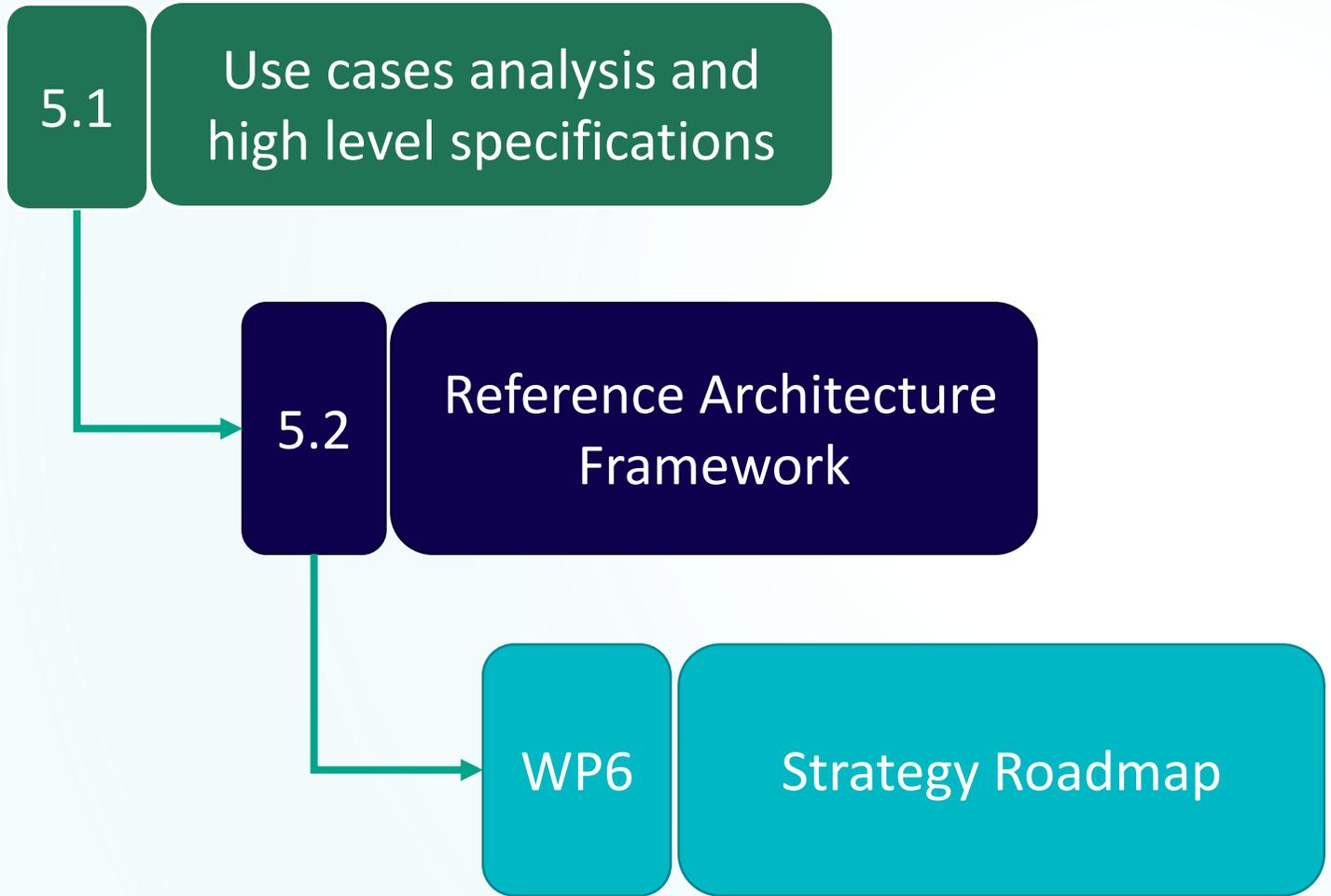


DigiPLACE key use cases and High Level specifications : working sessions



Understanding DigiPLACE expected output



Understanding DigiPLACE expected output



The vision

of the digital transformation of european construction industry, expressed as key use cases, to help achieve core objectives (eg climate change, resource use, health, productivity, competitiveness...)



The required architecture

to support this vision, in terms of digital tools, services and platforms, interoperability, data and knowledge sharing...



How to get there

Research effort, pilot projects, regulations, deployment of new services...

Focus on DigiPLACE Reference Architecture Framework



DigiPLACE Reference Architecture Framework

A comprehensive set of common guidelines for building, implementing and deploying digital platforms for the construction sector across Europe (public or private, local or European...)

Different types of guidelines

General guidelines for implementing digital platforms (interoperability, open standards, data security & privacy...)

A referential of tools and services to be developed/generalized to support key use cases

Special focus on required public services and regulations, both at EU and MS levels

....

First step : identify the use cases and high level specifications



For construction sector and some other sectors

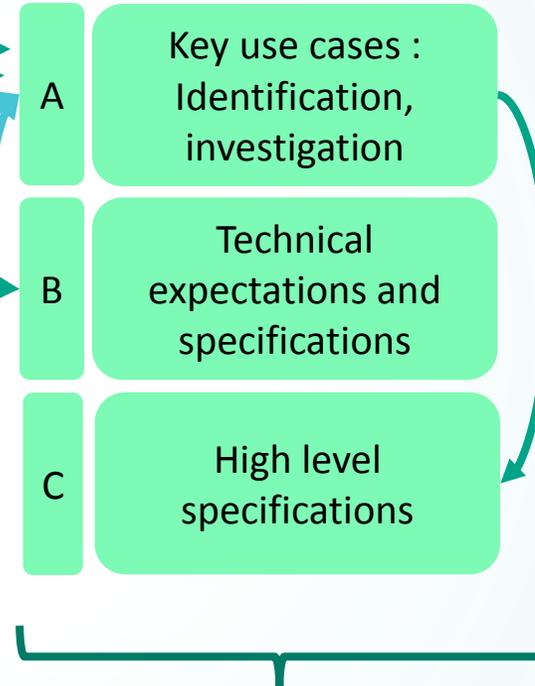
WP3

- 3.1 Level of implementation of digital technologies
- 3.2 **Comparative analysis of existing digital platforms**
- 3.3 **Impact analysis and success factors for possible technology transfers**

WP4

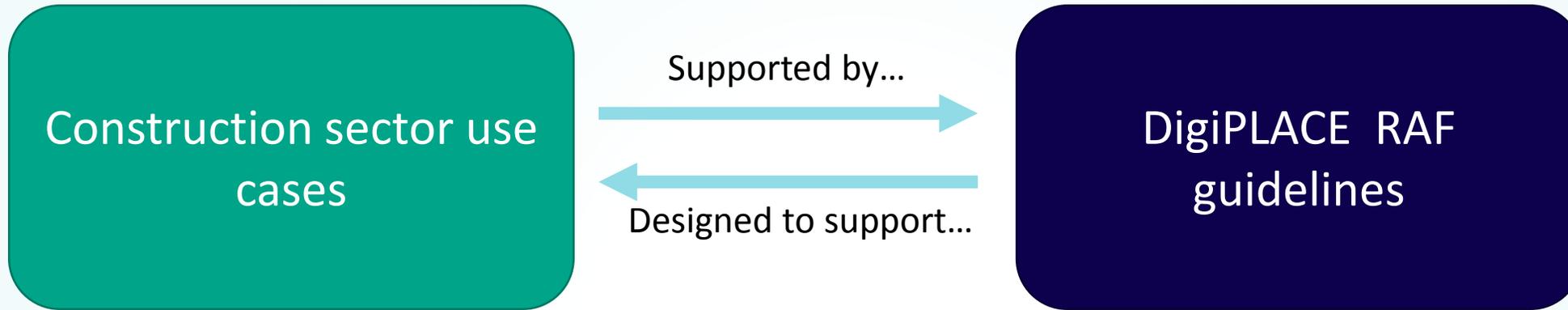
- 4.1 Social and technical barriers
- 4.2 **Sharing data : willingness and tools**
- 4.3 **Needs & expectations of stakeholders, SMEs**
- 4.4 **Measures to mitigate barriers**
- 4.5 Pilot case studies for proposed measures

T5.1 : Use Cases and specifications



T5.2 : Reference architecture framework

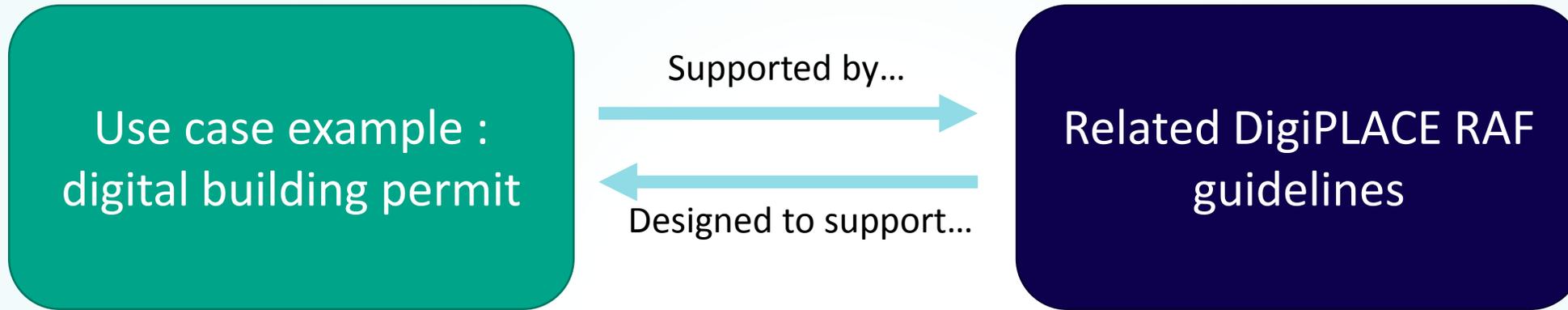
Identifying DigiPLACE key use cases : a dual approach



- Related to the digital transformation of construction
- Supporting : productivity gains, improved environmental performance,...

- Guidelines for construction platforms architecture
- Guidelines for standards implementation
- Proposal of tools and services
- Guidelines for public services/ regulations
- ...

An example



- Use case description : digitalized building permit application using BIM models. Automatized rules checking

- Use of Open BIM standards
- Dedicated MVDs
- Need of ontologies for urban planning rules
- Required public tools & services
- ...

Collaborative work to identify the key use cases : the strategy



Common language,
interoperability, standards

Rules & Regulations, public
services

Data and knowledge sharing

Environmental performance

Business, market and
collaboration

- 5 working groups on 5 main areas
- Not disconnected issues, but rather different viewpoints to address all the issues, with expected overlap
- Collection of contributions on use cases (excel file), serving as a starting base for the working groups

Description of the working groups

**Common language,
interoperability, standards**

Rules & Regulations, public
services

Data and knowledge sharing

Environmental performance

Business, market and
collaboration

General approach :

- DigiPLACE is not replacing standardisation bodies. Provide guidelines for successful standards implementation

Examples of issues :

- Interoperable product databases
- Link between BIM and IoT or telematics
- Open BIM implementation guidelines, promote the use of open standards
- Harmonize data requirements in public or private contracts

Description of the working groups

Common language,
interoperability, standards

**Rules & Regulations, public
services**

Data and knowledge sharing

Environmental performance

Business, market and
collaboration

General approach :

- Address all the interactions of the construction project with the administration
- Public procurement
- Regulatory issues

Examples of issues :

- Digitalized Building permits
- Use of BIM in public procurement
- Coordination of national regulations
- Access to rules, rules checkers
- Building passport, B-LOG...

Description of the working groups

Common language,
interoperability, standards

Rules & Regulations, public
services

Data and knowledge sharing

Environmental performance

Business, market and
collaboration

Examples of issues :

- Sharing of private data : which data to share ? With which value ? Business models ?
- Open data
- Artificial intelligence
- Best practices exchange
- Reskilling of the workforce, training
- Mutualisation of innovation patterns

Description of the working groups

Common language,
interoperability, standards

Rules & Regulations, public
services

Data and knowledge sharing

Environmental performance

Business, market and
collaboration

General approach :

- Transversal : strong overlap with other WGs, with a focus on environmental performance issues

Examples of issues :

- Environmental product data for BIM
- Generalization of LCA
- Calculation of Energy Performance Certificates
- Circularity, reversible building design
- Promote LEVEL(s) framework, sharing of environmental performance data

Description of the working groups

Common language,
interoperability, standards

Rules & Regulations, public
services

Data and knowledge sharing

Environmental performance

**Business, market and
collaboration**

General approach :

- Address the digital transformation of the construction project, examining the different phases (design, construction, delivery...)
- Collaborative platforms, CDE
- Contracts and market issues

Examples of issues :

- CDE implementation
- BIM services marketplaces
- Digital supply chain, industry 4.0
- Contract standardization, Smart contracts, blockchain

Collaboration tools Use Cases (1/3)



Directory of public BIM platforms

Contributeur

WHAT: Identify the different existing platforms as collaborative platforms, indicating their advantages and limitations... and give access to them

WHO: all the actors/players of a project, in particular project owners who can impose the choice of collaborative tools.

WHY: the idea is not to impose a platform but to let the project owner (or sometimes designers) choose the platform knowingly. What's more, it foster quality of the services offered

WHAT FOR: list the already existing apps and distinguish the working ones from the less well working in order to develop and enhance DigiPLACE

Requirements : Evaluation of the safety and security data management

Access to tools and services directly through the platform

Example : public services for small projects, targeting SMEs. Same as the previous Use Case, knowing that a marketplace also lists internal applications to the platform (or accessible through API directly on the platform), free or not.

Create a "market place" platform for BIM services vendors with interoperability features

WHAT: create a marketplace that offers complementary applications to the platform (or even other platforms?) offering other classified services according to major themes and always regarding interoperability

WHO: all the players of a project

WHY: multiple applications do exist and it is necessary to guide the choice of payers

WHAT FOR: list already existing apps

Comments from MEEM : Not sure that getting a new market place is the right evolution, instead of studying the existants digitals market places and propose the way using them throught a BIM process

Collaboration tools Use Cases (2/3)



BIM services platform and market place

DigiPLACE should be free and public, and associated to an ecosystem of services that allow to cooperate around the BIM digital model in all phases of the building's life cycle. The platform aims at: allowing easier access to BIM for small and medium-sized companies, working in a reliable digital environment, improving planning and resources management, increasing reactivity and productivity, optimizing costs, organizing meetings, videoconferences, chats, sharing information and documents in real time, assigning and managing activities, generating a 3D model starting from 2d drawings, verifying the compatibility of digital models, in compliance with BIM protocols contracted in projects

Expected benefit, added value : One of the main objectives of the DigiPLACE platform should be to allow to all the stakeholders of the construction sector to take part in the BIM process with easy to use applications and open formats: "data must be accessible and editable by everyone".

References: KROQI

Common guidelines for implementing common data environments

WHAT: list and summarize the instructions to implement a CDE in a simple and useful way, respecting the terms of ISO standards and the project owner requests and the needs of the designer team.

WHO: mainly the designers (BIM manager) in charge of setting up the common data environment.

WHY: ISO 19650 gives elements for the implementation of a CDE but it is very complex to apply, so it is necessary to explain it.

WHAT FOR: check if the ISO standards are applicable.

Interoperable BIM-based analysis tools

WHAT : possibility of fast evaluation of cost alternatives using BIM data, possibility of fast evaluation of environmental impacts of alternatives using BIM data.

Collaboration tools Use Cases (3/3)



Project management tool (Topic: Project Management)

WHAT: offer a project management tool with different opportunities: GANTT chart, budgets, approval phase, document database.

WHO: every player of a project.

WHY: improving project management by providing the project leader a monitoring tool and improving collaboration between the different actors/players.

WHAT FOR: a more sustained use of the collaborative platform during the “project mode”.

Keeping track of decisions made "outside platforms" (Topic: Co-located collaboration)

Enable retrieving of data for hosting colocated meetings, and store outputs of such meetings (decisions made).

Sharing data of big public infrastructure (transnational projects) (Topic: Large Works)

A European archive of all major infrastructure could be created. This archive must be created in collaboration with public administrations and with all contracting stations. In this way, when the individual designer will have direct access to all information regarding that infrastructure, such as: BIM model of the infrastructure (if it exists), age of the infrastructure, historical and landscape constraints present, maintenance work made over the years, any designs to remedy structural problems, infrastructure manager, etc.

Unique authentication (Topic: Single entry point)

Allowing end-users to access all services they have subscribed to through a unique authentication. With one single web address for all actors of a project.

Easier circulation of / access to services and products

Being a single entry point, the platform has the capacity to link or integrate various types of services and/or products, as well a digital twin (engineering orientation). It also eases the search of these services and products for the end-users (marketplace orientation).



Business, Market Use Cases (1/3)



Smart contract for order processing and follow up of invoicing and payment (Topic: Supply chain)

Order processing and follow up of invoicing and payment for ready mixed concrete supplies

BIM approach in the Call for Tender phase (Topic: Tender phase)

- * Project owner & project implementer want some time/efficiency/quality/costs improvements using BIM-based call-for-tender-procedures
- * contractors (especially SMES), get a better information about the project to answer with BIM-based procedures
- * easy and harmonized access to call for tenders from any EU State

Blockchain implementation for identified use cases (Topic: Smart Contract and blockchain)

The use cases for which we intend to deepen the use of blockchain technology are

1. protection of intellectual property, attribution and traceability of responsibilities,
2. certification of processes,
3. application of smart contracts to the construction process,
4. monitoring and certification of data collection from digital instruments

Requirements: implementation of a decentralized application, that allows a working group to certify and sign an IFC file to make it immutable over time.

References, standards: ACCA software, Ethereum blockchain, browser plugin Metamask

Business, Market Use Cases (2/3)



Integration of construction equipment in digital supply chain, use of construction equipment data (Topic: Jobsite management)

Library of Digital twins of construction equipment and materials on jobsite

Expected benefit : better logistics, less time waste

Planning of all operations relating to machinery management on jobsites (Topic: Machinery jobsite management)

Access to database with digital information about refueling/recharging operations, maintenance, working hours and shifts (data source: telematics, digital operating manual, digital driver worktime planner)

Expected benefit : Better planning = less idle time, more uptime = less financial waste

Tools and services targeting SMEs (Topic: Digitalization of SMEs)

WHAT: identify and explain the tools and services usable by SMEs. Make them available on the platform (through API live or not...) to create a free and easily usable toolkit which is approved by the public authorities.

WHO: all the actors/players of a project, in particular the designers and companies like SMEs.

WHY: small businesses often have little means and therefore little room for manoeuvre to digitize their processes and working methods (or simply to master/use digital tools). This provision of tools and methodologies is therefore of vital importance.

WHAT FOR: the expected benefits are in line with the orientations of the French context, namely:

- convince and inspire actors to take ownership of the digital tool.
- develop the use of digital tools by creating data and software both adaptable to all types of projects, with particular attention to very small projects.
- develop a trustful ecosystem with free tools and services, attested by public services.

Business, Market Use Cases (3/3)



Training tools based on simulation of construction sequences (Topic: Digitalization of SMEs)

WHAT: among the different services that provide a gain in competences identified in the other use case related to reskilling workforce, prioritize those that are particularly aimed at SMEs (whatever the reason).

Training tools for on site activities based on simulation of construction sequences

WHO: typically SMEs.

WHY: success in the cultural and operational transition of companies with little room for manoeuvre in the evolution of their practices.

WHAT FOR: develop a common, harmonised but specific culture for each profession so that everyone understands each other. Avoid errors on both, the operational part and the procedures to promote coordination between players.

Contract standardization (Topic: Contractualisation, confidence, data retention matters)

WHAT: formalise contractualisation by allowing the online editing of contractual documents, such as BIM agreements.

WHO: this contract is aimed at all stakeholders in an operation: everyone is therefore concerned

WHY: contractualisation enables the public procurement to be secured by describing precisely the role of each actor. Very often, this contractualisation is not formalised and it leads to delays in the production of studies, in the execution of works or even in the worst case, the failure to realize certain parts or an ineffective implementation.

WHAT FOR: secure procurement, reassure all public actors/players and enhance project coordination.

Other Use Cases



Educational tools for workforce, access to e-training modules – WG3 (Data and knowledge sharing) – Topic: Reskilling of workforce

WHAT: identify the training tools to discover and support the use of the digital model adapted to the different professions and accessible from everywhere: MOOC , tutorial use, explanation of standards with a regular update.

WHO: players not initiated or who wish to strengthen their knowledge whether they are project owners, prime contractors, specialized design office or construction companies.

WHY: It's not just about learning to use new tools. Digital technology brings new working methods, sharing and collaboration between players where communication and exchange are valuing the project's digital models. The digital transition requires a successful cultural transition

Expectation form DigiPLACE : An online training area divided into modules could be created and accessible to every construction professional. It would be desirable that such courses be free.

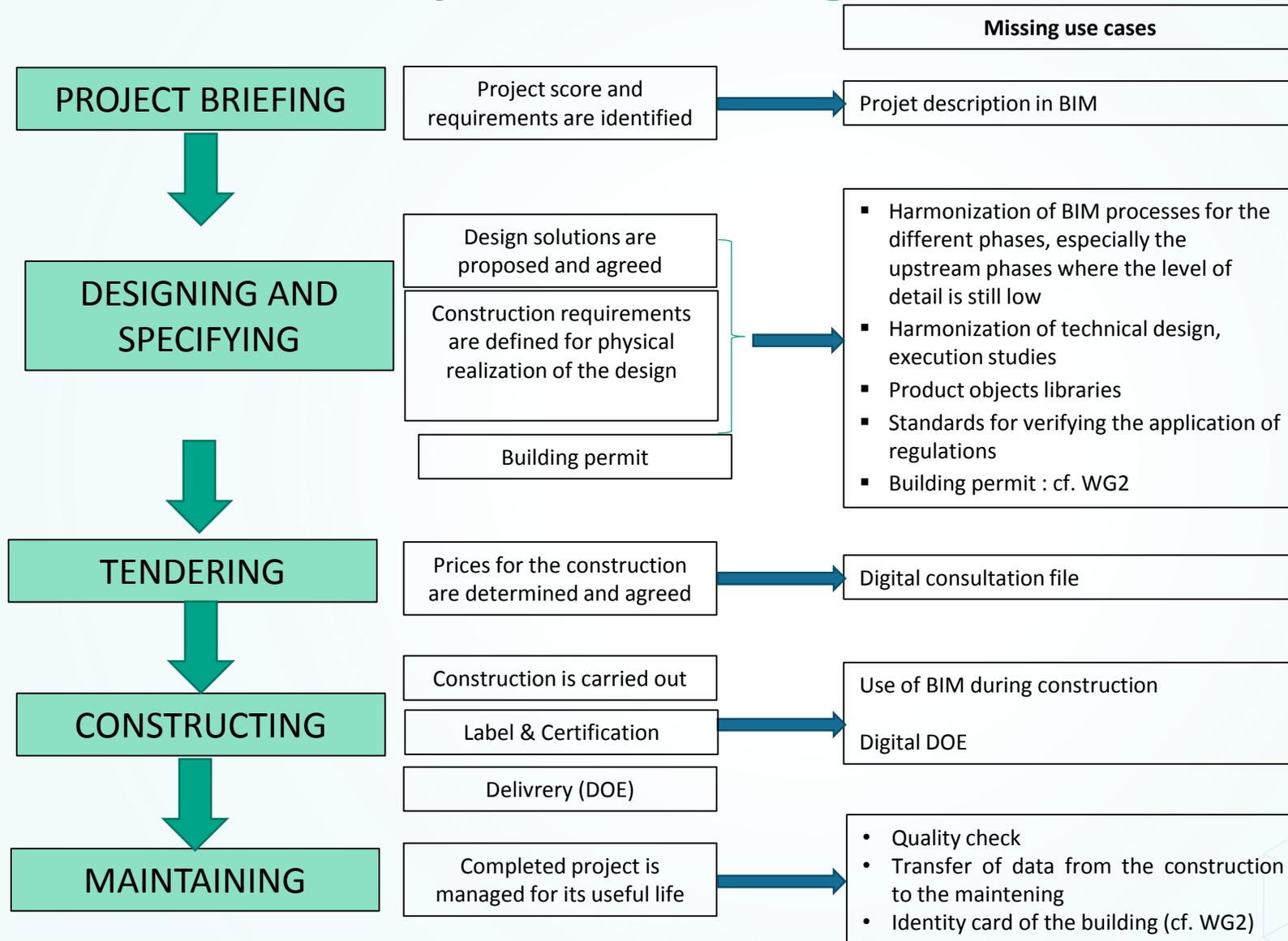
Digitalized Building permit application and delivery (with automated checking)– WG2 (Regulations, public services) – Topic: Building permit

A full numeric management of the permit is proposed making validation process through EU states, local governments and project owners (citizens), easier

Expected benefit:

- * EU STATES what to Share reliable and comprehensive data, Harmonize the many processes (filing, instruction, consultation, transmission), Standardize exchanges and data, Modernize the agents' working environment, Control public spending, Reduce processing times via numeric building permit
- * regional governments require to Reduce management costs by dematerializing exchanges, Have more visibility on the progress of processes on the State side, Give visibility on the progress of the files, have a one-stop servicing model
- * projects owners require Simplified procedures, Have more visibility on the progress of the processes, Benefit from new services

Project construction phases/Missing use cases



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