIM nas Fases de Contratação, Projeto e Obra em Empreendimentos Civis baseado na ISSO 19650*, Escola Politécnica da Universidade de São Paulo, Universidade de São Paulo.

[46] D. M. BRITO, *Fatores Críticos de Sucesso para Implantação de Building Information Modelling (BIM) por Organizações Públicas*, Escola Politécnica da Universidade Federal da Bahia, Universidade Federal da Bahia, Salvador, p. 191, 2019.

It is the uniqueness of contracting engineering works and services - whether common or special, in BIM or another model - that demonstrates that technical qualification is one of its main, if not the main, distinguishing factors. Proof of this can be found in the extensive rulings handed down by the Federal Court of Auditors on technicality in engineering works and services. This is exemplified by some Precedents attached by the Court:

SÚMULA TCU 260: É dever do gestor exigir apresentação de Anotação de Responsabilidade Técnica - ART referente a projeto, execução, supervisão e fiscalização de obras e serviços de engenharia, com indicação do responsável pela elaboração de plantas, orçamento-base, especificações téc[47]nicas, composições de custos unitários, cronograma físico-financeiro e outras peças técnicas.

SÚMULA TCU 261: Em licitações de obras e serviços de engenharia, é necessária a elaboração de projeto básico adequado e atualizado, assim considerado aquele aprovado com todos os elementos descritos no art. 6º, inciso IX, da Lei 8.666, de 21 de junho de 1993, constituindo prática ilegal a revisão de projeto básico ou a elaboração de projeto executivo que transfigurem o objeto originalmente contratado em outro de natureza e propósito diversos[48].

SÚMULA TCU 263: Para a comprovação da capacidade técnico-operacional das licitantes, e desde que limitada, simultaneamente, às parcelas de maior relevância e valor significativo do objeto a ser contratado, é legal a exigência de comprovação da execução de

[47] Federal Court of Accounts. Precedent 260, Judgment 1524/2010, Plenary Session, Reporting Judge: Augusto Nardes, Judgment: 06/30/2010.

[48] Federal Court of Accounts. Precedent 261, Judgment 1536/2010, Plenary Session, Reporting Judge: José Múcio Monteiro, Judgment: June 30, 2010.

quantitativos mínimos em obras ou serviços com características semelhantes, devendo essa exigência guardar proporção com a dimensão e a complexidade do objeto a ser executado[49].

The Federal Court of Accounts, in Judgment 19/2017-Plenary[50] once again ratified the importance of technical expertise in engineering works and services in a final judgment dealing with BIM Methodology. In the case in question, a company filed a request regarding possible irregularities in Tender No. 02/2015, promoted by the General Coordination of Acquisitions of the Ministry of Planning and Management, in which the contract was intended for a company specializing in technical engineering services to carry out works and services in Block "O" of the Esplanada dos Ministérios, in Brasília-DF.

Among the irregularities cited, was the use of new technologies, such as *Building Information Modeling* (BIM), which is why the applicant requested a preliminary injunction to suspend Competition No. 02/2015 and any other acts arising therefrom or from the , as well as the cancellation of the bidding process and, eventually, the contract, which would lead to a new bidding process without the aforementioned controversial issues.

On this point, we refer to the views of Nathalia Fukunaga[51] on the recommendations and guidelines issued by the Court in its ruling on the use of BIM methodology in public procurement, together with excerpts from the ruling:

[49] Federal Court of Accounts. Precedent 263, Judgment 32/2011, Plenary Session, Reporting Judge: Ubiratan Aguiar, Judgment: January 19, 2011.

[50] Federal Court of Accounts. Judgment 19/2017, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: January 13, 2017.

[51] N. FUKUNAGA, *A Utilização da Modelagem da Informação da Construção no Processo de Desenvolvimento das Contratações Públicas*, *Infraestrutura Jurídica da Inovação: Anais do 2° Congresso Infraestrutura Jurídica da Ciência, Tecnologia e Inovação nos Países em Desenvolvimento* (J. F. SIQUEIRA NETO, D. F. N. MENEZES eds.) v. 2, Belo Horizonte, Arraes Editores, 2020.

(i) Metodologia BIM constitui uma oportunidade inovadora e eficiente na execução, manutenção e controle das obras. A integração do ciclo de vida da obra possibilita um acompanhamento conjunto de todos os elementos para a concepção da obra

"Assim, considerando a necessidade de modernização dos sistemas de redes nos órgãos públicos e a oportunidade vislumbrada com a reforma do Bloco "O" da Esplanada, o qual servirá como piloto para os demais prédios, entende-se razoável a exigência da qualificação no edital da reforma pretendida. Configura, no caso concreto, oportunidade de se implantar tecnologia mais eficiente e moderna em edifícios cujas chances para a realização de reformas dessa magnitude novamente são escassas, seja em função da ausência de recursos, seja em função da necessidade de desocupação pelos usuários. Quanto à tecnologia BIM, verifica-se que ela oferece benefícios para as etapas de execução das obras, além de propiciar melhor controle na fase posterior, de manutenção do edifício, por meio da construção de modelo virtual que compreende todos os elementos da edificação, desde a arquitetura, estrutura, até as instalações. (...) Além disso, permite que os projetos as built (como construído), a serem entregues pela contratada ao final da obra, sejam elaborados ao longo da execução dos serviços, reproduzindo, de forma fidedigna, os elementos de arquitetura e instalações empregados, gerando modelo tridimensional completo do prédio[52]*".* (ii) A exigência de comprovação de habilitação técnico-operacional em Metodologia BIM (não) configura restrição ao caráter competitivo na licitação.

On the issue of experience in performing Building Information Modeling in public procurement, the author continues with her understanding and the positions of the TCU—which she considers to be undefined—in the same ruling[53]:

[52] Federal Court of Accounts. Judgment 19/2017, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: January 13, 2017.

[53] N. FUKUNAGA, *A Utilização da Modelagem da Informação da Construção no Processo de Desenvolvimento das Contratações Públicas*, *Infraestrutura Jurídica da Inovação: Anais do 2° Congresso Infraestrutura Jurídica da Ciência, Tecnologia e Inovação nos Países em Desenvolvimento* (J. F. SIQUEIRA NETO, D. F. N. MENEZES eds.), cit., p. 173-174.

Por um lado, o TCU reconhece que a Metodologia BIM é uma oportunidade de inovação capaz de proporcionar eficiência e otimização nas contratações públicas:

"Portanto, entende-se que *a experiência prévia das licitantes na utilização da tecnologia BIM não configura exigência excessiva e restritiva para a habilitação*. Além disso, em que pese a sua reduzida representatividade no valor total da contratação, os benefícios posteriores por ela trazidos quanto à construção e manutenção da edificação sopesam tais argumentos. *Diante das análises acima, verifica-se que não assiste razão nos argumentos trazidos pela representante quanto às exigências de comprovação de habilitação técnico-operacional das empresas, no que tange ao emprego das tecnologias GPON e BIM*[54]".

Por outro lado, no decorrer do Acordão n° 19/2017, o TCU demanda uma *avaliação mais sensível e cuidadosa com relação a exigência de atestados técnicos com a Metodologia BIM* que possam frustrar o caráter competitivo da licitação, inclusive, recomenda ao Ministério do Planejamento, Desenvolvimento e Gestão uma análise da "real necessidade" da sua exigência:

"Em acréscimo ao exame realizado, é pertinente ressaltar que o próprio MPOG informou que a implantação de tecnologia GPON é relativamente recente no Brasil, assim como o uso do BIM - Building Information Model, na confecção de projetos executivos de obras e serviços de engenharia. Embora considere um avanço o emprego de novas tecnologias nas obras públicas, julgo que a exigências dos respectivos atestados técnicos tenha que ser avaliada com muita cautela[55]*"*.

[54] Federal Court of Accounts. Judgment 19/2017, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: January 13, 2017.

[55] Federal Court of Accounts. Judgment 19/2017, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: January 13, 2017.

"(...) 9.5 recomendar ao Ministério do Planejamento, Desenvolvimento e Gestão que: 9.5.2 avalie a real necessidade de exigir atestados técnicos referentes a novas tecnologias ou materiais, quando constatar que tais exigências possam frustrar o caráter competitivo da licitação, fomentar a formação de cartéis ou comprometer o desenvolvimento da engenharia nacional[56]".

Even in the absence of a clear position from the Court on the application of BIM, its perception of the Methodology as an innovative and necessary opportunity in the design, management, and supervision of public works is evident. Equally tangible is its concern regarding the verification of technical certificates demonstrating prior experience with the BIM Methodology, since this requirement could potentially undermine the competitive nature of the bidding process[57].

Regarding this last point, it is worth remembering that technical requirements - especially in the case of specific activities such as engineering works and services, and particularly with the use of Building Information Modeling - should never be so demanding as to make the tender process unfeasible. The jurisprudence of the TCU has been clear in this regard:

REPRESENTAÇÃO. *LICITAÇÃO DE OBRA E SERVIÇOS DE ENGENHARIA* DE TORRE DE CONTROLE, SEGURANÇA E PROTEÇÃO AEROPORTUÁRIA, BEM COMO DE SERVIÇOS COMPLEMENTARES DE RECUPERAÇÃO DE PISTAS E PÁTIOS DE AERONAVES NO AEROPORTO DE CONGONHAS/SP. EXIGÊNCIAS DE PRÉ-QUALIFICAÇÃO QUE COMPROMETEM O CARÁTER COMPETITIVO DO

[56] Federal Court of Accounts. Judgment 19/2017, Plenary Session, Reporting Judge: Benjamin Zymler, Judgment: January 13, 2017.

[57] N. FUKUNAGA, *A Utilização da Modelagem da Informação da Construção no Processo de Desenvolvimento das Contratações Públicas*, in J. F. Siqueira Neto, D. F. N. Menezes, *Infraestrutura Jurídica da Inovação: Anais do 2° Congresso Infraestrutura Jurídica da Ciência, Tecnologia e Inovação nos Países em Desenvolvimento*, p. 174.

CERTAME. PROCEDÊNCIA PARCIAL. DETERMINAÇÃO À INFRAERO PARA ANULAÇÃO DO EDITAL.

1. *É vedada a imposição de exigências excessivas que frustrem o caráter competitivo do certame licitatório, nos termos do art. 37, inciso XXI, da Constituição Federal e do art. 30, § 1º, inciso I , da Lei 8.666/93.*

2. A Administração tem o dever de demonstrar que as exigências de capacitação técnico-profissional dos licitantes devem simultaneamente recair sobre parcelas de maior relevância e de valor significativo do objeto da licitação, conforme art. 30, § 1º, inciso I , da Lei 8.666/93.

3. *A apresentação de atestados de capacitação técnico-operacional encontra-se restrita aos limites do art. 37, inciso XXI, da Constituição Federal, que somente admite exigências de qualificação técnica indispensáveis à garantia do cumprimento das obrigações*.

4. O estabelecimento de condições diferenciadas de qualificação econômico-financeira entre licitantes cadastrados e não-cadastrados no Sicaf (Sistema de Cadastramento Unificado de Fornecedores) viola o princípio da isonomia entre licitantes[58].

REPRESENTAÇÃO. PREFEITURA MUNICIPAL DE IPIRÁ - BA. CONCORRÊNCIA PÚBLICA 1/2020. IRREGULARIDADES

CONSTATADAS. DETERMINAÇÃO À UNIDADE JURISDICIONADA PARA ANULAR O CERTAME E OS ATOS DELE DECORRENTES. PROCEDÊNCIA. CIÊNCIA. ARQUIVAMENTO. É restritivo à competitividade cláusula que exija a apresentação de documentação com firma reconhecida em cartório. *Não cabe à*

[58] Federal Court of Accounts. Judgment 1332/2006, Plenary Session, Reporting Judge: Walton Alencar Rodrigues, Judgment: August 2, 2006.

Administração estabelecer, sem base objetiva, critério de cunho técnico que exorbita a regulamentação profissional. É irregular a cláusula do instrumento convocatório que exige comprovação de qualificação técnica para além do indispensável à garantia da execução do objeto licitado. "Nas contratações de *obras e serviços de engenharia*, a definição do critério de aceitabilidade dos preços unitários e global, com fixação de preços máximos para ambos, é obrigação e não faculdade do gestor[59]".

REPRESENTAÇÃO. *LICITAÇÃO PARA CONTRATAÇÃO DE SERVIÇOS DE ENGENHARIA E ARQUITETURA*. ADOÇÃO INDEVIDA DA MODALIDADE CONCORRÊNCIA DO TIPO TÉCNICA E PREÇO. CABIMENTO DE PREGÃO ELETRÔNICO. *PONTUAÇÃO TÉCNICA EXCESSIVA E INJUSTIFICADA*. OITIVA. ARGUMENTOS INSUFICIENTES PARA AFASTAR OS INDICATIVOS DE IRREGULARIDADES. ADOÇÃO DE MEDIDA CAUTELAR. SUSPENSÃO DA LICITAÇÃO OU DE ATOS DE EXECUÇÃO DE EVENTUAL CONTRATO ASSINADO. REFERENDO PELO PLENÁRIO.

2. A *representante contesta especificamente a inclusão, como quesito de pontuação técnica, de experiência comprovada na "Elaboração de Projetos Prediais utilizando a tecnologia BIM" (Building Information Modelling ou Modelagem da Informação da Construção),* conforme os itens 9.3.8.2 e 9.3.9 do edital.

3. Segundo a Ceppla, o conhecimento sobre a aplicação de um software não mede a qualificação técnica pertinente ao objeto, violando o art. 30 da Lei 8.666/1993. Argumenta que existiria apenas um pequeno grupo de empresas que detêm atestados para a tecnologia BIM, ainda não bem difundida no mercado, *aspecto que indicaria restrição à disputa e direcionamento da licitação, tanto que só uma concorrente forneceu documentação*

[59] Federal Court of Accounts. Judgment 4061/2017, Plenary Session, Reporting Judge: Raimundo Carneiro, Judgment: December, 08, 2020.

correlata. Aduz que o serviço de elaboração de projetos, que utilizaria o BIM, significa menos de 2% do valor global a ser contratado[60].

Therefore, it is common for technical requirements to reduce the pool of bidders, but they should never segment competitors excessively and unavoidably in order to direct or undermine competition.

After this theoretical explanation of the main concepts and aspects related to the subject of this article, we will now present the empirical research conducted on BIM bidding notices. The objective is to understand the current scenario, without attempting to exhaust the subject, in terms of the evaluation criteria in order to extract the limits of the bidding requirements regarding the technical capacity of bidders.

4. EMPIRICAL RESEARCH METHODOLOGY

This section presents the research methodology used in this article. First, it is important to highlight the choice of empirical research, defined as research dedicated to the empirical and factual treatment of reality; it produces and analyzes data, always proceeding through empirical and factual control[61].Therefore, this research was based on (i) data collection, (ii) data observation, and (iii) quantitative and qualitative inferences.

First, the scope of the research is defined for the collection of initial data. Since the objective of this article is to list the main limits of the requirements in public notices regarding technical, professional, and operational capacity in BIM construction bids, it is obviously important to understand the current scenario of public procurement with this scope. This will make it possible to observe how technical capacity is being required, identifying any excesses

[60] Federal Court of Accounts. Judgment 241/2023, Plenary Session, Reporting Judge: Minister Vital do Rêgo, Judgment: February 15, 2023.

[61] P. DEMO, *Metodologia do conhecimento científico*, São Paulo, Atlas, 2000.

that could compromise the fairness of the tender process and, ultimately, listing the best ways for the Public Administration to prepare tenders.

Therefore, the data collection stage was based on documentary research, namely the search for tender notices, in different phases and federal entities, which included in their object the contracting of BIM engineering works and/or services.

To this end, the website of the National Public Procurement Portal[62] was used, under the tab "Contratações - Editais e Avisos de Contratações" (Procurement – Procurement Notices and Announcements)[63] . In the corresponding search field, the keyword "BIM" was used first. In a second step, the keyword "Building Information Modeling" was used. It should be noted that both searches returned the same results.

These keywords were used with the following *status* filters available on the website: "A receber/Recebendo propostas"; "Em julgamento/Propostas Encerradas" and "Encerradas".

In addition, the search covered all Contracting Modalities[64] , all Agencies, Units, Federal Units, Municipalities, Spheres, and Powers available in the website filter, in order to obtain the highest number of results.

The table below shows the raw results obtained:

Table 1

[62] https://www.gov.br/pncp/pt-br

[63] https://pncp.gov.br/app/editais?q=&status=recebendo_proposta&pagina=1

[64] Non-enforceability, Waiver of bidding, Electronic and In-Person Auctions, Electronic and In-Person Competition, Accreditation, Electronic and In-Person Contests and Auctions.

Status	Number of Public Notices
Pending/Receiving proposals	0
Under review/Proposals closed	1
Closed	47
TOTAL	71

Source - Own elaboration

This gross result was then subjected to a preliminary analysis to assess the subject matter of the Public Notice, in order to determine whether all results specifically addressed the contracting of BIM engineering works and/or services. Based on this analysis, it was possible to refine the initial data, generating a net result, described below:

Table 2

tatus	Gross Result	Subject	Quantity per Purpose	Exclusions	Net Result
Receivable/Receiving proposals	8	Preparation of Basic and/or Executive Projects for Construction	6	2	**4**
		Not applicable	2	N/A	

Under review/Proposals closed	16	Preparation of Basic and/or Executive Projects for Construction Works	8	1	**7**
		Acquisition of BIM Software	4	N/A	
		Contracting BIM courses	3	N/A	
		Not applicable	1	N/A	
Closed	47	Preparation of Basic and/or Executive Projects for Construction Works	11	2	**9**
		Acquisition of BIM Software	12	N/A	
		Contracting BIM courses	24	N/A	
		Technical Assistance for Contract Supervision	1	N/A	
		No relation	0	N/	
TOTAL NET INCOME					**20**

Source - Own elaboration

It is necessary to define some classifications adopted. First, "Not applicable" refers to those notices whose object did not provide for BIM engineering works or services, but which returned as results due to the spelling of certain terms. This is explained below. The three (3) notices unrelated to BIM actually provided for the contracting of lighting services involving a device called "BIM MOVING." This is therefore a lighting device and has no relation to the subject matter under study.

In addition, public notices corresponding to the subjects "Acquisition of BIM Software," "Contracting of BIM Courses," and "Technical Assistance for Contract Supervision" were not considered as net results, since they did not actually involve the contracting of engineering works or services. Thus, only public notices whose object provided for the Preparation of Basic and/or Executive Projects for Construction Works were considered for analysis.

Finally, the exclusions made in relation to the object "Preparation of Basic and/or Executive Projects for Construction" must be justified. In total, there were five exclusions, one due to the absence of the respective public notice in the PNCP, three due to duplicate results, and one due to the absence of the necessary information in the document available in the PNCP.

In this sense, based on the search carried out in the PNCP, 20 (twenty) notices were effectively analyzed. To broaden the sample field of this study, we opted to search for *BIM notices in the state of Santa Catarina.*

The choice of this federal entity is justified by its already consolidated state action on the subject. In 2015, the Santa Catarina BIM Laboratory was created, the first in Brazil, with the aim of developing case studies to maximize the potential gains from the use of BIM methodology (BRASIL, 2022, p. 8). These studies resulted in the BIM Project Specification Notebooks, BIM and CAD Project Requirements, and the BIM Project Presentation

Notebook[65] , all already in their second version and being updated for the third. In addition, in 2021, through State Decree No. 1.370/2021, the State established the State Strategy for the Implementation and Dissemination of BIM in Santa Catarina (BIM SC Strategy).

However, since 2014, the State has already been implementing BIM contracting, publishing five public notices since then, four for projects and one for the execution of works. All were found on the BIMSC website, under the tab "Editais BIM SC" (BIM SC Public Notices)[66] . Thus, these five public notices were analyzed for the purposes of this research. This *brings the total number of BIM contracting public notices analyzed to twenty-five.*

Having clarified the data collection methodology, we will now describe the activities undertaken in the data observation stage, in order to then list the quantitative and qualitative inferences.

The data was observed by analyzing the content of the documents downloaded via PNCP and the BIMSC Portal, which were Public Notices and/or Terms of Reference. Thus, first, we analyzed (i) *the type of contract;* then, (ii) the *evaluation criteria* adopted; and finally, we searched for the terms "technical qualification," "technical expertise," and "technical capacity" in order to extract the (iii) *technical requirements* demanded of bidders. Using this methodology, it was possible to make quantitative and qualitative inferences, which are demonstrated below.

5. QUANTITATIVE RESULTS

As mentioned above, we first analyzed the (i) *type of contract*; then, the (ii) *evaluation criteria* adopted; and, finally, the (iii) *technical requirements* demanded of bidders.

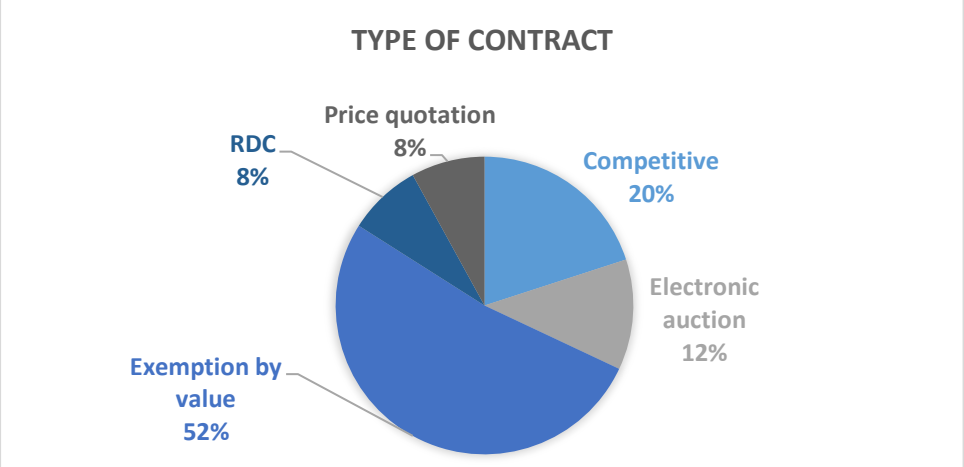
[65] Available at: https://www.bim.sc.gov.br/cadernos-bim

[66] https://www.bim.sc.gov.br/editais-bim

Regarding the type of contract for the 25 (twenty-five) public notices analyzed, the following types were adopted: (i) competitive bidding, (ii) electronic auction, (iii) direct contracting due to exemption based on value, (iv) direct contracting due to non-enforceability, (v) RDC, and (vi) price quotation (the latter two only in relation to public notices in Santa Catarina, since they date from a period prior to the enactment of Law No. 14.133/2021).

Direct contracting by waiver due to value prevailed, based on Article 75, item I, of Law No. 14.133/2021, totaling 13 (thirteen) public notices. Secondly, the Competition modality was adopted by five (5) public notices, followed by electronic auction (three, 3); RDC and Price Collection, both with two (2) public notices each. See the chart below:

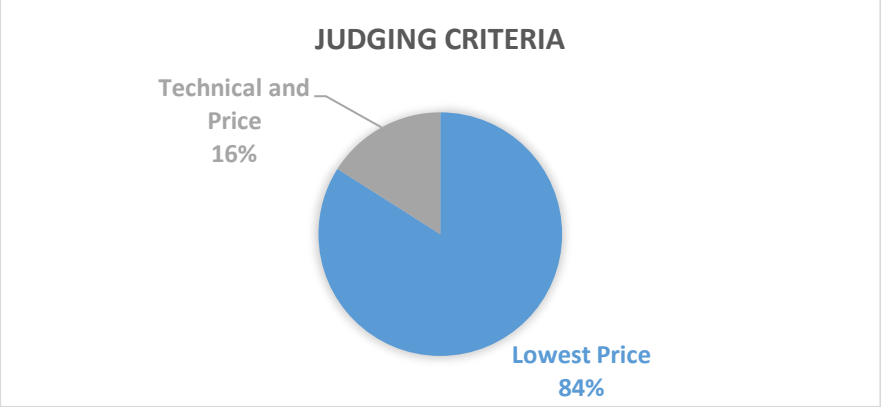
Graph 1



Source - Own elaboration

The prevailing contracting modality (exemption by value) also influenced the number in relation to the evaluation criteria used. Of the 25 (twenty-five) public notices analyzed, only 4 (four) adopted the Technical and Price criteria, while 21 (twenty-one) opted for the Lowest Price criterion.

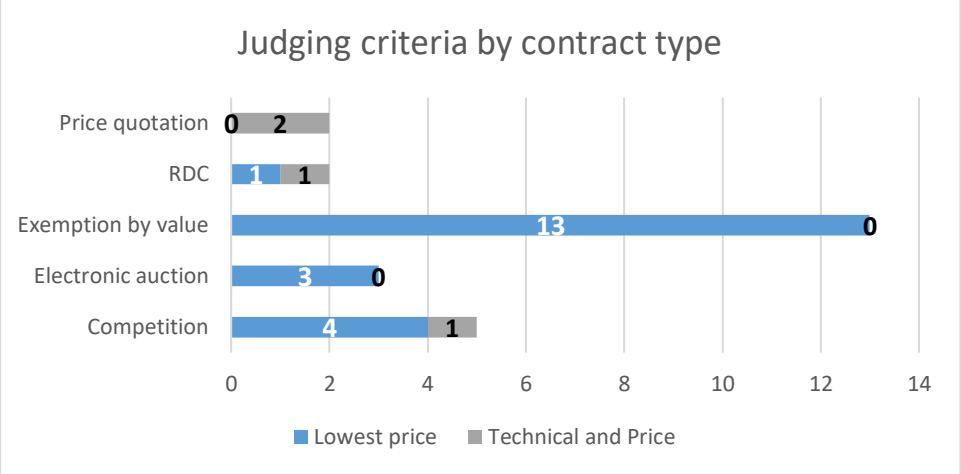
Graph 2



Source - Own elaboration

When analyzing the evaluation criteria by type of contract, it is noted that the adoption of Technique and Price predominates in Price Collection notices (prior to Law No. 14.133/2021), and is also adopted in one (1) RDC and one (1) Competition. The lowest price prevails in the notices of Exemption by value (13), Electronic Auction (3), and Competition (4).

Graph 3



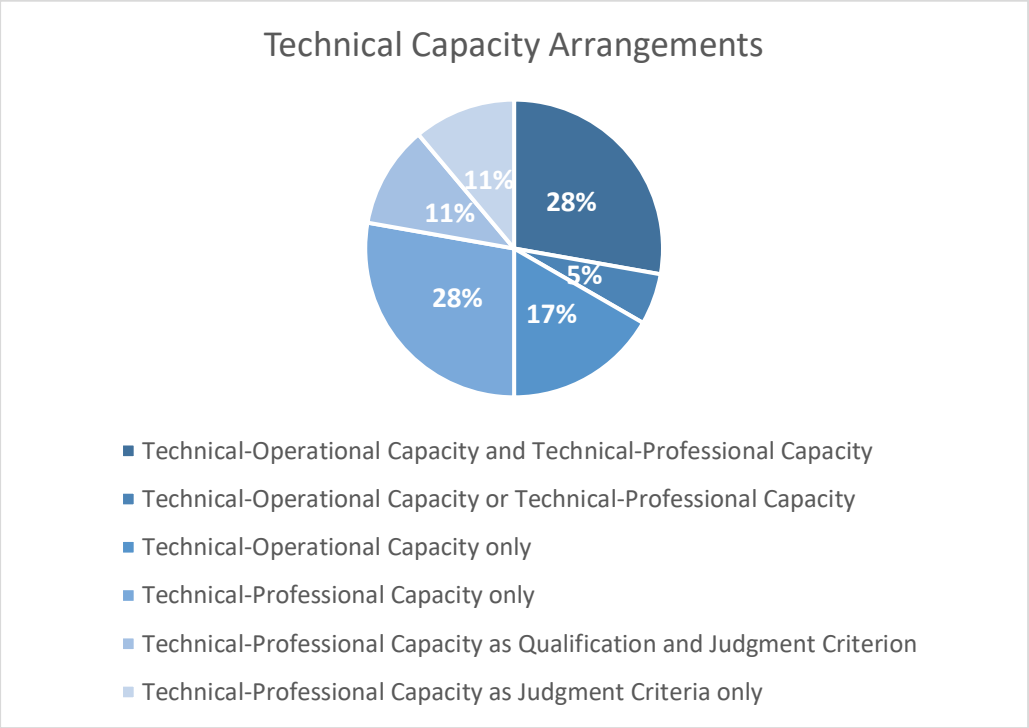
Source - Own elaboration

These figures are in accordance with the legal provisions of Law No. 14.133/2021, which, in its Article 6, item XXXVIII, provides for the possibility of adopting, in the Competition modality, the criteria of lowest price (item "a") and technical and price (item "c"), among others. Similarly, it establishes that the Auction modality shall adopt the criterion of lowest price or highest discount (Article 6, item XLI).

Despite the adoption of technical criteria and lower prices, it was observed that only seven (7) public notices did not include technical qualification requirements related to BIM. In other words, eighteen (18) public notices, including those whose evaluation criteria were based on the lowest price, included some technical qualification requirements, whether operational and/or professional, related to BIM.

In addition, six arrangements were noted regarding technical requirements: (i) Technical-Operational Capacity and Technical-Professional Capacity (5; 28%); (ii) Technical-Operational Capacity or Technical-Professional Capacity (1; 6%); (iii) Technical-Operational Capacity only (3; 17%); (iv) Technical-Professional Capacity only (5; 28%); (v) Technical-Professional Capacity as Qualification and Judgment Criterion (2; 11%); and (vi) Technical-Professional Capacity as Judgment Criterion only (2; 11%). The chart below shows the quantities:

Graph 4



Source - Own elaboration

It can therefore be seen that there is a prevalence of both the requirement to prove Technical-Operational and Technical-Professional Capacity (5; 28%) and only Technical-Professional Capacity (5; 28%). Secondly, there is a requirement for Technical-Operational Capacity only (3; 17%), followed by requirements for Technical-Professional Capacity both as a Qualification and/or Judgment Criterion for technical proposals (2; 11%, each). Finally, only one (1) public notice provided for the alternative between Technical-Operational and Technical-Professional Capacity.

Given these figures, it is important to understand the content of such technical requirements in order to assess what is being requested from bidders and to establish parameters and limits. This is what will be demonstrated in the qualitative inferences.

6. QUALITATIVE RESULTS

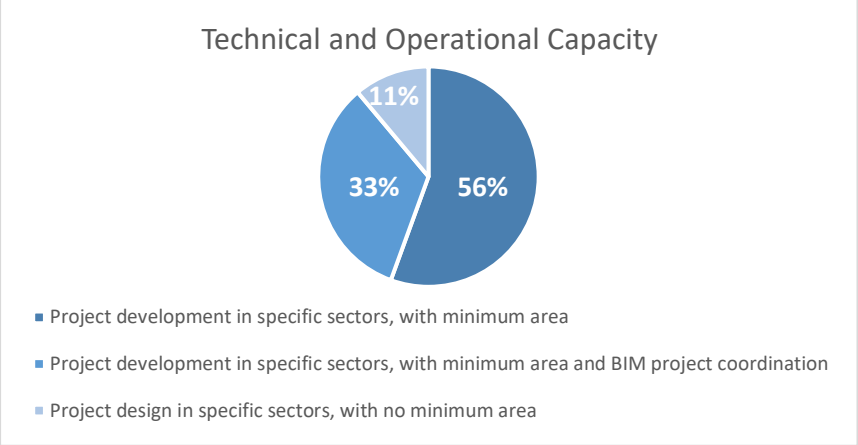
At this point, we will analyze the main qualitative inferences observed. The objective of this analysis is to understand how federal agencies and entities have been assessing the technical capacity of bidders in relation to BIM.

To this end, the requirements regarding Technical-Operational Capacity and Technical-Professional Capacity will be evaluated. Subsequently, in those notices where the criterion adopted was Technical and Price, the requirements related to BIM will be analyzed as part of the bidder's Technical Score.

6.1. Technical-Operational Capacity

From the analysis undertaken, *three (3) groups of requirements* were observed regarding Technical and Operational Capacity, namely: (i) Project development in specific sectors, with a minimum area (5; 56%); (ii) Project development in specific sectors with a minimum area and BIM project coordination (3; 33%); and (iii) Project development in a specific sector, with no minimum area (1; 11%). Below is a graphical representation of the findings:

Graph 5



Source - Own elaboration

The prevailing group, (i) *Project design in specific sectors, with a minimum area*, corresponds to the clauses in the tender notice on the technical qualification of bidders, which required proof, through the presentation of certificates in the name of the bidding company, of the design of sectoral projects, such as architectural, structural, electrical, and hydro-sanitary projects, designed in BIM, *in a minimum area equal to or greater than a certain percentage of the area to be tendered.* An example is provided below.

The Public Notice of Competition held by the City Council of Candói/PR[67] required, as specific technical qualification on BIM, proof of technical and operational capacity through certificates involving the preparation and execution of renovation and expansion projects using BIM technology, of at *least 350 m²* of masonry construction. The Direct Contracting Notice for exemption due to value, issued by CODEVASF - Alagoas[68] , also

[67] Contracting a company specialized in architecture or engineering to prepare projects and budget spreadsheets for the renovation and expansion of the City Council headquarters building using BIM technology, and monitoring the execution.

[68] Contracting of engineering services for the preparation of a basic project for a jabuticaba-based fermented beverage agroindustry, using BIM methodology, for the Mixed Cooperative for Peasant Production and Marketing of the State of Alagoas (COOPCAM), located in the municipality of Palmeira dos Índios, in the state of Alagoas.

required the presentation of Certificate(s) or Attestation(s) of technical capacity, in the name of the company, proving that the bidder had performed BIM services for the preparation of architectural, structural, electrical, and plumbing designs in *a minimum area of 50 m²* in each project.

Similarly, the Direct Contracting notice issued by the National Foundation for Indigenous Peoples[69] provided that the technical and operational capacity of the bidding company must be proven by a certificate, declaration, or attestation proving the preparation of an architectural project for building renovation, prepared using BIM methodology, *with a minimum area of 65 m²* , corresponding to approximately 10% of the estimated area of the subject matter of the tender, proven by means of a single certificate. In this specific case, it is worth noting that the *BIM requirement was alternative,* i.e., the bidder could submit a certificate of preparation of an architectural design for building renovation work *without BIM methodology,* provided that, in this case, the minimum area was 327 m²(50% of the area to be tendered), which could be proven by means of one or more certificates. Therefore, it can be seen that the requirements relating to BIM methodology are more measured and moderate.

The subsequent group, *(ii) Project design in specific sectors with minimum area and BIM project coordination*, is similar to the first group in that it provides for the design of projects with minimum areas, but also includes in the technical and operational capacity the proof of BIM project coordination services.

[69] Contracting of specialized technical services for the preparation of basic and executive architectural and engineering designs, developed and compatible with the BIM platform, including: approval and obtaining of licenses from the competent authorities, list and specifications of materials, descriptive reports, specifications, calculation reports, physical and financial schedule, and complete budgeting in accordance with Decree No. 7,983/2013, to enable the contracting of renovation, adaptation, modernization, and possible expansion of the property that houses the facilities of Funai - Regional Coordination of João Pessoa - CR-JPA

This is the case of the public tender notice issued by the Municipality of Londrina/PR[70] , which included the following requirement in item 5.3:

Atestado de *capacidade técnica operacional* emitido em nome da empresa licitante, referentes a objetos similares ao licitado, admitido o somatório, desde que em período concomitante, que comprove:

[...]

Elaboração de *projeto arquitetônico de edificação em BIM* com área igual ou superior a *550m²*;

Elaboração de *projeto de estruturas de concreto armado (moldado in loco, protendido e/ou pré-moldado), em BIM*, de edificação com área igual ou superior a *550m²;*

Elaboração de *projeto de estruturas metálicas para cobertura de edificação, em BIM*, com área igual ou superior a *200m²*;

Elaboração de *projeto de instalações elétricas para edificação, em BIM*, com área igual ou superior a *550m²* e que contenha entrada de energia em média/alta tensão;

Coordenação/compatibilização de projetos em BIM de edificação com área igual ou superior a 550m².

The same was true of the direct contract award notice issued by the Municipality of Belo Horizonte/MG, which required bidders to prove, by means of a technical and operational capacity certificate, that they had executed/prepared a structural building design using BIM modeling for *a minimum area of 1,200m²* , in addition to *the coordination of building projects using BIM modeling.*

[70] Contracting of engineering projects and services, modeled in BIM, for the renovation and expansion of the Malvina Poppi Pedrialli CMEI.

The notice of the Electronic Auction undertaken by the Regional Superintendence of the Federal Police in Rio Grande do Sul[71] also required the bidding company to prove its technical and economic qualification to perform services for the preparation of executive architectural, structural, electrical, and hydro-sanitary projects, all executed according to BIM (Building Information Modeling) methodology, in buildings with a *minimum* area *of 245.00 m² (two hundred and forty-five square meters), i.e., equivalent to approximately 25% (twenty-five percent) of the planned built area, in addition to the general coordination of the aforementioned projects.*

Finally, there is group (*iii) Project development in a specific sector, with no minimum area,* consisting of only one (1) public notice. In this case, the public notice only required the tion of technical qualification through certificates proving that the specialized company or professional had provided services in executive architectural design using BIM. In this case, no minimum area was specified. In addition, this public notice is the same as the one that provided for proof of technical-operational or technical-professional capacity, with the same requirement for each.

Thus, bidding companies could either prove their technical-operational capacity or their technical-professional capacity, provided that they submitted the respective certificate with the above-mentioned specifications.

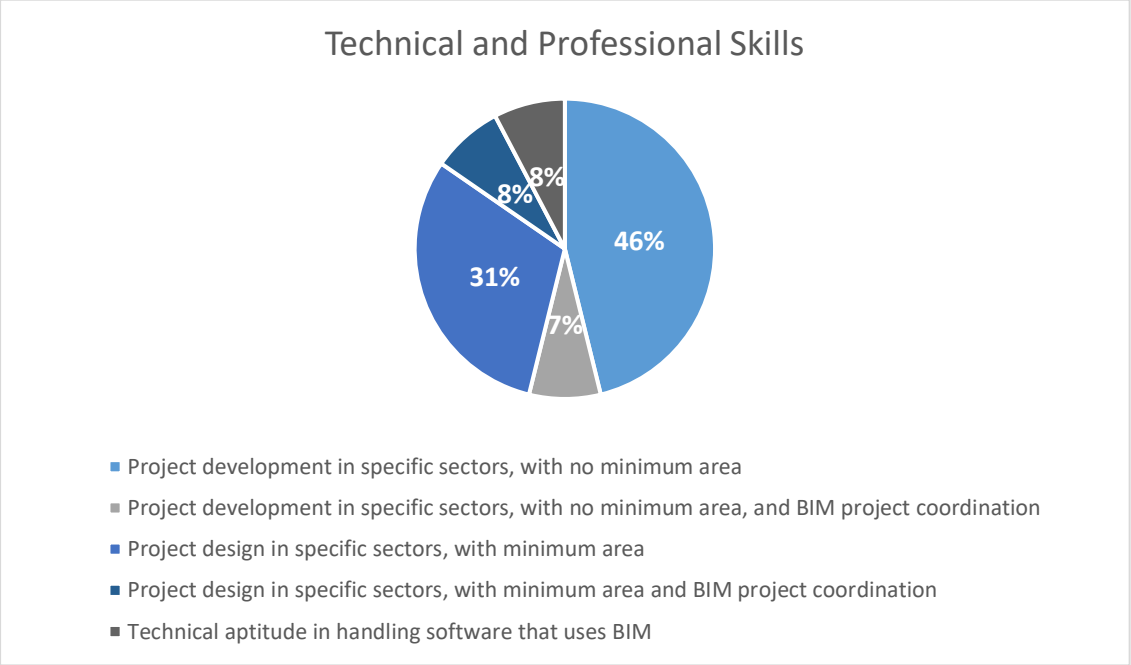
6.2. Technical-Professional Capacity

From the analysis undertaken, *five (5) groups of requirements* were observed regarding Technical-Professional Capacity, namely: (i) Project development in specific sectors, with no minimum area (6; 46%); (ii) Project development in specific sectors, with no minimum area, and BIM project coordination (1; 7%); (iii) Project development in specific

[71] Provision of basic and executive project design services, using BIM (Building Information Modeling) methodology, for the Nautical Base of the Special Maritime Police Unit of the Federal Police Station in Rio Grande do Sul - NEPOM/DPF/RGE/RS.

sectors, with minimum area (4; 31%); (iv) Project development in specific sectors, with minimum area and BIM project coordination (1; 8%); and (v) Technical aptitude in handling software that uses BIM (1; 8%). Below is a graphical representation of the findings:

Graph 6



Source - Own elaboration

The prevailing group, (*i) Project development in specific sectors, with no minimum area*, corresponds to the clauses in the tender notice on the technical qualification of bidders, which required proof, through the presentation of certificates in the name of the technical team professional, of the development of sectoral projects, such as architectural, structural, electrical, and plumbing projects developed in BIM, *without the requirement of a minimum area equal to or greater than a certain percentage of the area to be tendered.* An example is provided below.

The same tender notice issued by the City Council of Candói/PR mentioned above required proof, through a Technical Collection Certificate (CAT) in the name of the technical manager presented, that the latter had been responsible for the same service required for Technical-Operational Capacity (preparation and execution of renovation and expansion projects using BIM technology). However, it expressly stated that, in this case, proof of the minimum quantity (minimum building area) was not required.

Also, the Direct Contracting Notice for exemption due to value, issued by CODEVASF - Alagoas, when requiring the bidder to prove, through the presentation of a CAT, that it *has* on its permanent professional staff someone *who has performed services related to the preparation of basic designs for residential, commercial, or business projects using BIM methodology, including architectural, structural, electrical, and plumbing designs and budgeting.* This is the same requirement for Technical-Operational Capacity, except that, in this case, *no minimum area to be proven was required.*

Similarly, the Direct Contracting Notices for exemption by the Municipality of Itagibá/BA, both those issued in December 2022 and January 2023, only required proof of a professional member of the company's technical staff who had *carried out a basic or executive architectural project (or other specialties) using BIM technology. In this case, no minimum area was specified,* only that the size of the building be compatible with the object to be tendered, providing a broad estimate.

The second group, (*ii) Project development in specific sectors, with no minimum area, and BIM project coordination*, consists of only one (1) public notice, namely Direct contracting by waiver for the amount, carried out by the Municipality of Belo Horizonte/MG, requiring the bidder to prove that it had professionals on its staff who *had executed/prepared structural building designs using BIM modeling and coordinated building projects using BIM modeling.* Unlike the requirements for technical and operational capacity, there was no minimum area requirement of 1,200 m².

The third group, and the second in prevalence, (*iii) Project development in specific sectors, with a minimum area*, corresponds to public notices whose technical-professional

capacity would be proven by previous experience in project development linked to the minimum area required, similar to that already detailed in Technical-Operational Capacity.

Examples include the Direct Contracting notices by waiver for the amount carried out by the Regional Chemistry Council-IV Region of São Paulo[72] and the Regional Council of Engineering and Agronomy of Santa Catarina[73] , which provided for proof of technical and professional capacity through certificates in the name of the technical managers proving the execution, *completed or in progress,* of architectural, structural, electrical, hydro-sanitary, and fire prevention projects with *an area equal to or greater than 50% (fifty percent) of the area planned* for the project that is the subject of each bid.

Similarly, two (2) public notices from Santa Catarina were classified in this group. These are RDC No. 670/2014[74] and Price Request No. 11/2019[75] . The first required technical team professionals to prove their experience in BIM development of architectural, structural, and installation projects with *a minimum area of 7,000 m² (76,220 ft²), corresponding* **to** *approximately 25% of the tendered quantity.* The second stipulated the same project requirement, differing only in the area, which was *3,300 m² (approximately 50% of the tendered amount)*. On these occasions, there were no project coordination/management requirements.

Regarding the fourth group, *(iv) Project design in specific sectors, with minimum area and BIM project coordination*, only one (1) public notice analyzed required projects

[72] Contracting, without bidding, for the provision of services for the preparation of executive engineering and architectural projects using BIM technology, budgets, descriptive reports, and construction schedules for the retrofitting of the auditorium at the CRQ-IV headquarters.

[73] Contracting of engineering and/or architecture company(ies) specialized in the preparation of executive engineering and architecture projects using BIM technology, budgets, descriptive reports, and construction schedules for the construction of a building for the CREA-SC Inspectorate in Videira-SC.

[74] Contracting a specialized company for the preparation of the Legal Project and Executive Project for the New Cardiology Institute of Santa Catarina using BUILDING INFORMATION MODELING (BIM) to be built in the municipality of São José, SC.

[75] Preparation of legal and executive project for the new building of the Santa Catarina Special Education Foundation (FCEE), using building information modeling (BIM), to be built in the municipality of São José, SC.

designed with a minimum area and BIM coordination. This refers to the Public Tender held by the Municipality of Londrina, which required a certificate of technical and professional capacity, issued in the name of the technical manager, allowing for the sum of certificates, proving the *preparation in BIM of architectural, structural, and electrical projects with a minimum area of 550m²* , in addition to *the coordination of projects in BIM* in buildings with an area equal to or greater than 550m² .

Finally, the fifth group, (*v) Technical aptitude in handling software that uses BIM*, only required professionals to *prove technical aptitude in handling software or tools that use the Building Information Modeling (BIM) methodology*, through certificates and/or attestations issued by public or private companies accredited by their respective councils, *without further requirements*. This was the case in the Electronic Auction held by the Municipality of Itagibá in April 2023[76] .

Finally, having outlined how BIM is being required in Technical-Professional Capacity, we will now analyze how technical capacities are integrated into the technical score in those public notices whose evaluation criteria were Technical and Price.

6.3. Technical Capacity in the Composition of the Technical Score

Firstly, it is worth noting the presence of four (4) public notices whose evaluation criteria were based on Technical and Price in the public notices analyzed. These are: Public Tender No. 17/2023 – Municipality of Atibaia/SP; RDC No. 670/2014 - State of Santa Catarina; Price Collection No. 11/2019 - State of Santa Catarina/Catarinense Foundation for

[76] Contracting of an engineering and urban planning company specialized in the provision of technical services for the preparation of architectural and urban planning projects, executive and complementary projects compatible with BIM methodology, parameterized budgeting, and 3D electronic models. Including technical documents, technical specifications, descriptive report, preliminary technical study, quantity and cost spreadsheets, unit service cost composition spreadsheets, calculation report, and physical and financial schedule for the works, and other technical documents of interest to the Administration, for the works in the municipality of Itagibá.

Special Education and Price Collection No. 015/2020 – State of Santa Catarina/State Secretariat of Public Security.

Public Tender No. 17/2023 - Municipality of Atibaia/SP, whose object is the contracting of specialized technical services for the preparation of architectural, engineering, and legal projects approved with development on a BIM (BUILDING INFORMATION MODELING) for the construction of the new "Campus Atibaia" composed of FATEC de Atibaia and Etec Carmine Biagio Tundisi, provided for the evaluation of the Technical Proposal based on three (3) scores - NT1, NT2, and NT3. NT2 dealt specifically with the Organization of the Technical Team and was the only technical score to include technical requirements related to *Building Information Modeling*.

The requirements relate to (i) the technical and professional qualifications of Sector Coordinator 1, who must be a professional architect with a degree in architecture and experience as a technical manager in the execution of *executive design* services *for public/private buildings using BIM methodology*; and (ii) the technical and operational capacity of the company, proven by certificates on behalf of the company for the design of public/private buildings using BIM methodology.

The tender did not require a minimum number of certificates, nor did it consider them mandatory. The submission of such certificates was qualifying, *comprising the bidder's technical score according to the number of certificates submitted.* Thus, in the case of technical and professional capacity, it would be scored as follows: ≥ 3 certificates = 6.0 2 certificates = 4.0 points 1 certificate = 2.0 points 0 certificates = 0 points. In the case of technical-operational capacity, the scoring would follow the following scale: 2 certificates = 6.0 points 1 certificate = 2.0 points 0 certificates = 0 points.

Next, based on the analysis of *RDC No. 670/2014 – State of Santa Catarina,* with the objective of hiring a specialized company for the Preparation of the Legal Project and Executive Project for the New Cardiology Institute of Santa Catarina using Building Information Modeling (BIM) to be built in the Municipality of São José -SC, it was noted that the Technical Note would be composed of NFCET and NFBIM, respectively. Final Score

for Technical Team Capacity (technical-professional capacity) and Final Score for BIM Project Development (technical-operational capacity).

Also for classification purposes, the *NFCET consists of 35 (thirty-five) questions, 23 (twenty-three) of which are related to BIM*. However, the BIM project development score for a given professional was alternative and had a lower score. This is explained below. When asked about the presence of one engineer or architect with proven experience in construction planning on the technical team, a score of 1.75 was awarded if the answer was "YES." If this planning was developed using specific software associated with BIM technology, an additional 1.0 point was awarded, with a maximum score of 2.75. The same applies to the other 22 (twenty-two) questions, with specific scores, as shown below:

Figure 1

Quesito 08	**Profissional**	
1 (um) Arquiteto com experiência comprovada na elaboração de projeto arquitetônico de construção, reforma ou ampliação de Hospital	**Ponto**	**Pontuação Máxima**
SIM ( ) NÃO ( )	1,35	2,15
O projeto foi desenvolvido utilizando a tecnologia BIM		
SIM ( ) NÃO ( )	0,80	
Critério: Para efeito de aferição do quesito, o profissional deverá apresentar Certidão de Acervo Técnico de no mínimo 03 (três) serviços com os respectivos atestados. Para projeto desenvolvido utilizando tecnologia BIM, o profissional deverá apresentar no mínimo 01 (um) atestado + 01 (um) Relatório/Documento gerado pelo software de comunicação, integração e		

Source - Public Tender No. 17/2023 – Municipality of Atibaia/SP

Figure 2

Quesito 32	Profissional	
01 (um) Engenheiro com experiência comprovada na elaboração de projeto hidrossanitário para edificação com área construída mínima de 9.400 m²	**Ponto**	**Pontuação Máxima**
SIM ( ) NÃO ( )	0,75	1,35
O projeto foi desenvolvido utilizando a tecnologia BIM		
SIM ( ) NÃO ( )	0,60	
Critério: Para efeito de aferição do quesito, o profissional deverá apresentar Certidão de Acervo Técnico de no mínimo 03 (três) serviços com os respectivos atestados. Cada serviço deverá comprovar a metragem mínima solicitada. Para projeto desenvolvido utilizando tecnologia BIM, o profissional deverá apresentar no mínimo 01 (um) atestado + 01 (um) Relatório/Documento gerado pelo software de comunicação, integração e interoperabilidade do desenvolvimento do Projeto(Documento de Engenharia/Arquitetura simultânea), assinados pelo responsável técnico e pelo proprietário.		

Source - Public Tender No. 17/2023 – Municipality of Atibaia/SP

The NFBIM, on the other hand, provided for only one (1) requirement to be proven by the company, also following the classification logic with progressive scoring and maximum score, linking the development of BIM projects with minimum areas in m^2, as shown below:

Figure 3

Quesito 01	Empresa	
01 (um) modelo BIM separado pelas especialidades de Arquitetura, Estrutura e Instalações utilizando um sistema comum de coordenadas definidas pela Arquitetura.	**Ponto**	**Pontuação Máxima**
Um Hospital com no mínimo 9.400,00 m² (**ou**)	50,00	50,00
Uma Policlínica ou UPA com no mínimo 7.000,00 m² (**ou**)	30,00	
Um Edifício Comercial com no mínimo 9.400,00 m² (**ou**)	20,00	
Dois Edifícios Comerciais com no mínimo 7.000,00 m² (**ou**)	15,00	
Um Edifício Comercial com no mínimo 7.000,00 m²	10,00	
Critério: Para efeito de aferição do quesito, a proponente deverá apresentar arquivo digital contendo o modelo BIM, em extensão .ifc + Atestado Técnico referente ao projeto + ART ou RRT para cada disciplina comprovando a contratação da empresa. No caso da empresa ou consórcio que apresentar dois projetos, relação entre as áreas das duas edificações (menor área dividida pela maior área) não pode ser menor ou igual a 0,60.		

Source - Public Tender No. 17/2023 – Municipality of Atibaia/SP

It should also be noted that the *Technical Score would make up 40% (forty percent) of the bidder's Final Score*, while the Price Score would account for 60% (sixty percent).

Finally, both *Price Collection No. 11/2019* - State of Santa Catarina/Catarinense Special Education Foundation and *Price Collection No. 015/2020* - State of Santa Catarina/State Secretariat of Public Security, composed the Technical Score solely with Technical-Professional Capacity, based on the so-called Final Score of Technical Team Capacity.

Both also presented questions (35 and 33, respectively) with and without reference to BIM (27 for each), along the same lines as the aforementioned RDC. In other words, the experience of a given professional in the preparation of certain projects is evaluated, assigning a certain score and awarding extra points if the project was developed using BIM technology, requiring at least one certificate for proof. In both cases, the *Technical Score* also *makes up the bidder's Final Score with a weight of 40% (forty percent),* while the Price Score would have a weight of 60% (sixty percent).

Therefore, the standard adopted in assigning progressive scores according to the number of certificates or size of the area previously designed in BIM, solely for classification purposes, was noted. In addition, it was noted that the score related to BIM would be considered extra points, in addition to the main item evaluated.

7. FINAL CONSIDERATIONS

This article aimed to present an overview of the technical requirements in public tenders related to Building Information Modeling (BIM), making it possible to establish limits and suggestions to be observed by public authorities when preparing tenders.

Based on empirical research, it was possible to assess the main types of bidding and evaluation criteria adopted. Regarding the *contracting modality* of the 25 (twenty-five) public notices analyzed, the following modalities were adopted: (i) competition, (ii) electronic auction, (iii) direct contracting by waiver due to value, (iv) direct contracting due to unenforceability, (v) RDC, and (vi) price quotation (the latter two only in relation to public notices in Santa Catarina, since they date from a period prior to the enactment of Law No. 14,133/2021).

The *prevalence of direct hiring due to exemption based on value* was observed*, based on Article 75, item I, of Law No. 14,133/2021*, totaling 13 (thirteen) public notices. ly, the Competition modality was adopted by five (5) public notices, followed by electronic auction (three, 3); RDC and Price Collection, both with two (2) public notices each. The prevailing contracting modality (exemption by value) also influenced the quantity in relation to the evaluation criteria used. Of the 25 (twenty-five) public notices analyzed, *only 4 (four) adopted the Technical and Price* criterion, while 21 (twenty-one) opted for the Lowest Price criterion.

Despite the lower adoption of the technical and price criterion, it was observed that only seven (7) public notices did not include technical qualification requirements related to BIM. In other words, eighteen (18) public notices, even those whose evaluation criterion was the lowest price, *included some technical qualification requirement, whether operational and/or professional, related to BIM*.

In those public notices whose evaluation criteria were technical and price, a pattern was observed of *assigning progressive scores* according to the number of certificates or size of the area previously designed in BIM, solely *for classification purposes*. In addition, it was noted that the score related to BIM would be considered *extra points, in addition to the main criterion evaluated.* Furthermore, the *Technical Score was given a weight of 40%,* while the Price Score accounted for 60% of the final score.

In addition, it was also observed that requirements concerning technical qualifications related to BIM were commonly requested in other public notices. Regarding *technical and operational capacity*, three groups of requirements were observed, namely: (i) Preparation of projects in specific sectors, with a minimum area (5; 56%); (ii) Project development in specific sectors with a minimum area and BIM project coordination (3; 33%); and (iii) Project development in a specific sector, with no minimum area (1; 11%).

With regard to *technical and professional capacity*, five groups of requirements were observed: (i) Project design in specific sectors, with no minimum area (6; 46%); (ii) Project design in specific sectors, with no minimum area, and BIM project coordination (1;

7%); (iii) Project development in specific sectors, with a minimum area (4; 31%); (iv) Project development in specific sectors, with a minimum area and BIM project coordination (1; 8%); and (v) Technical aptitude in handling software that uses BIM (1; 8%). In this case, "specific sectors" refers to architectural, structural, electrical, plumbing, building, and installation projects using BIM methodology.

In addition, there was also a prevalence of both the requirement for proof of Technical-Operational and Technical-Professional Capacity (5; 28%) and proof of Technical-Professional Capacity alone (5; 28%).

With this information, it can be inferred that the Public Administration itself has *been setting certain limits for technical requirements related to BIM*. There is a requirement for technical-operational and/or professional capacity in BIM, subject to certain criteria, such as minimum area relating to the object to be tendered. In addition, they do not determine the minimum number of certificates to be presented, but rather assign a score according to the quantity demonstrated.

This practice is said to be self-contained because any minimum determination of the number of certificates and minimum areas regardless of the object to be contracted could be seen as directing the tender or restricting its competitiveness. On the contrary, by establishing the execution of projects in one or more specific areas (tonic, structural, electrical, hydro-sanitary, building, installations), with progressive scoring, it allows more companies to participate in the tender.

However, the prevalence of the lowest price criterion may indicate a certain reluctance on the part of the Public Administration to consider technical expertise as a component of the final score, precisely because of the possibility of restricting the tender in a market that is still growing.

However, it is suggested that the technical criterion should be adopted for more complex objects, provided that the final score considers an appropriate proportion (as seen, 40% technical and 60% price) and that the requirement regarding BIM corresponds only to

a scoring criterion, as recommended by the Federal Court of Auditors without determining a minimum number of certifications[77].

The Public Administration must act with caution, not fear, in relation to such requirements and must instruct the case files with robust justification containing the purpose and minimum requirements for contracting in BIM, as also recommended by the TCU[78].

To ensure the competitiveness of tenders and promote the development and maturation of BIM use, it is also necessary for the agencies and companies that issue Technical Capacity Certificates to take action. This is because they need to adapt to this new reality and rectify certificates issued in the past that did not properly qualify that a particular work or project was carried out using BIM methodology, even if the degree of maturity is initial.

In addition, professional associations also need to adapt, albeit gradually, to this new scenario. They need to update their certificate registration systems to ensure that they include a specific field that allows for qualification with "in BIM," since this field does not currently exist.

For this reason, it is also recommended that the Technical Collection Certificate, when required in conjunction with certificates for technical and professional capacity purposes, does not need to mention BIM, since, due to the scenario described above, it may not contain such a reference. Therefore, this requirement should be considered.

Finally, it can be concluded that the development and maturation of BIM technology in the market and its widespread use by the Public Administration must observe the limits

[77] Federal Court of Accounts. Judgment 241/2023, Plenary Session, Reporting Judge: Minister Vital do Rêgo, Judgment: February 15, 2023.

[78] Federal Court of Accounts. Judgment 1367/2021, Plenary Session, Reporting Judge: Minister Aroldo Cedraz, Judgment: June 9, 2021.

and precautions set forth herein when qualifying bidders. This will ensure fair and competitive tenders that effectively contribute to the efficient improvement of the execution, supervision, and management of public works and engineering services using BIM methodology.

As far as the general approach to BIM methodology concerns, examples from European legal context (as developed under Directive 2014/24/EU and national implementations) offers several instructive principles, as graduated qualification, interoperability mandates requiring open and transparent formats to prevent vendor lock-in and promote equal treatment of bidders regardless of software platform choices[79] and, foremost, collaborative contract paradigm to be realized through integrated team structures, mutual information commitments, and transparent data sharing[80].

Abstract. *This article aims to provide an overview of the technical requirements related to Building Information Modeling (BIM) in public notices in Brazil, in order to establish limits and suggestions to be observed by public authorities when preparing public notices. Based on a theoretical study of technical-operational and technical-professional capabilities and empirical research conducted on a sample of 25 (twenty-five) public notices for bids involving BIM engineering works or services, the quantitative and qualitative results will be presented, such as the most commonly used bidding modalities and evaluation criteria and the main technical qualification requirements related to BIM. Finally, suggestions will be made to public authorities, companies, and bodies that issue technical qualification certificates in order to improve and develop the maturity of BIM use.*

[79] E.g. Italy's Annex I.9, legislative decree no. 36/2023, which expressly requires "interoperable platforms through open, non-proprietary formats,". More in general, on BIM and transparency, see the perspectives in Position Paper of the EU BIM Task Group (November 2025) Fostering the policies to incorporate BIM in Public Procurement across the EU, and Public Buyers Community, *BIM integration in Public Procurement Survey Analysis Report* 2025, 16 January 2026.

[80] G.M. RACCA, *Digital Transformation for an Effective E-Procurement*, in C. Risvig Hamer, M. Andhov, E. Bertellsen, R. Caranta (eds.), *Into the Northern Light. In memory of Steen Treumer*, Ex Tuto Publishing, Copenaghen, 2022, p. 225 ff.