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PRŮMYSLU A OBCHODU

Update of the Czech BIM implementation strategy

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MINISTERSTVO PRŮMYSLU A OBCHODU

BIM KONCEPCE

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1 PREAMBLE

This updated Czech BIM implementation strategy (hereinafter also referred to as the 'Strategy' or 'BIM strategy') has been prepared on the basis of Government Resolution No. 1087 on the execution of the BIM (building information modelling) method implementation strategy in the Czech Republic, dated 21 December 2022. By this resolution, the Government ordered the preparation of an update of the Strategy for the Implementation of the BIM method in the Czech Republic (hereinafter also referred to as the 'original Strategy') approved by Government Resolution No. 682 of 25 September 2017, including its subsequent amendment by Government Resolution No. 41 of 18 January 2021.

The key reasons for updating the original Strategy include the extension of the BIM strategy from its original focus on building information modelling to the broader area of built asset information management, including their contexts and links within the built environment. The reasons for the update are summarised in Chapter 2. Introduction.

The update of the Strategy was prepared by the Ministry of Industry and Trade (hereinafter referred to as 'MIT') with the support of other members of the Government and the Chairman of the Czech Office for Surveying, Mapping and Cadastre (hereinafter referred to as 'COSMC'), in cooperation with the Czech Standardisation Agency (hereinafter referred to as 'CSA') and professional and interest organisations and chambers – the Czech BIM Council, z.s. (hereinafter referred to as 'czBIM'), the Czech Chamber of Chartered Engineers and Technicians Engaged in Construction (hereinafter referred to as 'ČKAIT'), the Czech Chamber of Architects (hereinafter referred to as 'CCA') and the Association of Building Entrepreneurs of the Czech Republic (hereinafter referred to as 'ABE'). The update was consulted with a wide group of stakeholders represented in a working group established ad-hoc by the CSA.

2 INTRODUCTION

The BIM strategy is a basic strategical material of a medium-term nature, which sets out the principles of BIM implementation in the Czech Republic until 2027.

The advancing digital transformation is a global trend in many areas of life and sectors of human activity and business or public administration, leading to the digitisation of key processes and systems and conditioned by the creation, management and sharing of information in digital form. In sectors related to the investment construction of buildings and infrastructure and their long-term use and operation, this also applies to information on built assets, structures and facilities, and the optimisation of their life cycle processes.

Within public administration, the introduction of modern procedures for processing and using information is the focus of eGovernment activities, in the Czech Republic covered by the Digital Czechia ('Digitální Česko') strategic framework. The digitalisation of public agenda and processes facilitates the performance of public administration and at the same time improves its accessibility for citizens, firms and other entities. At the same time, the digitisation of information and processes related to buildings and facilities, including their links and relationships in the territory, using information modelling of the built environment is necessary for many important administrative areas and activities of public administration and the private sphere.

The current background to the Strategy can be summarised in the following points:

- the strategic importance of the construction industry for the economy of the Czech Republic,
- limited digitisation of the sector with stagnating labour productivity rates,
- additional changes to construction projects documentation during implementation,
- the effectiveness of BIM in fulfilling the principles of sustainable construction throughout the built asset life cycle,
- the importance of BIM for the construction industry comparable to the digitisation of industry,
- more efficient construction and construction management,
- shift from fragmentation of processes in the built asset life cycle to collaboration,
- reducing human error during the preparation and execution of the construction which results in cost overruns,
- increasing transparency in the use of public funds,
- the need for closer cooperation between all stakeholders.

Internationally, BIM has been applied in the private construction sector since the end of the last century, and in developed economies public contracting authorities subsequently require its use by their contractors. More recently, the digitisation of the built environment is being promoted abroad to address new challenges in the construction industry and other sectors and services within the built environment, to the application of artificial intelligence and connected digital twins with an emphasis on data centric systems and processes that will enable the adequate deployment and use of future technologies and methods of planning and management. Following these trends is essential for maintaining the competitiveness of the Czech construction industry and, more generally, for the development of the economy and society as a whole.

The BIM strategy should provide the construction industry with a clearly articulated strategy for the

development and digitisation of processes so that they can be built upon by those involved in the digitisation of downstream public agenda.[1] Standardising the creation, management and exchange of construction project information throughout the life cycle will speed up and improve the process of preparing, implementing, using and operating construction projects and save associated costs. The BIM strategy sets out the objectives and follow-up measures needed to achieve them through the effective use of construction projects information management in the Czech Republic.

2.1 Creation and implementation of the original Strategy to date

In November 2016 Government Resolution No. 958, on the importance of the BIM (Building Information Modelling) method for construction practice in the Czech Republic and the proposal for the further procedure for its introduction, was approved, in which the Government expressed support for the introduction of the BIM method in the Czech Republic in connection with its impact on the growth of the economy and competitiveness of the Czech Republic, appointed the Ministry of Industry and Trade as the administrator for the introduction of the BIM method in the Czech Republic and instructed it to prepare, with the support of other ministries, the Strategy for the implementation of the BIM method in the Czech Republic.

In addition to the MIT, the Ministry of Transport (hereinafter referred to as the 'MoT'), the State fund for transport infrastructure (hereinafter referred to as the 'SFDI') and czBIM experts participated in the actual preparation of the original Strategy. The original Strategy for the implementation of the BIM method in the Czech Republic approved by Government Resolution No. 682 in September 2017 included a schedule of 38 measures focused on 7 thematic areas. In January 2021, the Government approved, by Resolution No. 41/2021, an update of this schedule and its extension with two new measures.

In January 2018, the Czech Standardisation Agency established the BIM strategy Department, which, on the basis of the MIT mandate, is gradually preparing individual outputs in the form of methodologies, standards, awareness and education that aim to support public contracting authorities in the process of applying the BIM method in the implementation of construction projects using this method. The progress of the implementation of the original Strategy and the status of implementation of its measures was continuously monitored, assessed and evaluated by the Government until 2022. The process will continue to be monitored, assessed and evaluated in the framework of the meetings of relevant working groups and committees of the Government Council for the Information Society.

2.2 Reasons for updating the original Strategy

The proposal for updating the original Strategy submitted to the Government by the Ministry of Industry and Trade in the Information on the fulfilment of the strategy for the implementation of the BIM method in the Czech Republic in the period from September 2021 to June 2022, and accepted by Government Resolution No. 1087 of 21 December 2022, was based on the assumption of such an update stated in the 'Justification for the update of the schedule of the BIM implementation strategy in the Czech Republic adopted by Government Resolution No. 41 of 18 January 2021.

While the existing measures of the original Strategy are gradually being implemented, according to the identified need to update it, it is necessary to respond to the general turbulent development and

[1] See Resolution of the Government of the Czech Republic No. 1087 of 21 December 2022

to take into account the current situation, which is affected in particular by the following changes in the framework:

Czech Republic:

- feedback on the 'Draft bill on built asset information management and built asset information model and built environment information model',
- amendments to the new Building Act,
- updating the digitisation of building permit procedure and spatial planning,
- the NIPI[1] Act preparation process,
- development of eGovernment implementation.

Internationally:

- development of carbon neutral EU policies,
- development of EU energy policies,
- the process of implementation of national BIM strategies in EU/non-EU countries,
- further development and implementation of international norms and other standards for the BIM method.[2]

These changes in the national and international context in the course of the implementation of the original Strategy to date also provide concrete reasons for updating its content, objectives and related measures, and are further elaborated in relation to the above list of its identified needs.

The fundamental output of the implementation of the original Strategy is the Draft bill on built asset information management and built asset information model and built environment information model (hereinafter also referred to as the 'BIM Act') approved by Government Resolution No. 298 of 3 May 2023. The process of preparation and discussion of the draft bill on BIM in a wide range of stakeholders also led to a deepening of knowledge that needs to be taken into account in the update of the Strategy. The obligation to use the BIM method will only apply to above-the-threshold public contracts (within the meaning of the Public Procurement Act) for construction projects funded from public budgets.

Specifically, the draft bill on BIM concludes that in order to fully evaluate the information generated by the BIM method in the preparation, implementation and operation of individual construction projects or their complexes within the digitised agenda of public administration and other entities, it is necessary to standardise the process of modelling information about the built environment as part of eGovernment services, which the update of the Strategy reflects.

In connection with the recodification of the public construction law leading to the adoption of the new Building Act, the Ministry for Regional Development (hereinafter referred to as 'MRD') has already in 2020 established the basic framework for the digitalisation of the building code and spatial planning (hereinafter referred to as 'DBCSP') with the introduction of the digital technical map of the Czech Republic, including the Information system of the digital map of public administration under the responsibility of the Czech Office for Surveying, Mapping and Cadastre. The update of the Strategy includes synergies of BIM within these plans, including the preparation of the gradual automation of the permitting of construction plans.

In the development of the national infrastructure for spatial information (hereinafter referred to as

[2] See Resolution of the Government of the Czech Republic No. 1087 of 21 December 2022

'NIPI'), the Ministry of the Interior (hereinafter referred to as 'MoI') prepared a draft bill on the NIPI approved by Government Resolution No. 636 of 19 July 2021 and subsequently a new strategy for the development of infrastructure for spatial information in the Czech Republic after 2020 adopted by Government Resolution No. 1014 of 12 November 2021. Also, in connection with the implementation of Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance, and amending Regulation (EU) 2018/1724 (DGA – Data governance Act), a draft bill on public sector data governance was approved by Government Resolution No. 576 of 16 August 2023. The update of the Strategy reflects the future development of the NIPI, now under the responsibility of the Digital and Information Agency (hereinafter referred to as the 'DIA'), for the use of built asset information models to support the agenda of public administration and other entities.

In relation to the digitisation of the construction sector in the context of the transition towards a sustainable and resilient construction ecosystem and built environment, the European Union, through the European Commission, is organising and supporting a series of initiatives under the umbrella of the 'Transition pathway for construction' strategy released in March 2023. The strategy provides an in-depth analysis of the challenges facing the ecosystem and helps stakeholders and policy makers identify areas for improvement. This paves the way for a resilient, green and digitally advanced industry, conditioned by the use of BIM, including the openBIM strategy.[3]

National BIM implementation strategies and initiatives in EU and non-EU countries focus on deepening the use of international standards and norms issued during the implementation of the original Strategy. Their outputs provide concrete findings on which the Strategy update draws to facilitate further action.

In the first place, it is the application of the international technical standards ČSN EN ISO 19650 series Organisation and digitisation of information about buildings and civil engineering works including building information modelling (BIM) – Information management using building information modelling. Similarly, other standards and technical norms are applied, for example, in the areas of data dictionaries, classification systems, level of information needs and information requirements, or templates for properties of construction objects, including the related area of construction products.

The reason for updating the original Strategy is also the application of the concepts of open data formats at international level, services and processes for the creation, management and exchange of information, known as openBIM. The buildingSMART international association, represented in most EU member states and from 2021 also in the Czech Republic, is dedicated to its development.

Other reasons for the update stem from the implementation of the original Strategy to date, the outputs of its pilot projects, as well as other projects implemented in the private and public sphere. In addition to the proven original principles and a number of implemented outputs of the original Strategy, the update enables reflection of new trends, changes and experience arising from the domestic and international context. Finally, the reason for updating the formal framework of the original Strategy document is the relevant methodological recommendation for the preparation of public strategic and implementation documents in the Czech Republic.

[3] See the openBIM strategy explained in more detail in Chapter 6.2.7.; it is a Strategy based on the interoperability of individual technical solutions (SW) and the openness of acquired systems so that individual data can be accessed through third-party SW tools/systems without the need to purchase a specific licence.

3 INFORMATION MANAGEMENT AND MODELLING OF INFORMATION ABOUT THE BUILT ENVIRONMENT

3.1 Information management using building information modelling and its benefits

Collaboration between participants involved in construction projects and in construction management is central to the effective preparation, implementation and operation and use of built assets. Organisations are increasingly working on new collaborative environments to achieve higher levels of quality and greater reuse of existing knowledge and experience. A significant benefit of these collaborative environments is the potential to effectively communicate, reuse and share information and reduce the risk of loss, contradiction or misinterpretation.

A significant amount of resources are currently consumed in correcting unstructured information or mismanagement of information by untrained personnel, in solving problems resulting from uncoordinated implementation team effort, and in solving problems associated with the reuse and re-creation of information.

The standard ČSN EN ISO 19650 series provides recommendations for all participants within an information management system including information exchange, recording, version management and organisation. It applies to the entire life cycle of any built asset, including strategic planning, initial design, technical preparation, investment preparation, documentation, construction, day-to-day operation, maintenance, refurbishment, repair and end-of-life.

For the purposes of this document, the important terms associated with information management are:

- **information** – reinterpretable representation of data in a formalised manner suitable for communication, interpretation or processing; note: Information can be processed by humans or automatic means [EN ISO 19650-1, 3.3.1],
- **information requirement** – specification for what, when, how and for whom information is to be produced [EN ISO 19650-1, 3.3.2],
- **built asset information model** (IMS) – shared digital representation of the physical and functional characteristics of built assets or their parts used for the investigation of their properties and for specified purposes, including the digital built asset model(s) (DiMS), documents and documentation associated with all phases of the built asset life cycle; [CSA, built asset information model and existing documentation],
- **project information model** (PIM) – information model related to the preparation and execution phase of a construction project; Note 1: During the project, the project information model can be used to convey the design intent (sometimes called the design intent model) or the virtual representation of the asset to be constructed (sometimes called the virtual construction model); Note 2: The abbreviation is from project information model in English, [ČSN EN ISO 19650-1, 3.3.10, modified – 'delivery phase' replaced by 'preparation and execution phase' to ensure compliance with Czech legislation],
- **asset information model** (AIM) – information model related to the operational phase of a construction project, information model related to the operational phase of a construction project; note: The abbreviation is from asset information model in English, [ČSN EN ISO 19650-1, 3.3.9],

- **digital built asset model** (DiMS, built asset model) – a comprehensive part representing the spatial arrangement and characteristics of the built asset, its structures and elements in a structured form; Note 1: the comprehensive part represents a structured and object-oriented representation of the built asset or its part, containing representations of individual construction objects with their properties and graphic form necessary for the required representation, usually created at the design stage by the appropriate software tool; Note 2: DiMS, as parts of IMS, are differentiated because of the possibility of precise specification of information requirements, use of buildingSMART IDS and storage of the resulting information in the part of the built asset information model in the structure according to the IFC data model; [CSA, Draft paragraph text of the Act on the management of information on built asset, built asset information model and built environment model, and on amendments to certain acts],
- **information container** – named persistent set of information retrievable from within a file, system or application storage hierarchy and consisting of structured and unstructured data and meta data stored together in a single computer file, including subdirectories and informati on files; note: The original definition is based on the single-purpose context of using an information container within a CDE and the replacement of the word 'file'. In this context it may be a separate document and the definition is not appropriate for further data processing purposes, [EN ISO 19650-1, 3.3.12, modified – definition added to ensure consistency with the technical standards EN ISO 21597 series],
- **building information modelling** (BIM) – use of a shared digital representation of a building to facilitate design, construction and operation processes to form a reliable basis for decisions; [EN ISO 19650-1, 3.3.14, modified – the name 'built assets' has been changed to 'buildings'; Note 1 to the entry has been removed],
- **common data environment** (CDE) – agreed source of information for any project or building for collecting, managing and disseminating each information containers through a managed process, [EN ISO 19650-1, 3.3.15, modified – the word 'asset' has been changed to 'building'],
- **level of information need** – framework which defines the extent and granularity of information (meaningful data), [EN ISO 19650-1, 3.3.16, modified – 'meaningful data' added],
- **construction object** – any part of the perceptible or conceivable world that is of interest in the context of the construction process, note: There are properties associated with a built asset object. Example: built asset entity, built asset ensemble, built asset complex, built asset element, built asset structure, room, built asset product, element of technical equipment of buildings, fire compartment; [ČSN ISO 12006-2:2017, 3.1.2, modified – term modified for the needs of the DSS and to ensure compliance with the set of technical standards ČSN EN IEC 81346 (ČSN ISO 81346), definition extended by the original definition for 'object', example added],
- **construction data standard** (DSS) – agreed geometric and alphanumeric information about individual elements in a built asset model specified for specific purposes of use, [CSA, construction project data standard architecture concept, modified],
- **information modelling of built environment** (modelling of information about the built environment) – the use of shared digital representation of buildings, facilities and other objects created by people (artificial environment) and objects influenced by their activity or influencing their activity (natural environment), in mutual relationships and located in the territory intended for creating a reliable basis for decision-making
- **built environment information model** – digital representation of physical and functional characteristics of the built environment and other purpose–grouped information about the site, built assets, relationships, constraints and processes related to the built environment,
- **CAFM** (computer-aided facility management) – software for the management and operation of real

estate, for the management, automation support of certain processes to support facility management,

New strategies will be anchored in national annexes to the relevant international standards.

Building information models are structured sources of information needed for decision making throughout the life cycle of built asset forming the built environment. Information models can contain structured and unstructured information. Examples of structured information include geometric models, tables and databases. Examples of unstructured information include documents, video clips and audio recordings.

The use of information modelling and information management throughout the life cycle of built asset usually leads to savings in human and natural resources, including time and funds. In particular, the following benefits are stated:

- effective involvement of all participants in the construction project, coordination of the project team, promotion of cooperation,
- coordinated project development with high quality standards, design optimisation,
- facilitating work with alternative designs, engineering analysis,
- collision detection before construction,
- facilitating the coordination of activities using information in the built asset information model,
- reduction in the amount of repairs and rework and the associated savings in materials and resources,
- better control over the construction site during the implementation, better logistics management, health and safety, quality control,
- the possibility of simulating different scenarios,
- visualisation in the planning phase,
- automating the extraction of the required information from the model and the use of models for management, maintenance and other issues related to the operational phase of the built asset life cycle.

3.2 Modelling of information about the built environment and its benefits

In order to fully evaluate the information generated during the preparation, implementation and operation of individual construction projects or their complexes within the digitised agenda of public administration and other entities, it is necessary to standardise the process of modelling information about the built environment as part of eGovernment services. Standardisation will ensure the creation of a base model of the built environment, which will be created by integrating spatial information including data generated through building information modelling using a unified technical and methodological framework.

The development of this framework will take into account European initiatives, such as the "Common European Framework for Digital Building Logbook", which is intended to ensure that data and information from individual EU member states is seamless, i.e., that it cannot only be used for decision-making and policy-making in the member state concerned, but also at EU level. The ambition is to create a common repository for all building-related data, or a central access point for verified and trusted building data.

The information model of the built environment not only enables the perception of each built asset separately, but to see it in relation to other built assets, including transport and technical

infrastructure networks, or to the surrounding public space. Standardisation of the modelling of information about the built environment will enable the creation and use of purpose-built supplements to the basic built environment model in the future to support other public agenda and ensure the creation of an appropriate sub-infrastructure of the national infrastructure for spatial information (NIPI).

4 VISION AND GLOBAL OBJECTIVES OF THE STRATEGY



Illustration 1: Continuity of the main parameters of the strategy

The introduction of information management with the use of building information modelling is of similar importance for the construction industry as the Industry 4.0 initiative for other sectors and is a prerequisite for the digitisation necessary for the application of modern methods of preparing, permitting and execution of construction projects and their use and operation to increase productivity and process quality. The purpose of information management is to improve the exchange of information to achieve more effective communication, collaboration and support in decision-making throughout the life cycle processes of built assets. Within the built environment, the management of information about built assets will enable their use to support agenda of public administration and other entities.

Setting the vision of implementation of the BIM method in the Czech Republic takes into account the general efforts to optimise the construction industry and the built environment through digitisation:

The vision of the BIM strategy is to use the standardisation of management and modelling of information about built assets and the built environment to digitise related processes.

Due to the strategic importance of the construction industry and the built environment, their digitisation conditions the societal development expressed by the global objectives (GC) of the Strategy, which are:

- **GC1 – Optimal management and development of the built environment**
  The built environment provides conditions for people to live, work and recreate and for businesses to operate. Its optimal state and necessary development have been an important goal throughout human history. Modern procedures, including digitisation and information management, enable further streamlining of the management of the built environment by public and private entities, including the planning and implementation of its development.

- **GC2 – Effective preparation and implementation of strategic investments**
  In the current global changes and trends, the Czech Republic also makes its further growth and international competitiveness conditional on necessary strategic investments. Whether they relate to transport, energy and data infrastructure, housing provision or education development, the effectiveness of these investments will also depend on the enhanced availability of information both in the preparation phase and in the subsequent implementation and management of the acquired assets.

- **GC3 – Productive construction industry and its supply chain**
  The productivity of the construction industry depends on efforts on the part of designers, contractors or manufacturers of construction products and materials, but also on improvements in public administration processes, including permitting processes. Achieving a productive construction industry is inconceivable without the digitisation of its processes, including the standardisation of information management. This also applies to future directions including robotics and automation or modular construction.

- **GC4 – Efficient management and maintenance of buildings and infrastructure**
  Due to the nature of the life cycle of built assets and facilities, including buildings, transport and infrastructure networks or production and processing units, ensuring effective management and maintenance is a key factor in the efficiency of owners and operators. This efficiency cannot be further increased without the application of digital processes and tools, for which the implementation of information management is essential.

- **GC5 – Rational response to new challenges and demands**
  The growing awareness and emphasis on the sustainability of the further development of human society with respect to the Earth's resources and the environment is leading to new challenges and requirements for the construction and modernisation of the built environment and its components. In addition to the use of new procedures or materials, these trends, partly resulting from our international commitments, require a rational approach, for which digitisation and information management are essential.

- **GC6 – Modern and accessible services for citizens and businesses**
  Among the important obligations of the state towards citizens and businesses is the gradual implementation of digital public administration services that will meet the requirements of the 21st century. Life situations and business activities and decisions related to construction projects and the built environment undoubtedly require such services, and the development of digitisation of the construction industry will be crucial for them as part of the development of eGovernment.

Despite the significant diversity of these global objectives and the different ways to achieve them, the common denominator and the necessary condition for further progress is the stated vision of the Strategy, which is further refined by the definition of its strategic areas and objectives.

5 STRATEGIC AREAS AND STRATEGIC OBJECTIVES

The implementation of the Strategy is set out in the Implementation plan of the Strategy (hereinafter referred to as the 'Implementation plan'), whose measures are assigned to strategic areas and strategic objectives, the combination of which creates a synergistic effect.

5.1 Strategic areas

Given the focus on supporting information management throughout the built asset life cycle and its use in other public administration and private sector agenda, the Strategy focuses on the following three strategic areas (SO):

- **SO1 – Information management for optimising the preparation and execution of construction projects**
  Within this area, measures focus on identifying and managing the information needed in the planning, design and execution phases of construction projects. This area also includes the permitting of construction projects or the selection of contractors. This phase is completed with the approval and handover of the built asset for use.
- **SO2 – Support for the digitisation of management and maintenance for efficient use and operation of built assets**
  Measures in this area focus on the definition of information requirements, which are based on the outputs of strategic area SO1 and form the basis for the use of information management in the use and operation phase of built asset.
- **SO3 – Support for the digitisation of agenda related to built assets and the built environment**
  This area includes measures aimed at the use of information on built assets in other agenda of the public administration and the private sector through the systems and processes of eGovernment of the Czech Republic using the national infrastructure for spatial information.

5.2 Strategic objectives

The strategic objectives (SC) are derived from the needs and requirements for the effective implementation of information management in the strategic areas mentioned above. Specific measures are set out in the Implementation plan for the following ten strategic objectives:

- **SC1 – Creating a legal environment**
  Creating a legal environment has been one of the key objectives of the BIM strategy since the beginning of its implementation. Given the development of digitisation in society and in public administration in the past period, the areas of preparation, implementation, use and operation of built assets have been extended to support other public and private agenda.
- **SC2 – Establishment of an education system, promotion of further education and awareness raising**
  The development of education and awareness is a prerequisite for digital transformation in any field, and this is doubly true for the construction industry given the state of its digitisation. The BIM strategy has been addressing this area for a long time and, based on the experience to date, it further specifies this objective with relevant measures. The objective relates to all three strategic areas.

- **SC3 – Implementation of standards, technical norms, terminology and ontology**
  Internationally and in the Czech environment, standardisation is one of the main objectives in the implementation of information management. In addition to the current advanced state of the art, international standardisation is still developing, including the adoption of other technical standards with the need for their localisation and implementation. Similarly, further emphasis is needed on standardisation of terminology, including ontological contexts within the construction industry, but also across the eGovernment sector. This objective of the Strategy primarily relates to the first two strategic areas, supporting the digitisation of eGovernment-managed agenda and services.

- **SC4 – Creating and providing support for the development and use of the construction data standard**
  Data standardisation is necessary to ensure interoperability of information and data, information systems or specific applications and tools, down to processes and their management. The implementation of the construction data standard is based on the basic process of information management, creating information requirements and exchanging information in digital form. A prerequisite for the further application of the construction data standard is the wider implementation and development of initial dictionaries of terms and data dictionaries. The objective is primarily intended for the first two strategic areas, but it is also a prerequisite for the digitisation of agenda in general.

- **SC5 – Development and implementation of standardised methodologies**
  The methodologies developed and published within the framework of the implementation of the Strategy are aimed at supporting the implementation of information management mainly in public contracting organisations, but their use is not limited. Their main areas of focus include the digitalization of existing structures, public procurement and its contractual framework, the establishment of a common data environment, the support of SMEs or modelling for selected uses, the updating of a set of existing methodologies and the establishment of rules for the exchange of information that cannot be housed within the CDE solution; these are specifically specified in the relevant descriptions of the actions of the Implementation plan. This objective applies to all three strategic areas.

- **SC6 – Ensuring a link between BIM and DBC, including documentation and permitting of construction projects**
  With the distribution of competences in the construction industry across several sectors, it is necessary to also ensure mutual coordination and cooperation in the area of digitisation of this sector. Specifically, at the key stage of permitting of construction projects, the aim is to ensure a link between BIM and the simultaneously prepared digitisation of the building code (hereinafter referred to as the 'DBC'), including a link between implementing regulations. It is then essential to clearly define the relationship and procedures for preparing project documentation using the BIM method. The objective primarily focuses on the first strategic area, namely the preparation of construction projects.

- **SC7 – Ensuring a link between BIM and NIPI**
  The progressive implementation of the national infrastructure for spatial information also includes the use of data and information generated in connection with the application of BIM, including making spatial information available to the public administration to increase the efficiency of construction project preparation. It is therefore a common interest and goal of the Strategy to contribute to ensuring such a link not only by cooperating in the preparation of the legal

environment. The objective concerns both the strategic area of digitisation of agenda and the preparation of construction projects.

- **SC8 – Validation of standards and methodologies in pilot projects**
  The only practical way to verify the prescribed standards and methodologies is to test them in real processes and procedures, i.e., through pilot projects. The common goal to ensure successful implementation of the Strategy related to all strategic areas is therefore the continuous use of pilot projects as a condition necessary for achieving quality outputs.
- **SC9 – Support for research, development and innovation, international cooperation and funding**
  In addition to specifying particular measures for further implementation, the implementation of the Strategy to date has brought a broader understanding of the impacts and contexts that require further efforts to understand and evaluate. This objective is aimed at verifying the possibilities of support for research, development and innovation activities. Supporting international collaboration will then ensure that further experience is gained, as well as the opportunity to share our knowledge and influence activities that ultimately impact our efforts. A monitoring measure and proposals for financing BIM implementation are aimed at facilitating funding. The objective is focused on all three strategic areas.
- **SC10 – Creating the basic model of the built environment**
  The standardisation of modelling of built environment information as part of eGovernment services will be implemented using the built environment information model consisting of the basic built environment model and its supplements. The basic built environment model will contain fundamental data on built environment objects representing the entire national territory. Its preparation and implementation are served by this objective, which focuses on the area of supporting the digitisation of agenda related to built assets and the built environment.

6 BACKGROUND TO IMPLEMENTATION OF INFORMATION MODELLING, BUILT ASSET INFORMATION MANAGEMENT AND BUILT ENVIRONMENT INFORMATION MODELLING

6.1 International development with a focus on Europe

At the European level, there is significant support for the digitisation of the construction industry, including the implementation of BIM by the European Commission, also in relation to the emphasis on sustainability and resilience of the construction industry and the built environment, including adaptation to climate change. EU member states have taken different approaches to the implementation of BIM, but in most countries there is at least a government strategy to promote it. The European Union is supporting the implementation of BIM in member states through the EU BIM Task Group, supported by the European Commission. In 2017, the EU BIM Task Group already produced a guide to support the adoption of BIM by the European public sector.

The possibility for EU member states to apply the legal requirement for the use of BIM in public procurement is embedded in Article 22 of Directive 2014/24/EU of the European Parliament and of the Council on public procurement, which provides that in the case of public works contracts and design contests, member states may require the use of specific electronic tools such as electronic graphical programs for construction information and similar tools, which is transposed into the legal system of the Czech Republic by Act No. 134/2016 Coll., on public procurement, as amended.

6.2 Development in the Czech Republic

6.2.1. Private sector – investor, manufacturer of construction products, designer, contractor

Within the private sector, the BIM method is increasingly demanded by investors who are aware of its benefits in the preparation, execution of construction and, especially, in the management and maintenance of construction projects. The transfer of documents and sharing of data using a common data environment is already routine for many investors, as is the continuous monitoring of construction progress and monitoring of changes during construction using the built asset information model, or part of it, the so-called project information model (PIM).

As the BIM method is increasingly demanded by investors, there is also a growing shift on the part of designers from creating documentation in the traditional way to creating documentation using the BIM method. It can be said that after the first experience, designers stay with this method and try to develop it further and find other ways to help them to make their work more efficient (i.e. to save time spent on creating design outputs and then utilise that time on designing and, thus, finding the best possible solution). On the designers' side, there is a clear benefit of the BIM method in the area of coordination of trades, preparation of documents for construction budgets, and a significant reduction of errors and inconsistencies in projects, as well as a significantly more efficient incorporation of changes in client requirements into the project.

Contractors are currently primarily using the BIM method for more efficient planning and coordination of construction, preparation of documents for guiding earthmoving machines, and additionally also pilot attempts to use the building information model for robotic construction or 3D printing of buildings. There is a clear effort to digitise administrative processes within the construction and use CDE for data storage and sharing, whether it is electronic approval of various documents and changes, or preparation of documents for electronic invoicing and other activities.

In general, there is a clear transition to the BIM method in the private sector, and this transition is independent of the preparation of documents, standards and laws by the state. However, thanks to the forthcoming standardisation steps, it is then possible to achieve some standardisation in the private sector as well. In general, it can be assumed that standardisation by the state will also be useful for the private sector. It is more efficient for all participants to use one standard (even with minor modifications) than to implement a different standard for each project.

6.2.2. Original BIM strategy from 2017 and its outputs

Based on the information on the implementation of the original Strategy for the implementation of the BIM method in the Czech Republic continuously submitted to the government, this original Strategy offers the construction industry a clearly formulated strategy for the development and digitisation of processes so that other entities involved in the digitisation of related public agenda can naturally follow. It is the process of creating, using and managing information about built asset throughout their life cycle. The implementation of this method will speed up and improve the process of preparation, implementation and operation of construction projects and save costs. The aim of the BIM strategy is to propose a procedure, including recommended measures, to enable this method to be commonly and effectively used in the Czech Republic.

In accordance with the schedule set out in the Annex to Government Resolution No. 682/2017, the original BIM strategy included 38 measures from its inception, focusing on 7 thematic areas: basic organisational and technical measures, public procurement issues, permitting processes, NIPI, education and pilot projects. The update of the schedule by Government Resolution No. 41/2021 extended the original BIM strategy by two new measures. It therefore includes a total of 40 measures, some of which have already been implemented.

Based on the fourth information on the implementation of the Strategy for the period from September 2021 to June 2022, activities in this period were mainly focused on the verification of supporting documents and the use of the BIM method in pilot projects, strengthening awareness of the BIM method through education and training of public administration employees, and continued activities on the preparation of important legislative documents.

As part of the validation of supporting documents in pilot projects, selected procedures for using the BIM method were tested, monitored and assessed, i.e., to what extent these procedures are applicable in the public administration environment with its special features. In particular, methodologies related to the implementation level and how to approach large-scale change and project preparation were tested.

The course of feedback collection thus far demonstrates the fact that as the level of interaction and involvement in concrete use in practice increases, the understanding of the topic increases proportionally, so does the meaningfulness and effectiveness of the feedback, but also the willingness to share it. This implies that much more intensive work with the target group is required when

deploying processes that are very new (or different) from existing ones.

The feedback from the pilot projects was used to update all the processed outputs to even more closely reflect the practice and current development of standards and technologies and to create optimal conditions for the implementation of the obligation to use the BIM method for above-threshold public procurement.

A lot of attention was paid to the media campaign and awareness raising related to the BIM method and its benefits. In addition to sharing experience with the use of the BIM method among the professional public, the communication was also extended to strengthen the awareness of this method among the general public.

6.2.3. Contracting authorities

6.2.3.1. Building construction

In the field of building construction, the application of the BIM method has been developed at all levels of public administration in the form of pilot projects during the implementation of the original Strategy. During the implementation, the outputs of the original Strategy were used and the actual needs were continuously refined. The findings are used to update the Strategy. The main topics were:

- information needed and data structure,
- public contracts and their contractual terms,
- common data environment and its use in relation to other information systems.

6.2.3.2. Transport infrastructure

In the past, the state fund for transport infrastructure has ensured the preparation of a number of methodologies and regulations that have facilitated the implementation of the BIM method into transport infrastructure projects. These documents were updated by SFDI on the basis of the projects implemented. The update concerned the following documents:

- specification of building information modelling (BIM) for transport infrastructure - Data standard for individual design stages,
- BIM protocol methodology for FIDIC contract standard,
- methodology for selecting a common data environment (CDE),
- BIM execution plan (BEP) requirements for transport infrastructure.

The SFDI in cooperation with the Ministry of Transport and investor organisations (Road and Motorway Directorate, Railway Administration and Directorate of Waterways) organised a number of intra-ministerial activities and projects in cooperation with the contractor sector (so-called pilot projects), and a number of these projects have already been completed or are currently under implementation. As the Ministry of Transport has been engaged in pilot projects for 7 years, it does not foresee the implementation of further projects, even in the framework of the implementation of this strategy. The Ministry of Transport has already gone beyond the strategic proposals of this Strategy in the implementation of the BIM method and now plans to move from the pilot project phase to the actual implementation of transport infrastructure structures using the BIM method. For this reason, the strategic provisions of this Strategy relating to pilot projects do not apply to the Ministry of Transport.

As mentioned, the Ministry of Transport has already implemented pilot projects for which public funds have been spent. At the same time, it is planned to continue to spend these funds on the further

gradual development of systems supporting the BIM method. This strategy aims to take measures to avoid economic losses from costs sunk in the transport sector. As part of collaboration, every effort will be made to avoid this and to comply with the 3E economic principle. Based on the above, the SFDI issued a 'BIM protocol methodology for the FIDIC contract standard', and it is necessary to state that FIDIC contract terms are used within the Ministry of Transport. Therefore, the provisions of the Strategy on the preparation and implementation of other contract terms and conditions of public procurement do not apply to the transport sector. The transport sector still expects to continue with the already set standard.

6.2.3.3. Technical infrastructure

6.2.3.3.1. Status of the BIM method in the gas industry

The gas sector is not indifferent to the BIM method, although most gas projects will probably not be subject to the obligation to use BIM, as the majority of projects in this area are not financed by public funds. However, given the size of their networks, gas distributors in particular feel the need to streamline the handling of information about their assets and to not only use this information for management and maintenance, but also for planning renewals within the gas network. Under the auspices of the Czech Gas Association, a group has been formed which, among other things, is working on a common construction data standard (hereinafter referred to as 'DSS'). The DSS, which is now being completed, is considered by gas engineers to be the cornerstone of the BIM method. The digital building code, which counts on the use of BIM models, also seems to be an interesting use of the BIM method for gas producers. The gas companies are now in the pilot project stage to test the use of BIM for their own internal purposes. Another complication of the BIM method is still the lack of a BIM software tool that can work with the special requirements of the gas network. The pilot projects are therefore in the field of technological units rather than in line pipelines, which have their own special features. However, it seems realistic that even these technical problems will soon find their solutions, and together with the completion of the DSS nothing will prevent the deployment of the BIM method on a wider scale.

6.2.3.3.2. Status of the BIM method in the power industry

Energy companies have tested the basic principles of the BIM method on the first pilot projects, which were implemented by internal capacities. They are continuously involved in the co-creation of a construction data standard for the industry as part of expert teams. Furthermore, the pilot projects will continue with the creation of the built asset information model and its digital built asset model.

6.2.3.3.3. Status of the BIM method in water management

Companies are already tendering above-the-threshold contracts using the BIM method. As part of the selection of the designer, they require that the documentation should be prepared using the BIM method. If they do not have a project prepared by the BIM method and they issue a public tender for a general contractor, they require that as-built documentation should be prepared using the BIM method. The implementation of new projects is already mostly carried out in CDE. Thus, everyone trials the BIM method on pilot projects and then shares their experience within the expert team. Thanks to the implementation of pilot projects, the need for a uniform construction data standard naturally arises.

6.2.4. Digitisation of the building code and spatial planning

Based on the public presentation of the Ministry of Regional Development, digitisation of the building code is one of the main priorities of the Ministry of Regional Development and the Programme statement of the Government in the field of housing, construction law and spatial planning. In accordance with the Building Act, the Ministry of Regional Development has initiated steps to implement the DBC, with the following main objectives:

- improve access to information for the correct and complete preparation of project documentation and introduce tools to clarify the requirements for project authorisation, both on the part of the builder and the building authority,
- simplify the submission by electronically entering project documentation and documents from the authorities concerned into the system,
- achieve better readiness of plans and simplify the control of required documents, both on the part of the builder and the building authority,
- ensure the possibility of submitting project documentation in electronic form to the central system, thus enabling simultaneous assessment of the project by the authorities concerned before the start of the permit procedure,
- carry out one permit procedure for the submitted plan.

The MRD primarily plans to achieve the aforementioned objectives by creating a set of information systems, such as the agency information system of building code (hereinafter referred to as 'ISBC'), the register of authorised persons in construction (hereinafter referred to as 'EAOS') and other supporting records and components that serve to ensure the paperwork concerning the building regulations under the Building Act.[4]

The National geoportal for spatial planning project will build a comprehensive information system that digitises the spatial planning process. It will ensure that information on the discussed and valid spatial planning documents is provided in one central place for all. It will also enable the sharing of this data across the whole public administration.

6.2.5. Defence and national security

In view of the special nature of built assets for the provision of national defence and security, the obligation to use BIM will not apply to built assets under the jurisdiction of other building authorities. The decision on the use of BIM in the execution of constructions for the provision of national defence and security will be left to the competence of the relevant organisational units of the state, espe cially with regard to ensuring the protection of classified and sensitive information.

6.2.6. Digital Czechia, DTM and GeoInfoStrategy

The cross-cutting strategic Digital Czechia document, approved by Government Resolution No. 629/2018, covers all the impacts of digitisation on the economy and society. The information concept of the Czech Republic focuses on digitisation in the field of public authority at the national level. It sets out the main objectives in the area of creating public administration information systems and the general principles of their management and operation. This is an area known as eGovernment in the Czech Republic.

The information concept of the Czech Republic, updated by Resolution of the Government of the Czech Republic No. 736/2023, requires the creation of basic services and implementation of a strategy

[4] Programme statement of the Government of the Czech Republic in the field of housing, building act and spatial planning, January 2022, as revised in 03/2023

for data sharing between public administration and the private sector in the form of digital technical maps and other authoritative, widely usable data sources, e.g., based on the use of methods such as BIM. For geoinformation, it states that the aim is to design and implement a data policy, ensure interoperability, eliminate duplication and make spatial information owned by public administration and in the public interest available for user-friendly public services, similar to other reference and authoritative data (e.g. for online applications in building permit procedures).

According to Act No. 200/1994 Coll., on land surveying and on amendments and supplements to certain acts related to its implementation (hereinafter also referred to as the 'Land Surveying Act'), a digital technical map (hereinafter also referred to as the 'DTM') is a database file containing data on transport and technical infrastructure and selected natural, construction and technical structures and facilities, which depict and describe their actual condition, and data on plans for changes to transport and technical infrastructure. The Act further defines a digital technical map of the region, a digital technical map of the municipalityand a digital map of the public administration formed by linking a cadastral map, orthophoto map and digital technical maps of the regions.

The Strategy for the development of spatial information infrastructure in the Czech Republic after 2020 (hereinafter referred to as 'GeoInfoStrategy2020+') is a basic conceptual material of a medium-term nature, which sets out the principles for further development of the national infrastructure for spatial information in the international context until 2027. The NIPI is a set of policies, principles, knowledge, technical specifications, institutional arrangements, technologies, data, services and skilled people used for the effective production, management, updating, use and publication of spatial information and sharing services for spatial information to provide guaranteed public administration services over spatial data. Within the framework of fulfilling the tasks of the BIM strategy, the aim is to determine the conditions and implementation procedure to ensure the usability of data from BIM models for the development of NIPI.

The implementation of the BIM method will also result in the creation of new authoritative data sources that will enable the gradual digitisation of the built environment and whose use is not practical with conventional procedures for the acquisition, management and use of s patial data. The built environment information modelling integration platform as part of the public administration reference interface will enable the use of these new data sources, including their harmonisation and interoperability with previously prevalent sources based on geodetic and geoinformation procedures and rules. An essential cooperating component for the construction and operation of the integration platform for modelling information about the built environment is the so-called System of registration of built assets (hereinafter referred to as the 'SES').

This SES, as discussed in the government-approved GeoInfoStrategy2020+, is intended to form the basic module for integrating data and information about built environment features into the built environment information model in the future. The Ministry of Regional Development, as the coordinator of measure No. 4.2.7 GeoInfoStrategy2020+, assumes that to ensure this role it will be possible to use the so-called System of registration of built assets and plans, which is currently being prepared as part of the digitisation of the building code in the information system of the identification number of the built asset (IS IČS) on the basis of Act No. 283/2021 Coll., the Building Act.

6.2.7. openBIM

According to the 'Transition pathway for construction' strategy issued by the European Commission in March 2023, digitisation is enabled by standardisation. One of the major problems is the incompatibility of different software tools between the parties involved. The openBIM concept enables integration to ensure access and usability of data throughout the life cycle of built assets without relying on specific proprietary tools. Open standards require support from the public sector. Open standards are to be applied to ensure access and control over data, tools and data processes.

The openBIM concept extends the benefits of BIM by improving the accessibility, usability, management and sustainability of digital data in the construction industry. OpenBIM processes can be defined as information sharing that promotes collaboration among all project participants. The openBIM concept facilitates interoperability that benefits projects and built assets throughout their life cycle. It helps to connect stakeholders, processes and data to achieve the goals of execution, operation and maintenance of constructions. The openBIM concept eliminates the traditional problem of BIM data, which is typically limited by proprietary contractors' data formats, discipline or project phase.

The openBIM principles document that:

- interoperability is the key to digital transformation in the construction industry,
- open and neutral standards are used to facilitate interoperability,
- independent quality measures are needed for reliable data exchanges,
- workflows are aided by open data formats,
- flexibility in technology choice increases value for all parties involved,
- sustainability is supported by long term assured interoperable data standards.

7 PRINCIPLES AND CONTEXT OF INFORMATION MODELLING AND BUILT ASSET INFORMATION MANAGEMENT

7.1 Main strategies and their application in the legal environment of the Czech Republic

For the needs of use in the Czech Republic and for a smoother transition to the use of the BIM method, the following Diagram 1 explains the context and data relationships between the existing documentation of construction projects and built objects, including the inclusion of the built asset information model in the current environment: Building information modelling

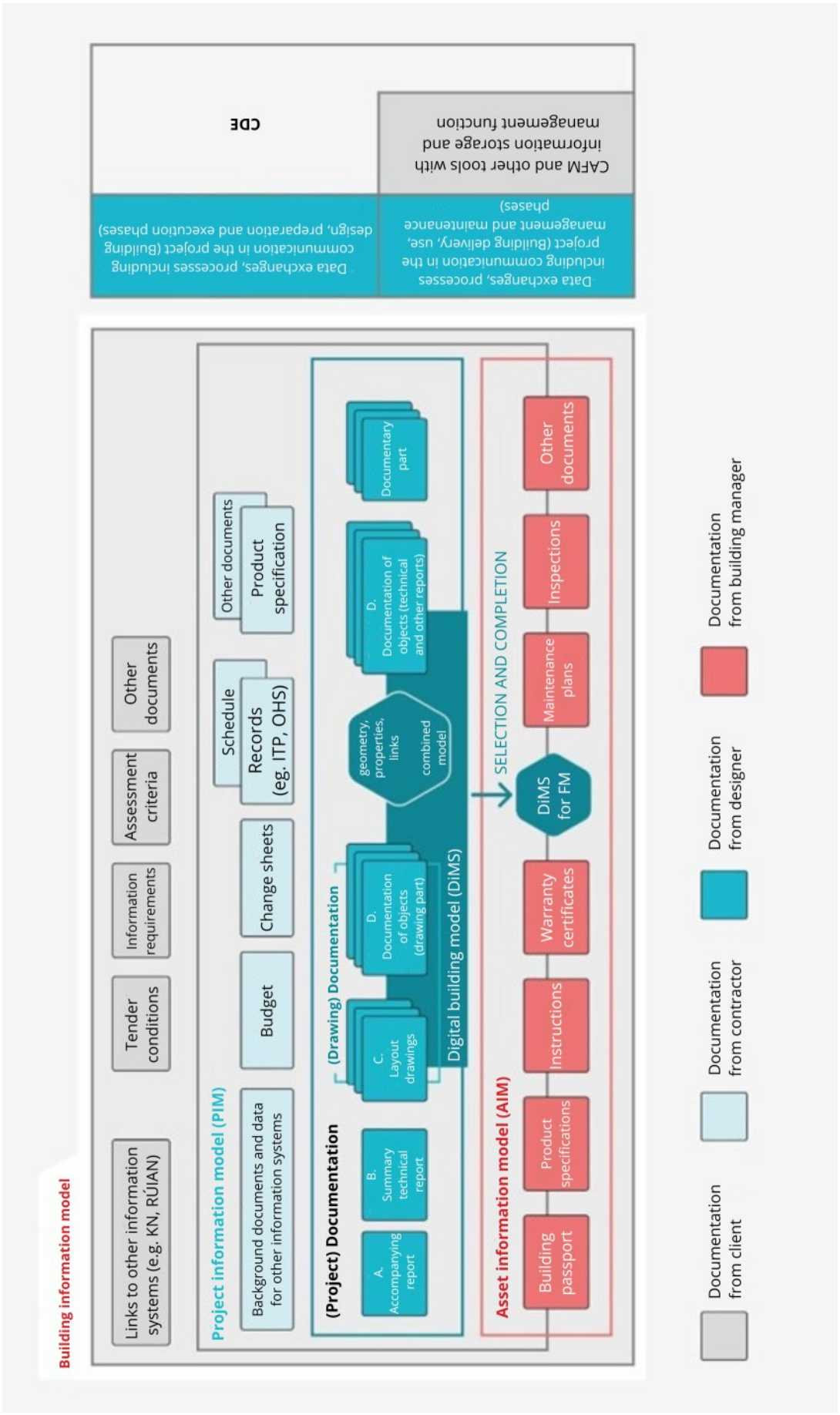


Diagram 1: Building information modelling

Since it is generally necessary to set standards for digitisation, the use of the BIM method is mainly based on technical standards. These mainly cover a range of technical fields and, unlike legislation, there is a clear attempt to harmonise terminology. Therefore, there is now a clear distinction between the terms used in legislation and in technical standards. For the purposes of digitisation, it will be necessary to harmonise to some extent both the regulations themselves and the terminology used, including a clear explanation of the context used. The need for harmonisation of terminology was also recognised in the implementation of GeoInfoStrategy, which also requires a description of the organisational and material support for this harmonisation.

The current legislation essentially only describes the basic requirements for information, mostly in detail that cannot be used directly for digitisation. In addition, for the digitisation and use of the BIM method, aside from a more precise specification of the data itself, it is necessary to complete the basic rules for its transmission, security and archiving, i.e., to specify the processes necessary for information management.

7.2 Specific standards and technical standards

The original Strategy was created at a time when the structure of valid international technical standards dealing with the BIM method had not yet been established. In the 2018-2023 period, standards and technical norms were being gradually developed in the following main areas:

1. **processes** – how to work in projects using the BIM method [the main representative is the technical standards ČSN EN ISO 19650 series Organisation and digitisation of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling],
2. **data model** – data schema and format [e.g. ČSN EN ISO 16739 Data format Industry foundation classes (IFC) for data sharing in construction and facility management],
3. **structure, content and detail of information model** (level of information need) (the main representative is the technical standard ČSN EN 17412/ČSN EN ISO 7817Building information modelling – Level of information need),
4. **classification, data dictionaries** (e.g. technical standards ČSN EN ISO 12006 series Building construction – Organisation of information about construction works, technical standards ČSN ISO/IEC 81346 series Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations, set of technical standards ISO 82045 Document management, ČSN EN ISO 23386 Building information modelling and other digital processes used in construction – Methodology to describe, author and maintain properties in interconnected data dictionaries),
5. **data templates, products and catalogues** [e.g. ČSN EN ISO 23387 Building information modelling (BIM) – Data templates for construction objects used in the life cycle of built assets – Strategies and principles, technical standards ČSN EN ISO 16757 series (Data structures for electronic product catalogues for building services)],
6. **documentation of processes and process maps** – so-called IDM (e.g. technical standards ČSN EN ISO 29481 series Building information models – Information delivery manual),
7. **common data environment (CDE)** – is described as a necessary requirement according to ČSN EN ISO 19650 series, the principles of openCDE (data portability between different CDE systems) are being developed,
8. **information container** (description and creation of data packages according to the standards ČSN EN

ISO 21597 series Information container for linked document delivery – Exchange specification),

9. **manuals and guidelines describing the relationships between technical standards, descriptions of case studies, various recommendations** (CEN/TR documents issued by CEN/TC442),
10. **technical standards developed outside CEN/TC442 using and related to the BIM method** (technical standards related to geographic information, technical documentation, data needed for design, product testing, various types of declarations, statements, environmental impact assessment).
    a. An up-to-date list of published technical standards for BIM is published on the CEN/TC442 website, also in graphical form.[5]
11. **The specific needs of the BIM method in transport infrastructure** are represented by workflows in global coordinate systems as specified by Government Regulation No. 159/2023 Coll. These coordinate systems are further specified by technical standards that allow them to be applied in the IFC interchange format structure and maintain information about the location of the built asset.

7.3 Components and conditions of BIM method use

Every built asset consists of construction products, materials and structures (elements). The digital virtual equivalent of the physical built asset is the built asset information model. The text of the original Strategy assumed that one of the conditions for the use of the BIM method was to build a model of the built asset. During the implementation of its measures in 2018-2023, the BIM method was refined thanks to international developments, and in the specification of information management it is necessary to distinguish between specification of information and specification of processes.

7.3.1. Specification of information

If built asset information models are to fulfil their expected role as an important part of the BIM method and an important source of structured data for other specialised applications (e.g. valuation, scheduling, facility management), they must be sufficiently standardi sed. Without standardisation of input information, it is not possible to create the required interfaces between systems and subsequently offer functionalities that will significantly increase the efficiency and quality of work of specialised application users.

The original idea of using the BIM method only focused on the part referred to as the DiMS built asset model, also simplified as 3D or BIM-model. Based on the current state of knowledge, the entire built asset information model (i.e. the sum of all required information about the built asset) consists of three basic types of information, which are:

- geometric information, defined as a description of the detail and extent of information that can be expressed using shape, size, number of dimensions and location,
- alphanumeric information, a description of the detail and extent of information that can be expressed using characters, digits and symbols or tokens such as mathematical characters and punctuation marks,
- documentation, defined as a set of documents relating to a given subject.

Even different types of information can be interlinked in digital form, but they are stored in different files, in different structures and in different formats, usable in different software applications. For specification of the links, the newly introduced term ‘information container’ is used, which includes this functionality in its technical description.

[5] A graphical map of technical standards for BIM is available for download at https://www.cencenelec.eu/areas-of-work/cen-sectors/construction/.

The DiMS built asset model(s) as part of the overall built asset information model includes significant geometric information linked to the required alphanumeric information. It is precisely because of the inclusion of the required alphanumeric information in the DiMS built asset model that a more precise specification according to the purpose of use is necessary. This leads to the need for a construction data standard described in a separate chapter (see Chapter 7.5). There is no uniform standardisation of the content of the built asset information model within the EU, as regulations and practices vary between member states and are dealt with at the national level. However, the common starting point is the demanded level of information needs. So far, due to the lack of standardisation at the national level of the Czech Republic, it happens that models are required in details that do not correspond to the stage of the construction project.

A conceptual data schema, described by the international standard IFC (Industry Foundation Classes), is used to standardise DiMS built asset models. The standard is being developed by buildingSMART, adopted by the international ISO organisation. The description also includes an exchangeable file format for writing data. The current version of IFC 4.3 not only already covers building constructio n but also infrastructure structures. IFC is part of the Czech system of technical standards as ČSN EN ISO 16739-1. It is necessary to consider the translation of the terminological part of this standard, while respecting other technical standards, into the Czech language so that all participants in the construction process use the same terms and their meanings are clearly defined when specifying certain parameters. The data dictionary, which forms the basis of the construction data standard, also needs to be linked.

In relation to the IFC, it is also worth mentioning the difference between open formats and open data. The IFC format is one of the open formats that can also be used to publish information in open data form, subject to other requirements. As structured information on built assets will be used for important agenda and their processes (e.g. digital permitting processes, national infrastructure for spatial information, built environment information modelling or public procurement), open data requirements need to be considered with regard to permissible uses, data security and privacy protection.

In addition to the scope and form of the information provided, the conditions of access to public and non-public parts should be addressed in the application of open data concepts, services and processes for the creation, management and exchange of informa tion, based on an assessment of the processes used, e.g., by categorising data, users and the necessary access measures.

7.3.2. Specification of processes

For the purpose of specifying the processes of building information management, the technical standards ČSN EN ISO 19650 series Organisation and digitisation of information about buildings and civil engineering works including building information modelling (BIM) – Information management using building information modelling (hereinafter also 'ISO 19650') is used, which also specifie s the methods of handling information. ISO 19650 is intended for all persons and organisations involved in the entire life cycle of built assets, as each of them requires or produces information during the life cycle, regardless of its form (models, tables, drawings and other documentation, records, certificates, technical reports, etc.).

The information management recommendations and requirements in ISO 19650 are based on the

joint work of clients, contractors and their subcontractors, and all these parties are to be involved in its implementation. Its process is intended to incorporate different perspectives of information management:

- when specifying information requirements,
- in planning the transfer of information,
- in the information transfer process.

Information management perspectives are to be determined on a case-by-case basis, but the four perspectives described in Table 1 are recommended. Depending on the nature of the asset (from the perspective of Czech legislation and construction practice, the term asset represents a built asset as a result of the construction process) or the project, other perspectives may be useful.

Perspective	Purpose	Example of outputs
Asset owner's perspective	Establish and maintain the purpose of the asset or project. Make strategic business decisions.	Business plan Evaluation of strategic assets portfolio Life cycle cost analysis
Asset user's perspective	Identify the real needs of the user and ensure the required quality and capacity in the resulting asset.	Project assignment AIM PIM Product documentation
Perspective of project execution or asset management	Plan and organise work, mobilise necessary resources, coordinate and manage progress.	Plans, e.g., BIM execution plans (BEP) Organisational charts Definition of functions
Perspective of the whole company	Ensure that community interests are taken into account throughout the life cycle of the asset (planning, preparation, implementation and operation).	Political decisions Zoning plans Building permit, other permits
NOTE: The examples of outputs are relevant to each individual perspective and do not indicate ownership of the outputs or identify who is doing the work of producing the outputs.		

Table 1: Perspectives on information management – source: Table 1, EN ISO 19650-1

An information requirement is a specification for what, when, how and for whom information is to be produced. The exchange of information is then the fulfilment of an information requirement or a part thereof. Contracting authorities should be aware of what information they require to meet their organisational or project objectives. These requirements may come from their own organisation or from external stakeholders. Contractors/suppliers should be able to describe these requirements to other organisations and individuals for specification or implementation of their work. Information requirements associated with the preparation and execution of the construction are to be expressed in terms of project phases. Information requirements associated with the operational phase should be expressed in terms of foreseeable life cycle trigger events such as planned or reactive maintenance, fire equipment inspection, replacement of equipment components or change of construction management provider.

The asset information model (AIM) and project information model (PIM) are created during the information life cycle. These information models are used throughout the life cycle of built assets to make decisions about assets and projects. Figure 2 (taken from the technical standard EN ISO 19650-1) shows the asset life cycle for the operational and delivery phase (associated preparation and execution of construction) of the assets (green circle) and some asset management activities (points A to C). In addition to the three points illustrated in the figure, verification of intentions should take place through a review of asset performance during the operational phase.

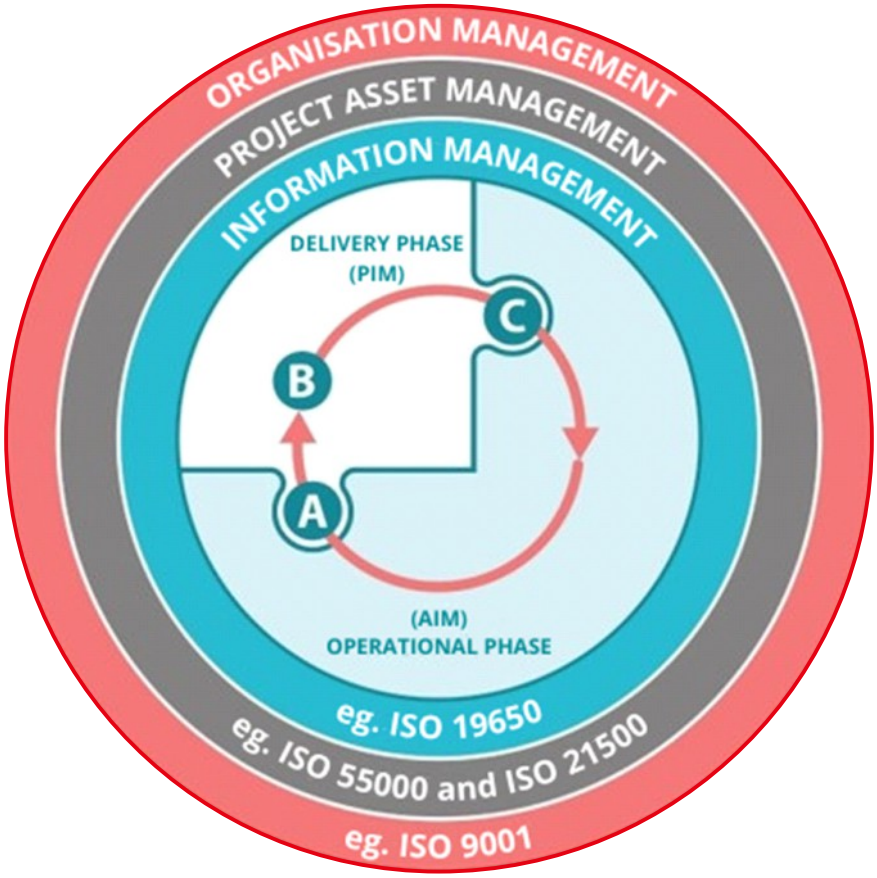


Illustration 2: General life cycle of project and asset information – source: -1

The following assumptions must be taken into account when specifying the level of information needs and how information is to be transmitted:

- purposes of the use of the information transmitted,
- milestones for the transfer of information regarding the transfer of specific information,
- actors who will request information and actors who will transmit information,
- construction objects organised in one or more division structures.

7.3.3. Specification of conditions for the contractual framework

The necessary information requirements, as well as a description of how these requirements will be fulfilled in a particular project or contract, are part of the performance of the corresponding contract and need to be captured as part of the contract terms.

Years ago, the term BIM-protocol came into use to refer to a document supplementing the contract conditions with essential points regarding the application of BIM in a project or contract. It is a document supplementing the contract for work or the tender documentation with provisions necessary for the application of the BIM method in the project or contract. The aim of the document is to inform potential contractors during the tender process what the information needs of the contracting authority are based on, how the required information is to be structured and how it is to be provided. The document also defines how reference information and shared information sources are to be handled and sets out the responsibilities, warranties, obligations and limitations applicable to team members, in particular licensing arrangements governing intellectual property rights in the material provided and outputs delivered.

A BIM execution plan (abbreviated BEP) is then maintained for the duration of the contract (order), in which all relevant information about the project and the resulting information about the construction that is generated as part of the project is maintained.

In this context, it should be noted that the meaning of the term project has shifted. It is not a mere design of built assets, project documentation. The use of the term project adapts to European terminology and refers to a unique process, consisting of a series of coordinated and controlled activities with start and end dates, carried out to achieve an objective that meets specific requirements, including constraints imposed by time, cost and resources [see ISO 10006:2004 (01 0333) Quality management – Guidelines for quality management in projects].

7.4 Introduction to the construction data standard

Article 7.3.1 describes the need for a clear and structured specification of the information to be used throughout the life cycle of the built asset. In the Czech Republic, the common determination of the required information is usually used in the form of an implementing regulation of one of the laws. This is sufficient at a time when most information is provided in the form of documents. However, for data-driven decision making, the structure, content and format of the data need to be described more precisely. Therefore, the implementation of digitisation in the construction industry cannot be achieved without setting uniform rules so that all stakeholders understand each other's requirements for the inputs and outputs of their work. The specification of a construction data standard proved to be the means.

The basic goal is to create a so-called data dictionary, i.e., a database of types of sets of built assets, built asset entities, systems, spaces and zones, built asset elements and structures and elements of technical equipment of built assets, collectively called 'construction objects', and properties that are meaningful to record about these construction objects, or whose values need to be known during at least one of the phases of the life cycle of this type of built asset.

At the same time, using the data dictionary items, consolidated data templates are created, which represent the necessary properties of the construction object organised in groups of properties for effective exchange of information between the individual actors of the process, e.g., between the contracting authority and the contractor, or between the builder and the building authorities / authorities involved in the building permit procedure.

Modernly conceived classification systems are not only used for the classification of individual categories of construction objects, but thanks to the faceted classification method it is also possible to create special sets of properties that need to be known for a given object in the context of other facets of the classification system. Typically, for example, for a built asset product, according to the system it is part of and the function it performs, the nature of the space or environment in which it is installed and the type of built asset or type of premises in which it occurs. All of this contextual information can have a significant impact on what information needs to be recorded or provided about a given construction object at each stage of its life cycle.

A well-prepared data standard must only enable the selection of those properties from the data templates of the construction objects thus created, which are relevant for the selected process participants (actors), the time period (project milestone / event) and the intended purpose of using the currently needed information, by applying the principle of the level of information need.

The use of data templates for creating structured information in the built asset information model (at the current stage of DSS development only for the DiMS built asset model) will ensure that it will be possible to gradually create tools for automated validation of built asset models. Not only for streamlining the transfer of models between the (public) contracting authority and its business partners representing the supply chain, but also for the transfer of models between the builder and the building authority / authorities concerned in the framework of the digital building permit procedure and some other tasks, e.g., in the exchange of information between the owner/operator of the construction and the supervisory authorities in situations where it is necessary to document data on the fulfilment of some of the legal obligations during the operational phase, or during use of the construction project.

For the management, operation and efficient use of such a large data dictionary and a large number of data templates of the construction data standard, it is necessary to have appropriate tools that allow continuous updating of the above database and well-controlled access of a large number of experts responsible for the management of the relevant parts of the construction data standard. Therefore, the Ministry of Regional Development has earmarked significant financial resources from the National recovery plan, allocated for the reform and acceleration of building permit procedures, or their digitisation, which finances the acquisition and management of the data standard, as well as software tools for its management and the development of tools for the validation of built asset information models in accordance with respected international standards.

7.5 Common data environment

The information model of a built asset is actually a set of information containers. A common data environment is used to store these information containers. (CDE – common data environment). It is an agreed source of information for collecting, managing and disseminating information containers through a managed process.

The principle of collaborative work based on information containers is mainly that the authors in each container create information, subject to intellectual property agreements, which they manage and control. They only use approved information from others as sources for their work, through information containers managed by them. The CDE is provided to manage and store shared information with appropriate and secure accessibility to all individuals or parties required to create, use or maintain the information.

This principle requires that a strategy for structuring the information model into information containers is appropriately set up. The strategy must take into account many aspects, including controlled access to information with regard to its security. Usually, parts of built assets or their systems are subject to one of the classification levels. This strategy must be continuously evaluated and updated, for example, when a new team is involved in creating, using or maintaining information about the built asset.

Information containers representing the built asset information model are not always maintained in one place, especially for large or complex assets (e.g. buildings) or projects. Working together based on information containers allows workflows in a common data environment to be carried out across different computer systems or technology platforms.

Each of the computer systems or technology platforms that co-create the CDE must meet the conditions to provide standardised activities in the information management process, create transaction logs about information containers, and maintain records that are systematic and protected against reversible changes. Therefore, each information container managed through a common data environment should have meta data including:

1. A revision code in accordance with the agreed standard,
2. A status code expressing the allowed use(s) of information. The basic statuses are:
    a. work-in-progress status,
    b. shared status,
    c. published status,
    d. archived status.

Sharing the contents of an information container with another stakeholder or entity may take the form of a link, pooling or direct exchange of information. Therefore, the software tools co-creating the common data environment are intended to enable the selection and delivery of the contents of the information container through an open application programming interface (API).

With regard to the above described processes and requirements for the tools co-creating the CDE, it is necessary within the implementation of the BIM strategy or for the enactment of the obligation to use the BIM method to resolve in particular:

- compliance with Act No. 365/2000 Coll., on public administration information systems
- compliance with Act No. 412/2005 Coll., on the protection of classified information and on security clearance, and Government Regulation No. 522/2005 Coll., establishing a list of classified information
- compliance with the legal regulations newly prepared by the National Cyber and Information Security Agency in the field of cybersecurity, or incorporation of the security requirements from these legal regulations into the methodologies and models for the acquisition of CDE co-creation tools and ensuring their long-term proper and secure operation.

7.6 Use cases of the built asset information model

The inclusion of all the information generated about a built asset in a common source on the one hand reduces the risk of losing information during the life cycle of the built asset and the need to re-create it, on the other hand it creates the need to sort the information and assign it different usability options. A purpose-driven approach to information management fulfils such roles.

In addition to specification of the information requirements, assigned responsibilities and applicability, it is also a description of the phase or stage for which the information is relevant. The most common tasks described in the following articles can be selected from the development of the use of information modelling.

7.6.1. Using IMS for creating project documentation

For project documentation using BIM, the most frequent task is the transfer of DiMS built asset models and ensuring the consistency of DiMS with the drawing part of the project documentation. Due to the concurrent processes used in the building permit procedure and the execution of constructions, document-based (2D) drawings are still required according to certain rules for human interpretation. Therefore, it is necessary to create appropriate conditions when specifying the content of the project documentation, to respect the technological development, the way of working in the preparation and execution of constructions and the processes associated with the building permit procedure.

7.6.2. Using IMS for valuation, budgets and schedules

DiMS built asset models are object-oriented (i.e., based on maintaining information and links about real-world objects with defined meaning) and allow reporting on the amount of materials, products and equipment used in a planned construction. In order to use it in the Czech Republic, it is necessary in the first phase to create rules for the way of modelling elements and structures in the DiMS built asset model so that it is possible to automatically create a list of modelled elements and structures with properties as a basis for the bill of quantities. In the future, the next stage of development is the convergence of DiMS built asset model approaches with valuation procedures.

If the model is appropriately structured, it is also possible to simulate the construction process virtually or use the information to create a construction project schedule. The number of tools that use built asset information models will continue to grow.

7.6.3. Use of IMS for the construction project management and use phase (hereinafter referred to as 'FM')

Facility management means the provision and management of support processes for the users of a construction project. Supporting activities are processes that are not related to the core business of the user organisation but must be provided for its proper operation. These are generally activities related to the use, operation, management and maintenance of a construction project. These include, in particular, the registration and management of areas and facilities, inspection and servicing of technical equipment, cleaning services, security, care of greenery, waste management, occupational health and safety, and fire protection.

7.6.4. Use of IMS for transport infrastructure

The specific needs of the BIM method in transport infrastructure are represented by workflows in coordinate systems specified in Government Regulation No. 159/2023 Coll. These coordinate systems are further refined by technical standards that allow them to be applied in the IFC exchange format structure and maintain information about the location of the built asset.

7.6.5. Use of IMS for technical infrastructure

In the case of technical infrastructure, aside from the requirements for information on the location of the built asset identical to the use of BIM in transport infrastructure, special forms of information requirements represented by the needs of geographic information systems (hereinafter also 'GIS') used for the creation and management of DTMs enter the issue.

7.6.6. Use of IMS for transferring information about the territory with geographic information systems and related agenda

In order to communicate between the individual agenda using spatial information and data, it is necessary to specify the transferable information as inputs (documents) on the one hand and as outputs (results) on the other hand in the built asset information models. This will gradually create a data base for various tasks related to modelling information about the built environment. From a technical point of view, it will again be appropriate to use open data models and formats and to exchange information using different coordinate systems according to the intended use.

7.7 Follow-up to international developments

Building information modelling is not only undergoing a rapid evolution in terms of technology and software tools, but also in terms of information requirements and the storage of the actual information and thus the processes involved in the transfer of information. In this context, it is necessary to continuously evaluate developments on the international scene, especially in areas such as:

- information on products used within the construction industry (e.g. in relation to the CPR – Construction Product Regulation),
- providing information to new agenda (e.g. DBL – Digital Building Logbook),
- use of information from new information systems at different levels (e.g. DPP – Digital Product Passport),
- modelling of built environment information (e.g. the European Interoperability Framework and the outputs of the DBL technical study developed for the European Commission, in particular the DBL-Semantic-Data-Model and DBL-Linked-Data-Implementation).

7.8 Ownership, copyright

The sphere of copyright and built asset information models (IMS) is addressed in accordance with the Opinion of the Ministry of Culture of 14 June 2018, on the fulfilment of Task No. 8 – Examination of legal issues of copyright in connection with the implementation of the BIM method, which was established by the Strategy for the implementation of the BIM method in the Czech Republic. The proposed copyright solution is to be included in the BIM protocol, according to which the stakeholders should proceed with the handling of the built asset information model.

7.9 Education and awareness raising

The BIM method will mean big changes for many users – new approaches in working with information, new procedures, but above all a change in thinking. New knowledge and approaches must therefore be reflected throughout the education system, from primary to lifelong learning.

For the purpose of the Strategy, education is divided into five pillars – motivation to adopt BIM on the basis of good practice examples, understanding of terminology in the field of BIM method and its principles, education of experts in the field of BIM, education of pupils and students (primary, secondary and higher education) leading to increased digital literacy in working with data formats and in working with information, and all this must be set in the framework of lifelong learning so that it becomes a useful part of the continuous improvement of qualifications. Education not only needs to focus on the needs of current employees of public institutions and private entities, but also on the needs of future generations. Education needs to be institutionally supported by educational institutions as well as professional associations and specialists in the field.

7.10 Pilot projects

Pilot projects are used to verify that the proposed procedures and standards (including methodological documents) necessary for the implementation of a project using BIM are complete and adequately guiding and contribute to higher efficiency of the BIM implementation. Work with pilot projects must be set up to increase the likelihood of future smooth implementation of BIM within construction projects, and to increase the value gained from this implementation. Pilot projects are a tool to verify that the prepared environment is functional and the methodological background is usable by participants in the construction process, especially contracting authorities, investor's representatives on construction sites, designers and construction contractors, and similarly during the operational phase of the assets.

There is a need to work with a representative set of projects, as well as affected groups, while effectively evaluating the findings from the pilot projects. A participatory approach ensures that validation is considered from different perspectives and that decisions on how to proceed in a specific field context are reached in a consensual manner. Stakeholders in pilot projects are thus more likely to support the implementation of BIM than those who have had little influence or interest in its implementation. Involving future 'implementers' who will be involved in the implementation of BIM, including the actual implementation of projects, as beneficiaries of the whole process will lead to interventions that are relevant, meaningful, feasible and, most importantly, sustainable.

8 LIST OF ABBREVIATIONS

AIM – Asset information model
BEP – BIM execution plan
BIM – Building information modelling
CAFM – Computer-aided facility management
CDE – Common data environment
CEN – Comité Européen de Normalisation (European Committee for Standardization)
CPR – Construction product regulation
czBIM – Professional Council for BIM, z.s.
CSA – Czech Standardisation Agency
CCA – Czech Chamber of Architects
ČKAIT – Czech Chamber of Chartered Engineers and Technicians Engaged in Construction
COSMC – Czech Office of Surveying, Mapping and Cadastre
DBL – Digital building logbook
DGA – Data Governance Act
DIA – Digital Information Agency
DiMS – Digital built asset model
DPP – Digital product passport
DSS – Construction data standard
DBC – Digital building code
DBCSP – Digitalisation of building code and spatial planning
DT – Data template
DTM – Digital technical map
EAOS – Register of authorised entities in construction
EIR – Exchange information requirements
EU – European Union
EUBTG – EU BIM Task Group
FIDIC – Fédération Internationale des Ingénieurs-Conseils (International Federation of Consulting Engineers)
FM – Facility management
GC – Global objective
GIS – Geographical information system
IDM – Information delivery manual
IFC – Industry foundation classes (data model – schema and formats for data exchange)
IMS – Built asset information model
ISO – International Organization for Standardization
ISBPP – Information system for building permit procedures
MoT – Ministry of Transport
MRD – Ministry of Regional Development
MIT – Ministry of Industry and Trade
MoI – Ministry of the Interior
NIPI – National infrastructure for spatial information
OPE – Operational programme employment
PIM – Project information model
SC – Strategic objective
SES – Built asset registration system
SFDI – State fund for transport infrastructure
SO – Strategic area
ABE – Association of building entrepreneurs

9 SOURCES

- Strategy for the implementation of the BIM method in the Czech Republic
- Digital Czechia
- Methodological recommendations for the preparation of public strategy and implementation documents in the Czech Republic
- Strategy for the implementation of the building information modelling methodology for the needs of contracting authorities
- Strategy for the development of spatial information infrastructure in the Czech Republic after 2020
- Draft bill on the national infrastructure for spatial information
- Transition pathway for construction
- Draft bill on built asset information management, built asset Information model and built environment information model
- Draft bill on public sector data management
- Technical standards CSN of Class 7301 – Organisation of building information

10 ANNEXES

- Implementation plan for the Update of the Strategy for the implementation of the BIM method in the Czech Republic – June 2024
- Annex to the Implementation plan for the update of the Strategy for the implementation of the BIM method in the Czech Republic – June 2024

10.1 Implementation plan for the update of the Strategy for the implementation of the BIM method in the Czech Republic – June 2024

SC	Strategic objectives		Responsibility	Collaboration	Deadline SO1	Deadline SO2	Deadline SO3
	ID	Measures					
SC1	**Creating a legal environment**						
	1.1	BIM Act and its implementing regulations	MIT, COSMC		2025	2025	2025
	1.2	Addressing compliance with statutory measures on BIM and other legislation	MIT, MRD, DIA, MOT, COSMC		2025	2025	2027*
SC2	**Implementation of a training system, support for further education and awareness raising**						
	2.1	Training system for public administration and support for its implementation	MIT, MRD	COSMC	Continuously	Continuously	Continuously
	2.2	Support for the implementation of BIM education into the educational programmes of secondary schools and post-secondary vocational schools as a complement to professional training	Ministry of Education, Youth and Sports, MIT	MRD	Continuously	Continuously	not applicable
	2.3	Supporting the implementation of BIM education into university curricula	MIT		Continuously	Continuously	not applicable
	2.4	Education system for the private sector	MIT		Continuously	Continuously	not applicable
	2.5	Establishment and use of a BIM certification system using the National qualification framework	Ministry of Education, Youth and Sports, MIT	MRD	2025	2025	not applicable
	2.6	Educational and promotional programmes	MIT		Continuously	Continuously	Continuously
SC3	**Implementation of standards, technical norms, terminology and ontology**						
	3.1	Participation in the development of technical standards in international organisations	MIT	MRD	Continuously	Continuously	Continuously
	3.2	Transposition and development of technical standards for the Czech environment	MIT	MRD	Continuously	Continuously	Continuously
	3.3	Implementation of technical standards into practice	MIT	Members of the government, COSMC	Continuously	Continuously	Continuously
	3.4	Dictionaries of terms and data dictionaries and the environment for maintaining them	MIT, MRD	DIA, COSMC	Continuously	Continuously	Continuously

SC	Strategic objectives		Responsibility	Collaboration	Deadline SO1	Deadline SO2	Deadline SO3
	ID	Measures					
SC4	**Creating and providing support for the development and use of a construction project data standard**						
	4.1	Creation and support of DSS	MIT, MRD, MoT – for transport construction projects	Members of the government	Continuously	Continuously	Continuously
	4.2	Evaluation, development, management and maintenance of the DSS and its management environment	MIT, MRD	-	Continuously	Continuously	Continuously
	4.3	Classification system	MIT, MRD	-	Continuously	Continuously	Continuously
	4.4	Use of openBIM principles, standards and services	MIT, MRD	Members of the government, recommended for higher territorial-administrative units	Continuously	Continuously	Continuously
SC5	**Creation and implementation of standardised methodologies**						
	5.1	Passportisation methodology for information management of existing buildings	MIT, MRD, MoT – for transport construction projects	Members of the government	2025	2025	not applicable
	5.2	Methodology and contractual framework for public procurement using BIM	MIT, MRD		2025	2025	not applicable
	5.3	Methodology for the implementation of CDE with a link to public administration information systems	MIT	DIA, MRD	2025	2025	not applicable
	5.4	BIM implementation methodology for SMEs	MIT		2025	2025	not applicable
	5.5	Modelling methodology for selected uses	MIT	MRD	2025	2025	not applicable
	5.6	Updating the set of existing methodologies	MIT		2025	2025	not applicable
	5.7	Rules for the exchange of information that cannot be housed within the CDE solution	MIT	Members of the government	2025	2025	not applicable
SC6	**Ensuring a link between BIM and DBPP, including documentation and permitting of construction projects**						
	6.1	Linking the implementing regulations to the Building Act to the use of BIM	MRD	MIT	2025	not applicable	not applicable
	6.2	Methodology for the use of BIM tools in the preparation of project documentation	MIT, MRD	MoT	2025	not applicable	not applicable

SC	Strategic objectives		Responsibility	Collaboration	Deadline SO1	Deadline SO2	Deadline SO3
	ID	Measures					
SC7	**Ensuring a link between BIM and NIPI**						
	7.1	Determination of the use of information from the built asset information model within the NIPI	DIA	MIT, MRD	not applicable	not applicable	2025
	7.2	Determination of the use of NIPI information for the preparation of construction projects	MIT, MRD	DIA, COSMC	2025	not applicable	2025
	7.3	Implementation and support of built environment information modelling	MIT, MRD	DIA, COSMC	not applicable	not applicable	2027*
SC8	**Validation of standards and methodologies in pilot projects**						
	8.1	Selection of pilot projects and setting of objectives	Members of the government, recommended for higher territorial-administrative units		2025	2025	2027*
	8.2	Implementation of pilot projects and their support	Members of the government, recommended for higher territorial-administrative units		Continuously	Continuously	Continuously
	8.3	Evaluation of pilot projects in relation to BIM	MIT, MRD	Members of the government, recommended for higher territorial-administrative units	Continuously	Continuously	Continuously
	8.4	Publication of case studies of pilot projects	MIT, MRD	Members of the government, recommended for higher territorial-	Continuously	Continuously	Continuously

SC	Strategic objectives		Responsibility	Co-operation	Deadline SO1	Deadline SO2	Deadline SO3
	ID	Measures					
				administrative units			
SC9	**Support for research, development and innovation, international cooperation and funding**						
	9.1	Verification of support options for research, development and innovation	MIT	MSRI, COSMC	2025	2025	2025
	9.2	International cooperation and use of foreign experience	MIT	COSMC, DIA, MRD	Continuously	Continuously	Continuously
	9.3	Monitoring and proposing ways of financing the implementation of BIM	MIT	Members of the government	Continuously	Continuously	Continuously
SC10	**Creation of a base model of the built environment**						
	10.1	Creation of a catalogue of geographical objects of a base model of the built environment	COSMC	MIT, MRD			2025
	10.2	Development and implementation of technologies for the creation, management and publication of a base model of the built environment	COSMC				2026
	10.3	Providing a means of financing the engineering, technology and processes of creating a base model of the built environment	COSMC, MF				2025
	10.4	Creation of a base model of the built environment including integration of existing geographic data in 3D with nationwide coverage	COSMC				2027*

Abbreviations:

MSRI – Minister for Science, Research and Innovation

SC – Strategic objective

SO – Strategic area

SO1 – Information management for optimising the preparation and execution of construction projects

SO2 – Support for the digitisation of management and maintenance for efficient use and operation of built assets

SO3 – Support for the digitisation of agenda related to built assets and the built environment

* For measures that have an overlap beyond the 31 December 2027 deadline, the final deadline for the measures will be set in the follow-up strategy document for the 2028-2037 period.

10.2 Annex to the Implementation plan for the update of the Strategy for the implementation of the BIM method in the Czech Republic – June 2024

This annex to the Implementation plan for the update of the Strategy for the implementation of the BIM method in the Czech Republic provides a basic description of the individual measures. Within the framework of the implementation of the updated BIM strategy, the required details of the measures will be specified, using the analysis of the status of implementation of the existing measures of the original Strategy, in the form of measures cards, including the quantification of the costs of the individual measures and subsequently the implementation of the Strategy itself, i.e., the implementation of the BIM method in the Czech Republic; bearing in mind that the programme financing is planned in T+2 years' time.

The measures cards will include, for example:

- Names of measures
- Description of measures
- Contribution to the strategic objective
- Coordinator of measures
- Entities cooperating in the implementation of measures
- Links to other measures (objectives)
- Deadline for fulfilling the measure
- Time milestones
- Measure indicator
- Estimation of the costs of the measures
- Organisational and technical arrangements
- Risks

SC1: Creating a legal environment

1.1. BIM Act and its implementing regulations

To prepare and submit a law on built asset information management, built asset information model and the built environment information model on the basis of its draft bill approved by Government Resolution No. 298 of 3 May 2023.

1.2. Addressing compliance with statutory measures on BIM and other legislation

Ensure that emerging BIM legislation is consistent with other legislation.

SC2: Implementation of a training system, support for further education and awareness raising

2.1. Training system for public administration and support for its implementation

Implementation of the training system according to the Strategy of the training system for public administration with a focus on the entire life cycle of the built asset.

2.2. Support for the implementation of BIM education into the educational programmes of secondary schools and tertiary vocational schools as a complement to professional training

Updating of topics for the inclusion of the BIM method in the framework educational programmes in relation to legislation and the development of the BIM method.

2.3. Supporting the implementation of BIM education into university curricula

Updating topics for the inclusion of the BIM method in the educational programmes of individual universities in relation to legislation and the development of the BIM method.

2.4. Education system for the private sector

Preparation and implementation of an education system with a focus on the supply chain.

2.5. Establishment and use of a BIM certification system using the National qualification framework

Ensuring consistency between the content of professional training in BIM and the content of professional qualifications in BIM, including updating the professional qualifications for BIM in the National qualification system.

2.6. Educational and promotional programmes

Promotion and education, including continuous sharing of experience from the practical use of the BIM method.

SC3: Implementation of standards, technical norms, terminology and ontology

3.1. Participation in the development of technical standards in international organisations

Involvement in international activities and experience sharing in the development and implementation of technical standards for BIM.

3.2. Transposition and development of technical standards for the Czech environment

Translations of international technical standards. Possibilities of supplementing these technical standards for the conditions of the Czech Republic in the form of national annexes and other standardisation documents.

3.3. Implementation of technical standards into practice

Use of BIM technical standards for data standard, classification and built asset information management processes.

3.4. Dictionaries of terms and data dictionaries and the environment for maintaining them

Creation of bases for the data standard and classification, acquisition and management of the necessary software tools.

SC4: Creating and providing support for the development and use of a construction project data standard

4.1. Creation and support of DSS

Creating components of the construction project data standard and supporting its use in practice.

4.2. Evaluation, development, management and maintenance of the DSS and its management environment

Use of pilot projects to evaluate and set further development of the construction project data standard. Management and maintenance of the content of the construction project data standard, including the extension of software tools for the construction pro ject data standard.

4.3. Classification system

Involvement in international initiatives in the field of classification and identification. Implementation, support and management of the classification system in the Czech Republic.

4.4. Use of openBIM principles, standards and services

Participation in international initiatives in the field of open standards for data structure and exchange and their application in the Czech Republic.

SC5: Creation and implementation of standardised methodologies

5.1. Passportisation methodology for information management of existing buildings

Support the use of the passportisation methodology for information management of existing buildings.

5.2. Methodology and contractual framework for public procurement using BIM

Promoting the use of a methodology and contractual framework for public procurement using BIM.

5.3. Methodology for the implementation of CDE with a link to public administration information systems

Preparation and support of the use of methodology for the implementation of CDE with a link to public administration information systems.

5.4. BIM implementation methodology for SMEs

Promoting the use of the BIM implementation methodology for SMEs.

5.5. Modelling methodology for selected uses

Preparation of modelling methodology according to the principles of requirements for the level of information needs in relation to budgeting and valuation of construction projects and execution of construction projects.

5.6. Updating the set of existing methodologies

Updating of existing methodologies following the development of new methodologies and taking into account the findings of pilot projects. The aim is to make the set of methodologies clearer and more efficient.

5.7. Rules for the exchange of information that cannot be housed within the CDE solution

Establishing rules for the exchange of information that cannot be housed within the CDE solution due to the protection provided by legislation. In particular, it concerns classified information pursuant to Government Regulation No. 522/2005 Coll., in connection with Act No. 412/2005 Coll.

SC6: Ensuring a link between BIM and DBPP, including documentation and permitting of construction projects

6.1. Linking the implementing regulations to the Building Act to the use of BIM

Ensuring compliance of the implementing regulations to the Building Act with the legal regulations for the use of the BIM method.

6.2. Methodology for the use of BIM tools in the preparation of project documentation

Determination of information requirements and procedures for the creation of project documentation in accordance with the legal regulations for the documentation of construction projects using the BIM method.

SC7: Ensuring a link between BIM and NIPI

7.1. Determination of the use of information from the built asset information model within the NIPI

Determination of information requirements and procedures for the use of information from the built asset information model for information systems using the national infrastructure for spatial information.

7.2. Determination of the use of NIPI information for the preparation of construction projects

Determination of information requirements and procedures for the use of information from the national infrastructure for spatial information for the creation of the built asset information model.

7.3. Implementation and support of built environment information modelling

Establishing principles and practices for modelling information about the built environment in public administration and supporting them.

SC8: Validation of standards and methodologies in pilot projects

8.1. Selection of pilot projects and setting of objectives

Assessment and selection of representative projects and determination of the objectives to be evaluated in the application of the BIM method.

8.2. Implementation of pilot projects and their support

Ensuring the implementation of selected projects, including their monitoring and methodological support.

8.3. Evaluation of pilot projects in relation to BIM

Evaluating the achievement of objectives in the application of the BIM method in projects.

8.4. Publication of case studies of pilot projects

Processing the results achieved in the projects and their publication.

SC9: Support for research, development and innovation, international cooperation and funding

9.1. Verification of support options for research, development and innovation

Verification of support opportunities for research, development and innovation in the application of BIM.

9.2. International cooperation and use of foreign experience

Involvement in international initiatives in the areas of digitisation of the construction industry and the built environment and the use of the experience gained in the Czech Republic.

9.3. Monitoring and proposing ways of financing the implementation of BIM

Developing a needs analysis for setting up a monitoring programme and proposing ways of financing the implementation of BIM.

SC10: Creating a base model of the built environment

10.1. Creation of a catalogue of geographical objects of a base model of the built environment

Design and definition of the data model of the catalogue of geographic objects of a base model of the built environment using the principles of ontology and semantic modelling of the built environment.

10.2. Development and implementation of technologies for the creation, management and publication of a base model of the built environment

The systematic process of designing, assessing the feasibility of, and then actually developing and implementing the technologies necessary to acquire, manage, and provide data for a base model of the built environment.

10.3. Providing a means of financing the engineering, technology and processes of creating a base model of the built environment

Validation of possible tools for financing the implementation of an information system for the management of a base model of the built environment, including its acquisition and subsequent operation.

10.4. Creation of a base model of the built environment including integration of existing geographic data in 3D with nationwide coverage

Establishment of routine operation ensuring the creation, management and updating of data of a base model of the built environment based mainly on data from digital technical maps, register of territorial identification, addresses and real estate, basic ge ographic data base, data from built asset information models and data from other public administration information systems.



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