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R.2.2

Needs assessment on current skills needs of the use of BIM at EOL practices

Germany Report

BFW NRW

07.10.2024

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Introduction

Building Information Modelling (BIM) is an innovative and transformative technology in the construction industry, offering a 3D digital representation of the physical and functional characteristics of buildings and infrastructure. BIM facilitates improved collaboration, efficiency, and sustainability throughout the lifecycle of a project, from design and construction to operation and maintenance.

Europe has been at the forefront of BIM adoption, with varying degrees of implementation and maturity across countries. The Directive 2014/24/EU on public procurement, adopted by the European Union in 2014, plays a pivotal role in promoting the use of BIM across Europe. This directive encourages member states to consider digital tools, such as BIM, for public works contracts. The aim is to enhance efficiency, transparency, and innovation in public procurement processes.

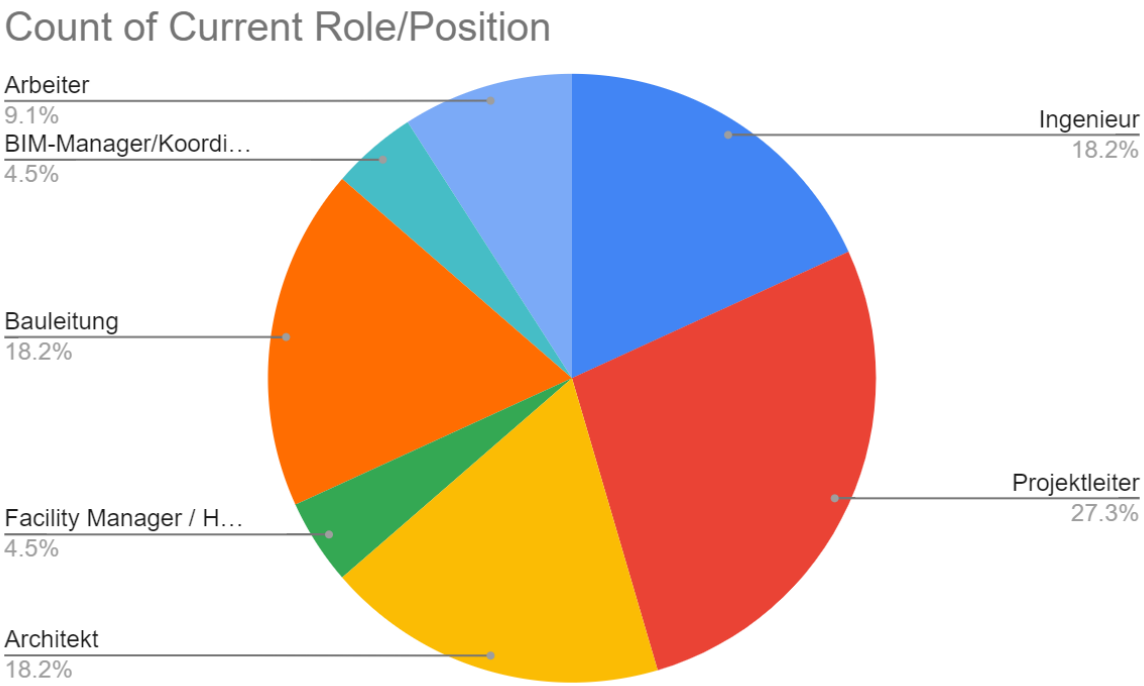
A.2.1 has provided a detailed research to conform a report on the current status of BIM uses providing an overview of the status of BIM in Belgium, Germany, Greece, Italy, and Slovenia, the countries that are represented in the BIM4D consortium. The second part of the research has been devoted to the use of BIM for deconstruction considering various elements: theoretical perspectives, benefits, current skills needs, challenges, relating policies and links with sustainable waste management.

A.2.2 - Needs assessment on current skills needs of the use of BIM at EOL practices has been implemented via a survey to understand the skills required for effectively using Building Information Modeling (BIM) in the deconstruction phase of construction projects and detect skills needs to design the training within the BIM4D project. The survey has been addressed to professionals and companies who use BIM in their regular work or who have knowledge of the topic or who consider BIM an opportunity for their company.

Profile of the participants to the survey

23 people participated in the survey and the chart below reports the percentage of the current role / position of the participants.

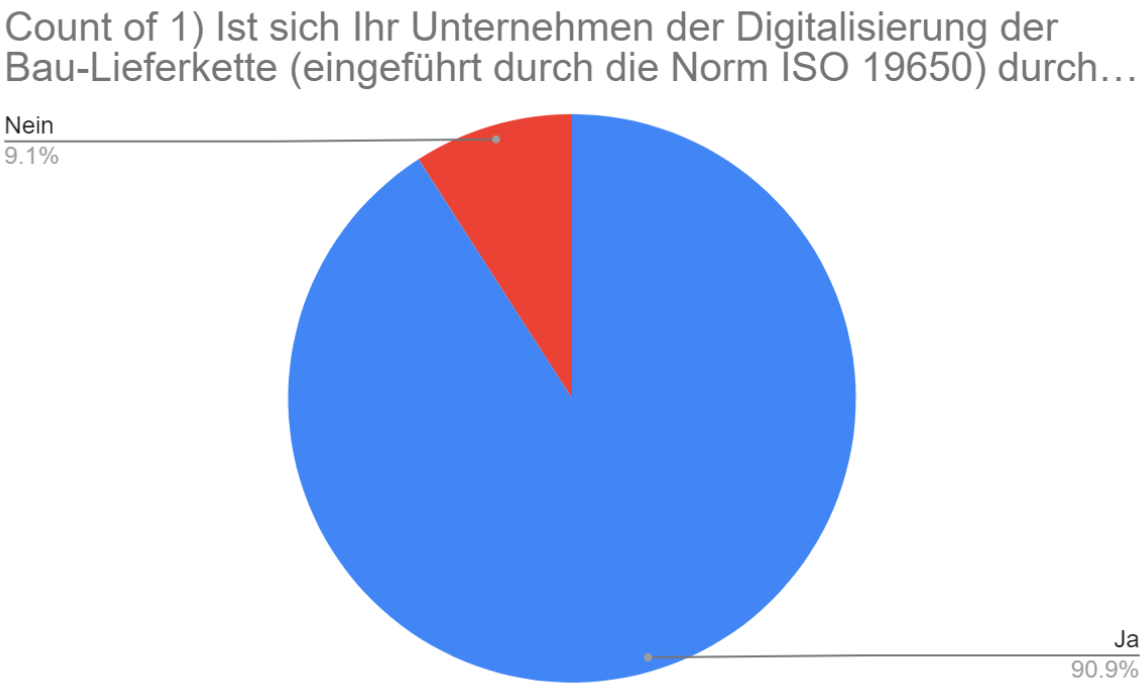
It is therefore possible to note that the Ingenieur, Worker, BIM-Coordinator, Site manager, Projectmanager, architect prevails.



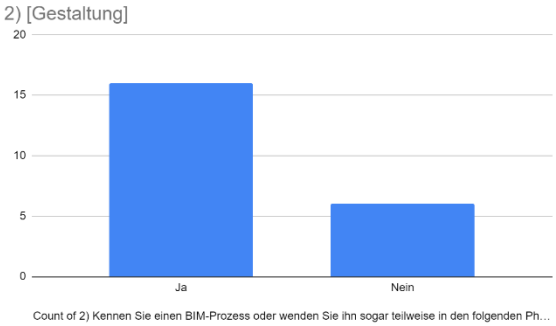
Presentation of the results of the online survey

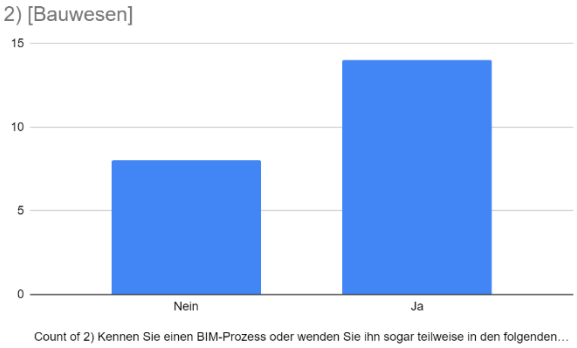
Current use / knowledge of the BIM

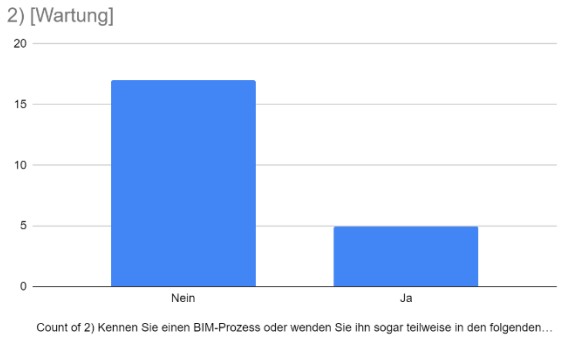
1 - Is your organization aware of the digitalization of the construction supply chain (introduced by the ISO 19650 standard) through the BIM methodology?

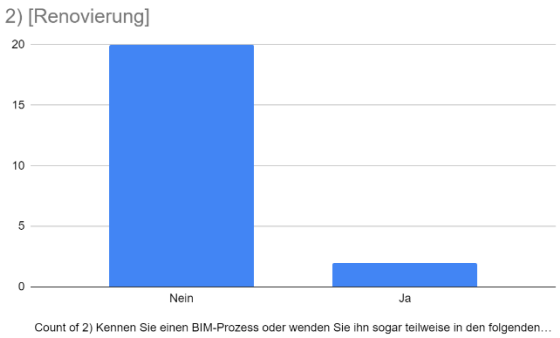


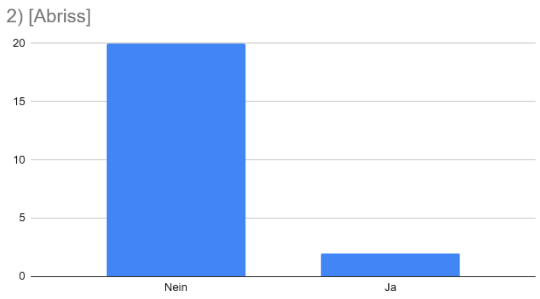
2 - Are you aware of or do you even partially use a BIM process in the following phases?



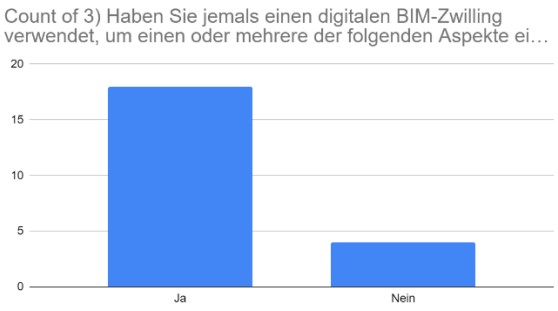


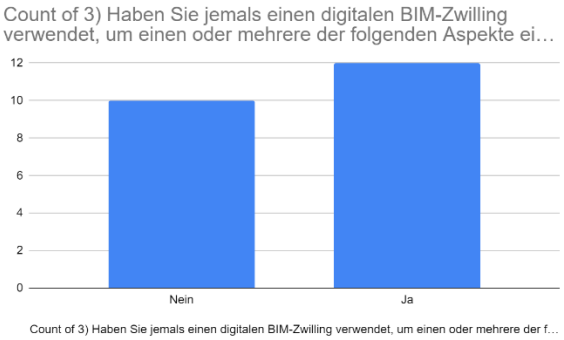


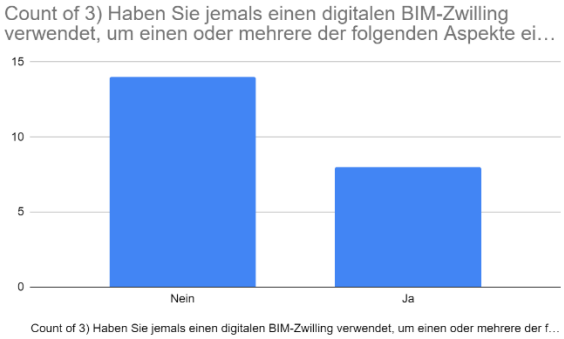


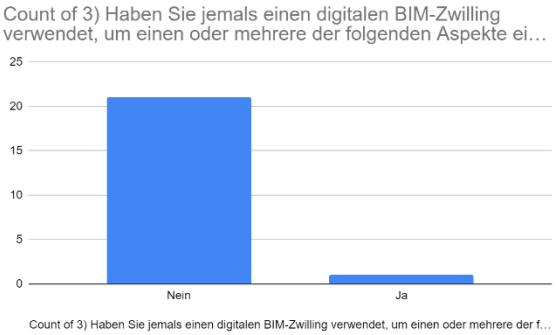


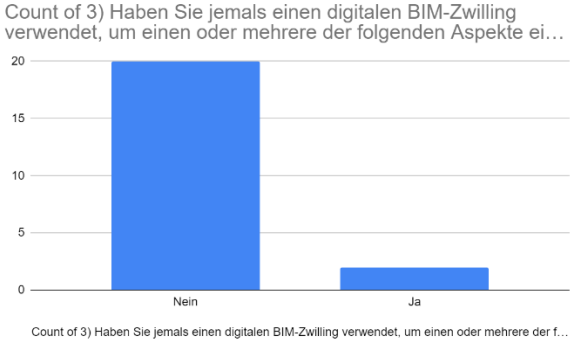
3 - Have you ever used a BIM digital twin to manage one or more of the following aspects of a construction project?





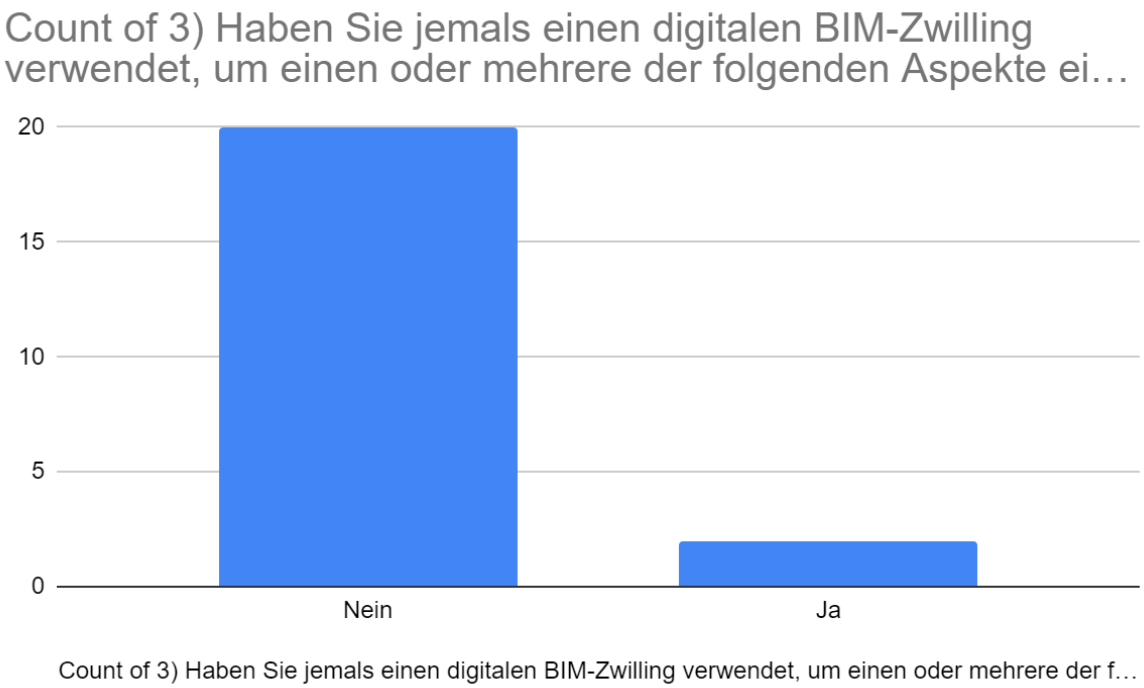




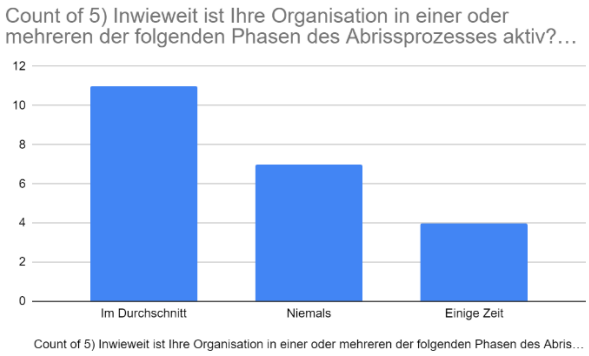


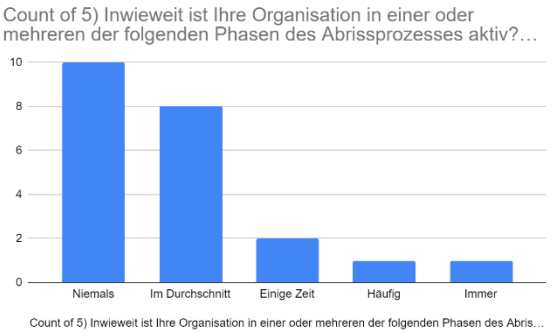
Perspective for the future

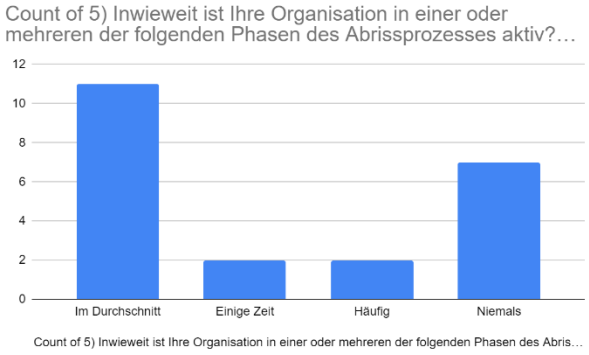
4 - Are you interested in developing an internal BIM process to digitalize company processes?



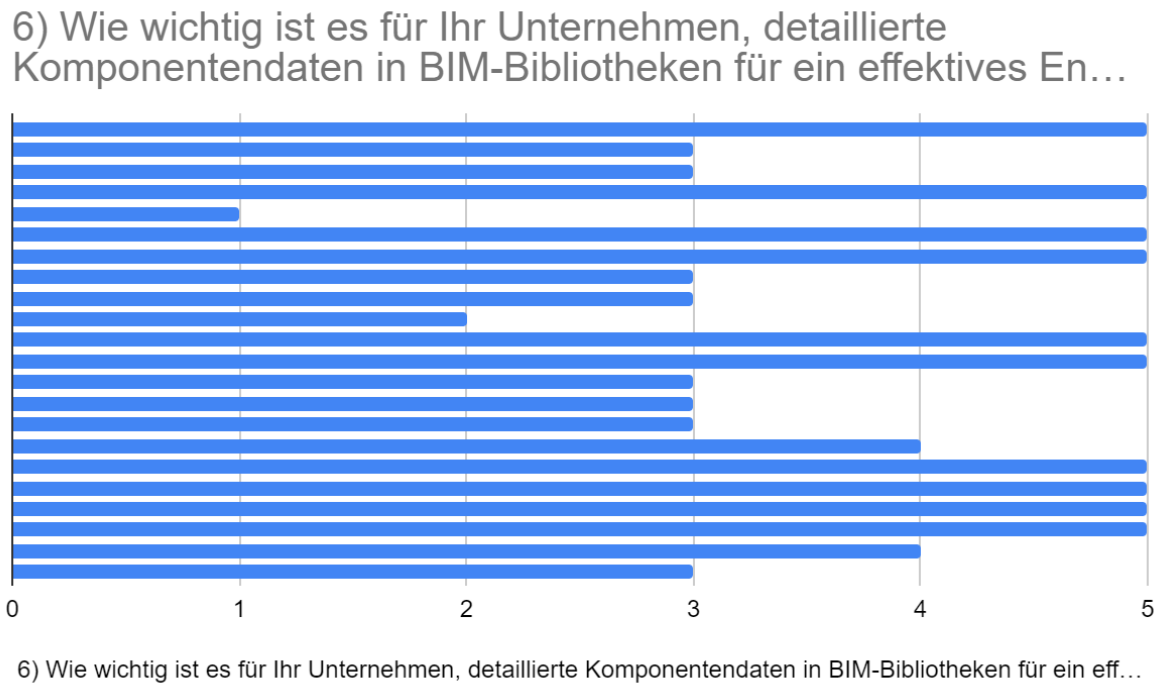
5 - To what extent is your organization active in one or more of the following phases of the demolition process?



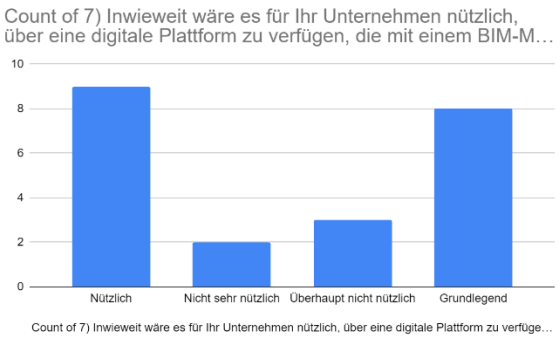


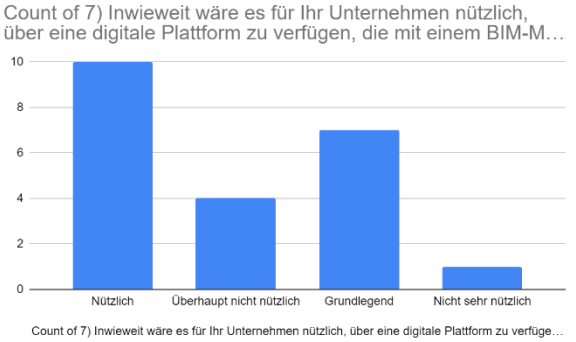


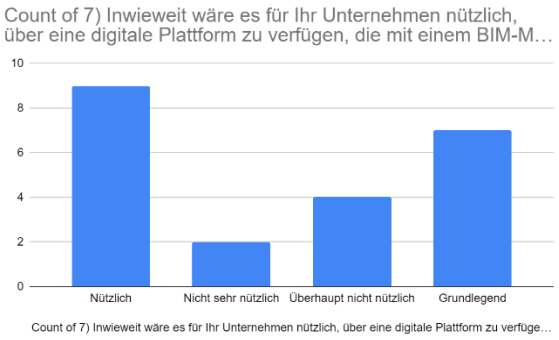
6 - How critical is it for your organization to have detailed component data in BIM libraries for effective end-of-life management?

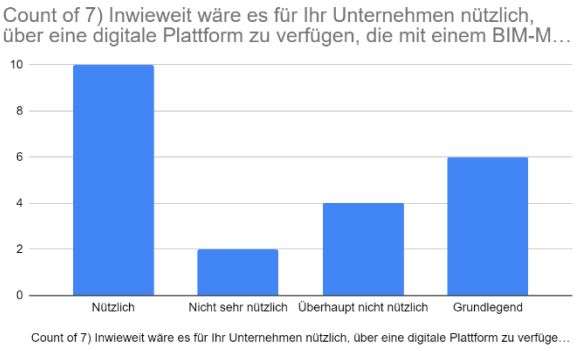


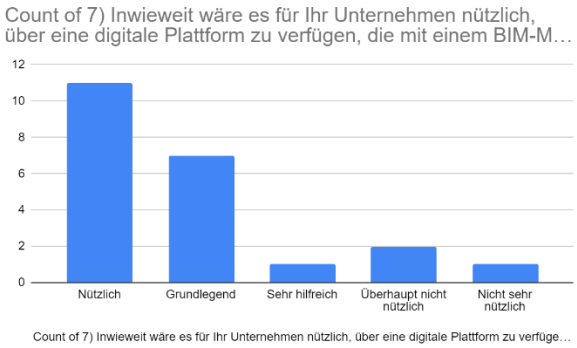
7 - To what extent would it be useful for your organization to have a digital platform linked to a BIM model to manage the following aspects of demolition?



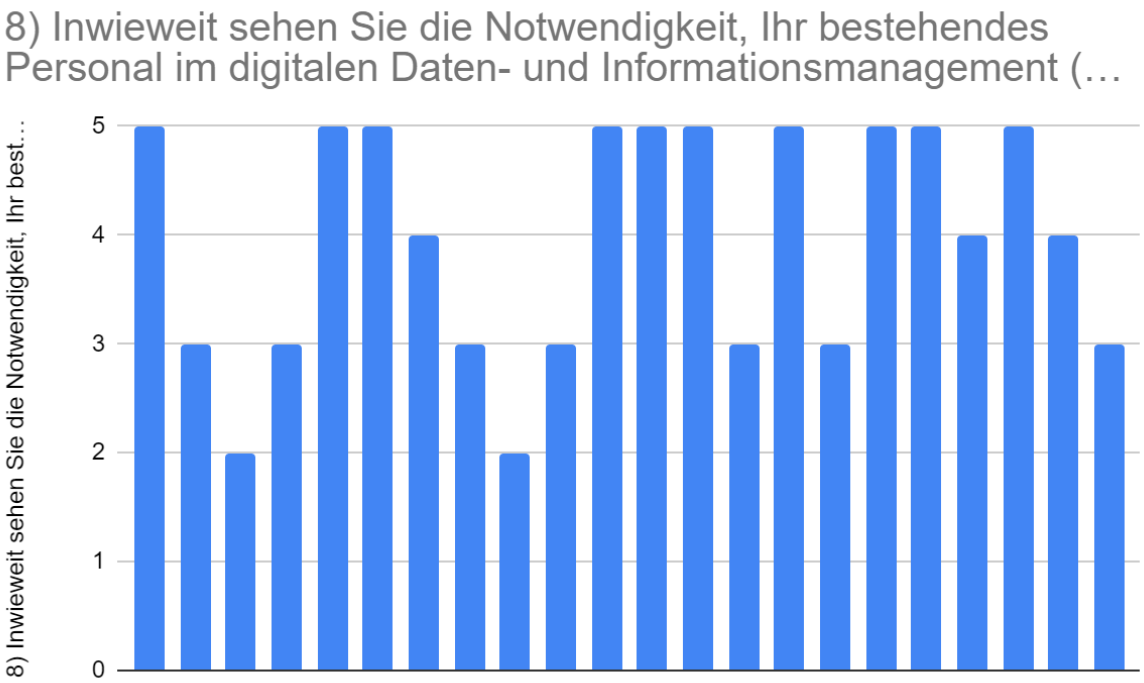




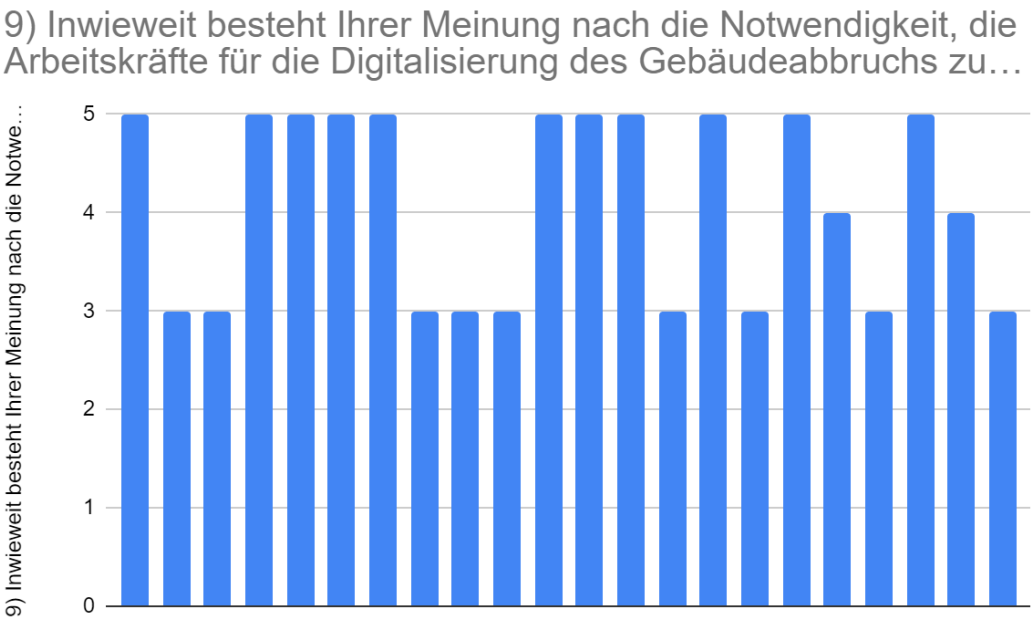




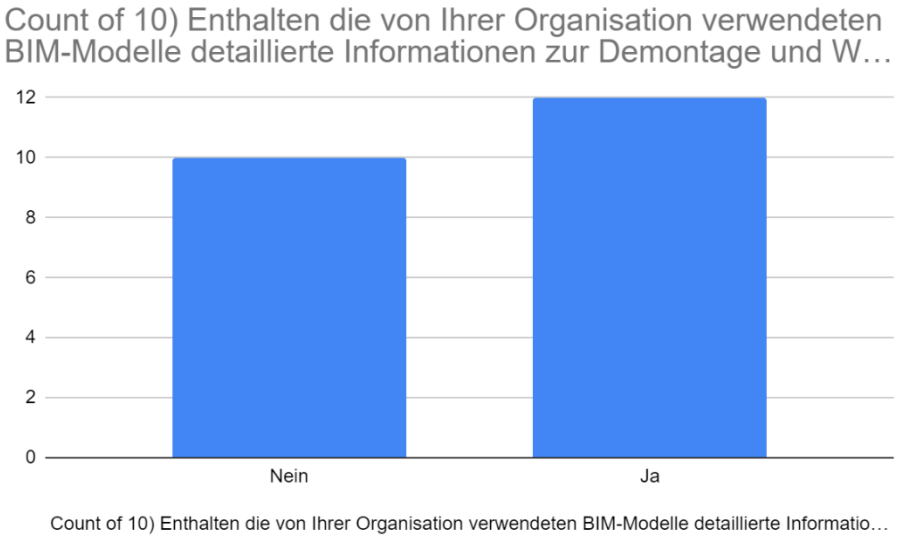
8 - To what extent do you see a need to upskill your existing workforce in digital data and information management (BIM)?



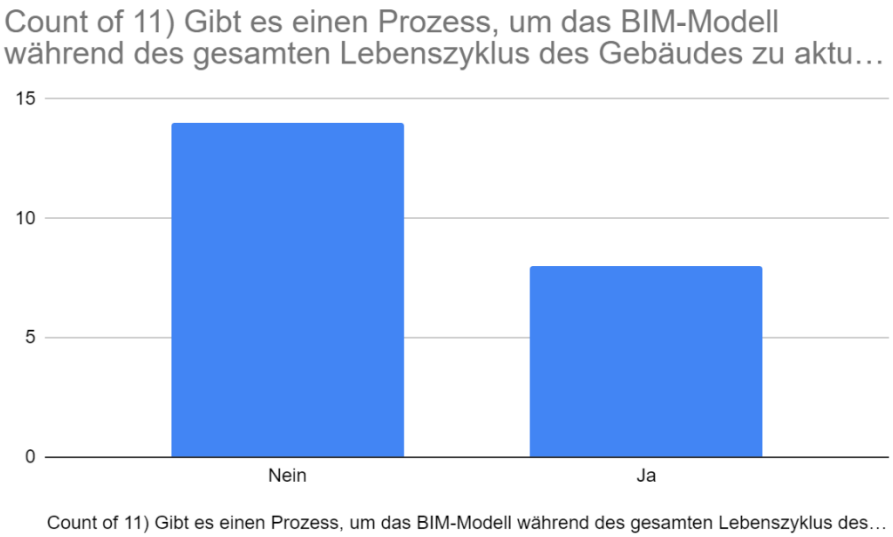
9 - To what extent do you think there is a need for an upskilling of the workforce for the digitalization of building demolition



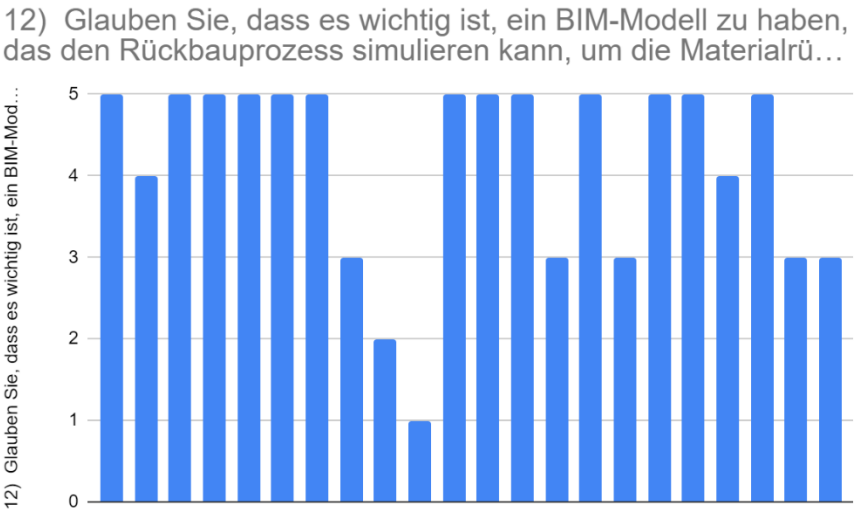
10 - Do the BIM models used by your organization include detailed information on the disassembly and recyclability of materials?



11 - Is there a process in place to update the BIM model throughout the lifecycle of the building to reflect renovations and changes accurately?



12 - Do you think it is important to have a BIM model that can simulate the deconstruction process to optimize material recovery?



13 - What topics would interest you in a training course on BIM and building end-of-life?

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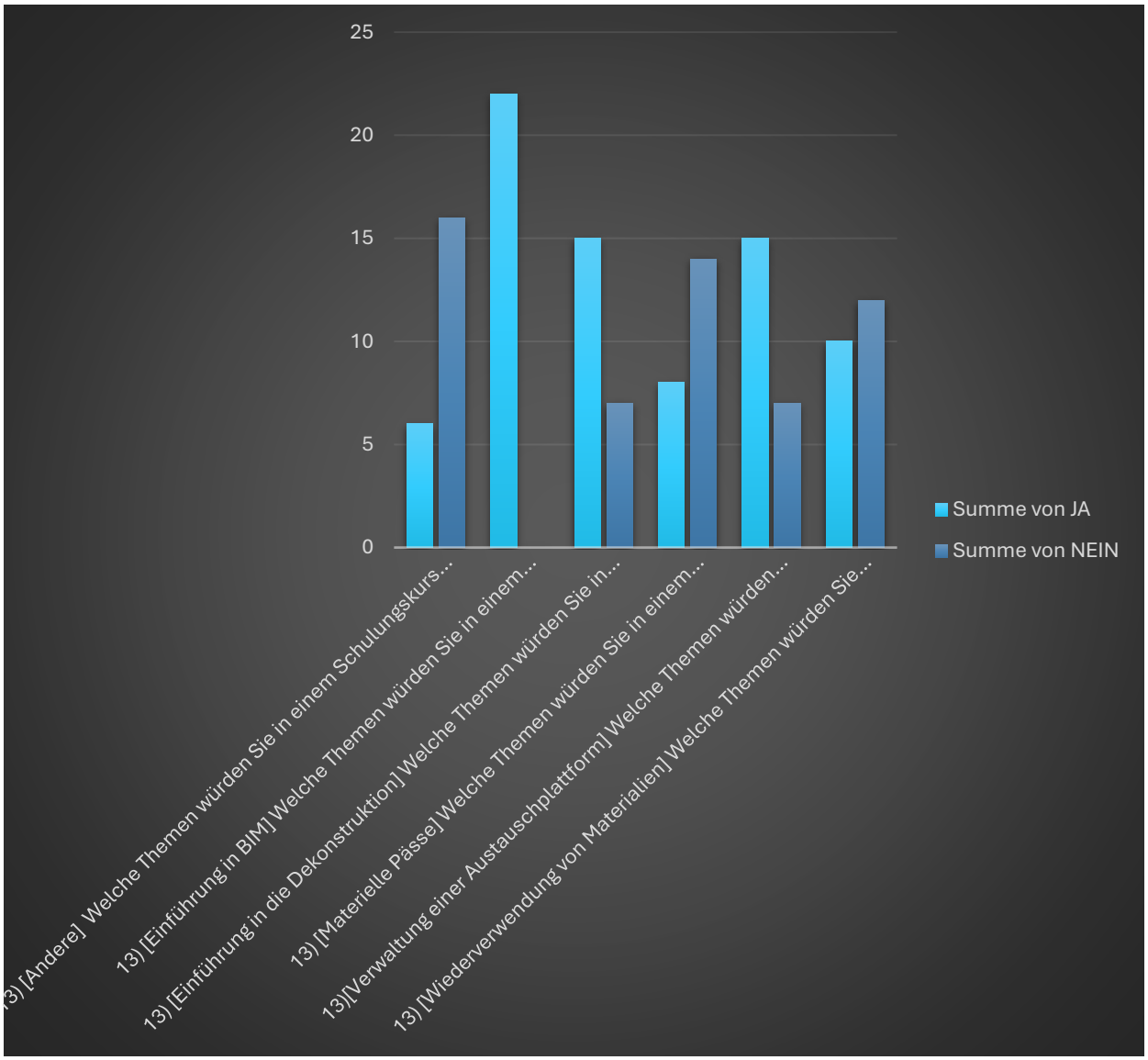

Conclusions

Digitalisation of the construction supply chain

The digitalisation of the construction supply chain is becoming an increasingly significant phenomenon in Germany. The BIM4D A.2.2 survey offers valuable insights into the current implementation and utilisation of Building Information Modelling (BIM) across various construction phases. This report presents a comprehensive overview of the survey's key findings, elucidating the challenges and opportunities inherent to the digitalisation process.

1. Awareness and application of BIM:

The majority of respondents indicated awareness of the digitalisation of the construction supply chain through the use of the BIM method.

BIM processes are predominantly employed during the design and construction phases, with lesser utilisation observed in maintenance, renovation, and demolition.

2. Utilisation of digital BIM twins:

Digital BIM twins are primarily employed for the management and scheduling of construction sites, with less frequent utilisation in the domains of cost management, safety, and demolition.

3. Interest in internal Building Information Modelling (BIM) processes:

There is considerable interest in the development of internal Building Information Modelling (BIM) processes with a view to the digitalisation of company processes.

4. Activity in the demolition process:

The organisations are engaged in a range of activities pertaining to the demolition process, with a particular focus on the inventory and selective dismantling of materials.

5. The perceived utility of digital platforms:

It is perceived that digital platforms linked to a Building Information Modelling (BIM) model are highly beneficial for the management of demolition processes.

6. Further training and training requirements:

There is a considerable requirement for further training in the management of digital data and information (BIM).

Training courses on the following topics are particularly in demand: introduction to BIM, deconstruction, management of an exchange platform and reuse of materials.

7. The provision of detailed component data and model updates:

The availability of detailed component data within BIM libraries is a crucial factor in the effective management of buildings at the end of their functional lifespan.

The BIM model is subject to updates throughout the entire life cycle of a building.

8. Simulation of the dismantling process:A BIM model that can simulate the dismantling process is considered important in order to optimise material recovery.

Awareness of digitalisation through BIM

The survey findings indicate that the majority of companies surveyed are aware of the digitalisation of the construction supply chain through the BIM (Building Information Modelling) method. This is a positive indicator that the industry has recognised the importance and benefits of digitalisation. BIM enables improved planning, execution and management of construction projects through the creation and use of digital models that contain all relevant information about a building.

The application of BIM in various phases

- BIM is frequently employed in the design and construction phases, in particular. The utilisation of BIM in these phases offers considerable advantages, including:
- In the design phase, BIM facilitates precise and efficient planning by enabling architects and engineers to create detailed three-dimensional models. These models can simulate and optimise various aspects, including structure, materials and energy efficiency.
- Construction: During the construction phase, BIM facilitates enhanced coordination between disparate trades, curtails the occurrence of errors and enables the monitoring of construction progress. By utilising BIM, construction companies can realise savings in time and financial resources by recognising and rectifying potential issues at an early stage.
- There is potential for expansion in the application of Building Information Modelling (BIM) to maintenance, renovation and demolition. However, there is still room for expansion in the use of BIM in these areas. There is considerable potential here to integrate BIM more comprehensively.
- BIM can be employed to facilitate the continuous monitoring of a building's condition, thereby enabling more efficient planning of maintenance work. By integrating sensors and IoT technologies, real-time data can be fed into the BIM model, allowing for the implementation of preventive maintenance measures and the extension of a building's service life.

- In the context of renovation projects, the utilisation of BIM can facilitate the accurate documentation of existing structures and the simulation of the effects of proposed changes. This approach enables more effective planning and execution of renovation work, minimises potential risks and optimises the utilisation of resources.

• Demolition: BIM can facilitate the demolition process by accurately documenting a building's materials and structures. This allows for the selective dismantling and recycling of materials, which contributes to a more sustainable construction industry.

The results of the survey indicate that there is still potential for more comprehensive integration of BIM in all phases of the construction process. Companies that have already successfully implemented BIM in design and construction should also leverage the benefits of BIM in maintenance, renovation and demolition. This may necessitate additional training and investment in technology, but offers significant long-term benefits in terms of efficiency, cost savings and sustainability.

In conclusion, the survey results demonstrate that the digitalisation of the construction supply chain through Building Information Modelling (BIM) is well underway in Germany. However, in order to realise the full potential of BIM, it is essential that companies integrate BIM into all phases of the construction process. This will not only enhance the efficiency and quality of construction projects, but also contribute to sustainability and resource conservation in the construction industry.

Construction site management and scheduling Digital BIM twins

Digital Building Information Modelling (BIM) twins are primarily utilised for the management and scheduling of construction sites. This application offers a number of significant advantages, including:

• Efficient construction site management: The utilisation of digital twins facilitates the real-time monitoring of construction site progress, thereby enabling enhanced coordination of the various trades and expediting the identification and rectification of issues.

• Optimised scheduling: The utilisation of digital twins facilitates the generation and amendment of construction plans through a process of comparing the actual progress with the planned schedule. This results in a more accurate scheduling process and a reduction in delays.

Cost management represents a relatively underdeveloped area of application for digital BIM twins. However, there is considerable potential for these technologies to offer significant benefits in this domain.

• Cost control: The utilisation of digital twins facilitates the monitoring and control of the financial aspects of a construction project. By integrating real-time data, construction managers can identify discrepancies from the budget at an early stage, enabling the implementation of corrective measures.

Cost forecasts: The use of digital twins facilitates the creation of more accurate cost forecasts, as they enable a comprehensive analysis of the requisite materials and labour hours.

It is evident that the potential of digital twins is not yet fully utilised in the area of security.

• Hazard analysis: The utilisation of digital twins enables the identification and analysis of potential hazards on construction sites, thereby facilitating the proactive planning and implementation of safety measures.

• Education and training: The utilisation of digital twins for the simulation of construction site scenarios facilitates the education and training of construction workers. This approach enhances awareness of safety risks and thus contributes to the prevention of accidents.

Furthermore, the utilisation of digital twins in the demolition process can be extended.

• Planning the demolition: Digital twins can provide detailed information about the structure and materials of a building, thus facilitating the planning of the demolition process. This enables the demolition to be carried out with greater precision and safety.

• Material recovery: By meticulously cataloguing the materials within a digital twin, the demolition process can be meticulously planned in a manner that allows for the efficient recovery and reuse of valuable materials.

In conclusion, the results of the survey indicate that the benefits of digital BIM twins in the areas of cost management, safety and demolition are not yet being fully utilised. It is therefore recommended that organisations make greater use of the potential of this technology in these areas to further improve the efficiency and safety of their construction projects. This may require additional investment in technology and training, but offers significant long-term benefits.

Specialisation: Interest in the internal processes of Building Information Modelling (BIM).

The results of the survey demonstrate a notable interest among the surveyed companies in developing internal Building Information Modelling (BIM) processes with the objective of digitising their business processes. This indicates that a considerable number of companies

have identified the necessity to modernise their internal procedures and enhance their efficiency. The following section presents a detailed analysis of the survey responses.

1. Awareness of and Readiness for Digitalisation

A high level of approval was evident, with an overwhelming majority of respondents (all but one) indicating interest in developing internal BIM processes. This demonstrates a widespread awareness of the benefits of digitalisation.

The interest in digitalisation is not limited to a specific role or position; rather, it is evident across a diverse range of roles, including engineers, project managers, architects, and site managers. This suggests that digitalisation is perceived as a necessity that transcends functional boundaries.

2. The rationale behind the interest in internal BIM processes

• Increased efficiency: Companies acknowledge that the implementation of digitalisation through BIM processes can result in a notable enhancement of operational efficiency. This encompasses the reduction of errors, the facilitation of enhanced communication, and the optimisation of workflows.

Cost savings can be achieved through the implementation of BIM processes, which facilitate more efficient resource management and improved precision in construction project planning.

• Competitive advantage: The successful implementation of BIM processes enables companies to gain a competitive advantage by enabling them to respond in a more innovative and flexible manner to market requirements.

3. Challenges Encountered During the Implementation Process

Training needs: A recurrent theme in the survey responses is the necessity for further education and training in the area of Building Information Modelling (BIM). Many companies have identified the requirement to provide training for their employees in digital data and information management.

Technological investment: The implementation of Building Information Modelling (BIM) processes necessitates investment in technology and software. Organisations must be prepared to invest in the requisite tools and platforms to fully capitalise on the benefits of BIM.

• Change management: The implementation of new processes and technologies necessitates the implementation of effective change management strategies. It is incumbent upon companies to ensure that all stakeholders are aware of and accept the new processes.

4. Potential benefits of internal BIM processes

• Improved project coordination: The utilisation of Building Information Modelling (BIM) facilitates enhanced coordination between disparate departments and external partners,

thereby ensuring a more streamlined project execution and a reduction in the occurrence of miscommunications.

• Data integration and utilisation: Building Information Modelling (BIM) facilitates the integration and utilisation of data throughout the entire life cycle of a construction project, encompassing the planning, construction, maintenance and demolition of buildings.

• Sustainability: By planning and managing construction projects with greater precision, companies can work in a more sustainable manner, utilising resources in a more efficient and waste-reduced manner throughout the entire life cycle of a construction project, including the planning, construction, maintenance and demolition of buildings.

In conclusion, the considerable interest in developing internal Building Information Modelling (BIM) processes demonstrates that a significant number of companies have acknowledged the necessity to modernise their internal procedures and enhance their efficiency. The survey findings substantiate the willingness of companies to invest in technology and training in order to fully capitalise on digitalisation. With the requisite support and resources, companies can optimise their internal processes and equip themselves for the future of construction.

Activity in the demolition process

1. Material Inventory

The frequency of activity is considerable, with a significant proportion of companies engaged in the materials inventory phase. This represents a pivotal initial stage in the demolition process, as an accurate inventory serves as the foundation for subsequent procedures.

The importance of a thorough inventory cannot be overstated, as it allows for the accurate recording of the quantity and type of materials generated during demolition. This information is vital for determining which materials can be reused or recycled.

2. Selective dismantling of materials

The selective dismantling of materials is also a frequently performed activity, indicating that companies are keen to remove materials selectively in order to facilitate their reuse or recycling.

The significance of selective dismantling is that it allows valuable materials, such as metals, wood and glass, to be separated and prepared for reuse. This has the dual benefit of reducing waste and contributing to sustainability.

3. Storage of Materials

The frequency of activity indicates that some companies are engaged in the storage of materials. This is a crucial phase in the process of ensuring the safe and proper storage of materials intended for reuse or recycling.

The objective of proper storage is to prevent damage to the materials in question and to ensure that they remain in good condition until they can be reused or recycled.

4. The resale of materials

The frequency of activity is less common, yet still an important aspect of the circular economy. The resale of materials plays a role in this process by returning materials to the market, thus contributing to the overall sustainability of the economy.

Significance: The resale of materials can generate additional revenue for companies while simultaneously reducing the demand for new materials.

5. Reuse of materials

The reuse of materials is another significant activity undertaken by some companies, demonstrating a dedication to sustainability and resource conservation.

The significance of the reuse of materials is twofold: firstly, it reduces the necessity for new resources, and secondly, it minimizes waste. This has the effect of reducing the environmental impact and promoting sustainable building practices.

In conclusion, the results of the survey demonstrate that the organizations surveyed are active in various phases of the demolition process, particularly in the inventory and selective dismantling of materials. This highlights the significance of meticulous planning and the execution of demolition in order to efficiently reuse or recycle materials. Companies that adopt these practices contribute to sustainability and resource conservation while reducing costs and generating additional revenue. Promoting and supporting such activities can facilitate the transition of the construction industry towards greater sustainability and environmental responsibility.

Usefulness of digital platforms

1. Material inventory

The majority of respondents rated digital platforms as useful for the inventory of materials. These platforms enable the precise recording and documentation of existing materials, which serves as the foundation for subsequent demolition process steps.

The advantages of digital recording are manifold. Firstly, it allows materials to be catalogued and managed efficiently. Secondly, it facilitates the planning and execution of demolition, ensuring that valuable materials are identified and prepared for reuse or recycling.

2. Selective dismantling of materials

The utilisation of digital platforms is also perceived as beneficial for the selective dismantling of materials. These platforms offer the necessary tools for the planning and monitoring of dismantling processes.

Advantages: The utilisation of digital platforms enables companies to ensure that materials are removed in a targeted and careful manner. This minimises damage and increases the amount of reusable or recyclable materials. Furthermore, the platforms facilitate the real-time monitoring of dismantling progress, allowing for adjustments to be made if necessary.

3. The storage of materials

The utilisation of digital platforms is also beneficial in the context of material storage. These platforms facilitate the management of stock levels and the tracking of materials.

The advantages of efficient stock management are twofold: firstly, materials are stored safely and properly until they can be reused or recycled; secondly, digital platforms facilitate the monitoring of stock levels in real time, ensuring the rapid availability of materials when required.

4. The resale of materials

The resale of materials is made more feasible by digital platforms that provide marketplace functions and connections to potential purchasers. The utilisation of digital platforms allows companies to market and sell materials in an efficient manner, thereby generating additional revenue and contributing to the circular economy by reintroducing materials into the market.

5. Reuse of materials

The reuse of materials is facilitated by digital platforms that provide information on the availability and condition of materials.

The utilisation of digital platforms facilitates the efficient identification and utilisation of materials for new construction projects, thereby reducing the necessity for new resources and minimising waste, which contributes to a more sustainable construction industry. In conclusion, the results of the survey indicate that digital platforms integrated with a Building Information Modelling (BIM) model are regarded as highly beneficial for the management of demolition processes. These platforms offer a plethora of benefits, including enhanced coordination and monitoring of the demolition process, more effective utilisation of resources and augmented sustainability. Organisations that utilise these technologies can optimise their processes, reduce costs and make a positive impact on the environment simultaneously. The promotion and implementation of such digital platforms can enhance the efficiency and sustainability of the construction industry as a whole.

Further training and training requirements

1. Introduction to Building Information Modelling (BIM)

A significant number of respondents indicated a keen interest in training courses designed to introduce them to the basics of Building Information Modelling (BIM). This suggests a clear and fundamental need to expand understanding and knowledge of BIM.

The content of the training should encompass the fundamental principles of BIM, an analysis of its advantages and disadvantages, and an investigation of its potential applications at various stages of the construction process. The objective is to equip participants with a comprehensive understanding that can serve as a foundation for further learning and development.

2. Deconstruction

Similarly, training courses on deconstruction are also in high demand, reflecting the growing interest in sustainable building practices and the reuse of materials.

The training should encompass techniques and methodologies pertaining to selective dismantling, the identification and assessment of reusable materials, and the planning and execution of deconstruction projects. The incorporation of practical exercises and case studies can facilitate a more profound understanding of the theoretical concepts.

3. The management of an exchange platform (Common Data Environment, CDE)

The management of an exchange platform represents another significant training need, as highlighted by the interviewees. The establishment of a Common Data Environment (CDE) is vital for the effective collaboration and data exchange inherent to BIM projects.

The training should encompass the establishment and administration of a CDE, the incorporation of data from disparate sources, the assurance of data integrity and confidentiality, and the utilisation of the platform for project coordination and communication. The objective is to equip participants with the competencies necessary for the effective utilisation and management of a CDE.

4. Reuse of materials

The reuse of materials represents another key topic included in the training requirements, reflecting a growing awareness of the importance of the circular economy in the construction industry.

The training programme should encompass the following elements: the identification and evaluation of reusable materials, the planning and implementation of material reuse projects, and an analysis of the economic and environmental benefits of reuse. The inclusion of practical examples and best practices will facilitate the application of the concepts by participants.

In conclusion, the results of the survey indicate a significant requirement for additional training in the domain of digital data and information management, particularly in the context of Building Information Modelling (BIM). Training courses on the following topics are particularly in demand: introduction to BIM, deconstruction, management of an exchange platform and reuse of materials. This demonstrates that the industry is willing to invest in the training of its employees in order to meet the demands of digitalisation. Through targeted training programmes, companies can ensure that their employees possess the requisite knowledge and skills to utilise BIM effectively and fully capitalise on the benefits of digitalisation. This will not only enhance the efficiency and quality of construction projects, but also contribute to sustainability and resource conservation in the construction industry.

Detailed component data and model update

1. The significance of comprehensive component data within BIM libraries

The majority of respondents highlighted the significance of detailed component data in BIM libraries, emphasising its pivotal role in effectively managing the entire life cycle of a building, particularly with regard to end-of-life management.

The detailed component data encompasses a plethora of information, including materials, dimensions, manufacturers, maintenance requirements, and recycling options. This data provides the necessary insight to make informed decisions regarding the reuse and recycling of materials.

The availability of detailed component data enables companies to enhance the sustainability of their construction projects by optimising material utilisation and minimising waste. Furthermore, this data facilitates the planning and implementation of renovation and demolition projects.

2. Processes for Updating the BIM Model

It is evident from the survey results that processes for updating the BIM model are in place at all stages of a building's lifecycle. These updates are essential for accurately reflecting renovations and changes.

Updating the BIM model can be achieved through a number of methods, including regular inspections, the integration of sensor data and collaboration with various project stakeholders. These methods ensure that the model is always populated with the most up-to-date and accurate information.

The advantages of a continuously updated BIM model are manifold. These include improved planning and coordination of construction projects, greater accuracy of data and better traceability of changes. This helps to minimise errors and increase efficiency.

3. End-of-life management

The role of Building Information Modelling (BIM) in end-of-life management of buildings is pivotal. By integrating comprehensive component data and maintaining a current model, organisations can plan and implement the deconstruction and reuse of materials in a more efficient manner.

• Sustainability: Effective end-of-life management contributes to sustainability by promoting the reuse and recycling of materials. This reduces the need for new resources and minimises waste, which has a positive impact on the environment.

In conclusion, the results of the survey demonstrate the significance of comprehensive component data within BIM libraries and the necessity for the continuous updating of BIM models throughout the lifespan of a building. These elements are vital for effective end-of-life management, ensuring the precision and timeliness of data. Organisations that adopt these practices can enhance the sustainability of their construction projects, boost efficiency and reduce costs. Promoting and implementing such processes can contribute to the overall efficiency and environmental responsibility of the construction industry.

The results of the survey indicate that the utilisation of a Building Information Modelling (BIM) model capable of simulating the dismantling process is perceived as a crucial factor in optimising material recovery. This highlights the industry's acknowledgement of the advantages of comprehensive planning and simulation in enhancing resource efficiency and reducing waste. The following section presents a comprehensive analysis of the survey responses, offering detailed insights into the subject matter.

1. The significance of simulating the dismantling process

The simulation of the demolition process enables the optimisation of material recovery. By precisely planning and carrying out the demolition of a building, companies can determine the quantity and type of materials that can be recovered with greater accuracy.

• Resource efficiency: A comprehensive simulation facilitates the more efficient utilisation of resources by optimising the demolition process and ensuring the preservation of valuable materials.

2. Advantages of simulation

The reduction of waste is another advantage of accurate planning and simulation of the dismantling process. By identifying and treating materials that can be reused or recycled, companies can minimise waste.

Cost savings can be achieved through the optimisation of the deconstruction process through simulation. The reduction of waste disposal costs can be offset by the generation of revenue from the sale or reuse of materials.

• Sustainability: The simulation of the dismantling process contributes to sustainability by promoting the reuse and recycling of materials. This reduces the necessity for new resources and consequently minimises the environmental impact.

The survey results show that a BIM model that can simulate the dismantling process is seen as important in order to optimise material recovery. This illustrates that the industry has recognised the benefits of detailed planning and simulation to use resources more efficiently and minimise waste. Here are detailed insights based on the survey responses:

1. importance of simulating the dismantling process

- Optimisation of material recovery: The simulation of the demolition process makes it possible to precisely plan and carry out the demolition of a building. The simulation allows companies to precisely determine the quantity and type of materials that can be recovered.
- Resource efficiency: A detailed simulation helps to use resources more efficiently by optimising the demolition process and ensuring that valuable materials are not lost or damaged.

2. advantages of simulation

- Reduction of waste: By accurately planning and simulating the dismantling process, companies can minimise waste. Materials that can be reused or recycled are identified and treated accordingly.
- Cost savings: Optimising the deconstruction process through simulation can lead to significant cost savings. Companies can reduce the cost of waste disposal while generating revenue from the sale or reuse of materials.
- Sustainability: The simulation of the dismantling process contributes to sustainability by promoting the reuse and recycling of materials. This reduces the need for new resources and minimises the environmental impact.

Overall conclusion of the BIM4D A.2.2 survey:

The results of the BIM4D A.2.2 survey indicate that the digitalisation of the construction supply chain in Germany is progressing at a satisfactory rate. However, there are still areas where improvements and greater integration of BIM are necessary. The willingness to undergo further training and recognise the benefits of digital platforms and models are positive indicators for the future development of the industry. With targeted measures and investments, digitalisation can be driven forward and efficiency and sustainability in the construction industry can be increased.

This is due to the fact that the digitalisation of the construction supply chain is becoming an increasingly significant issue in Germany. The report is based on the findings of the BIM4D

A.2.2 survey and provides an insight into the current implementation and utilisation of BIM across various stages of the construction process.

A brief summary is provided below:

Awareness and application of BIM

- **Awareness**: The majority of respondents are aware of the benefits of digitalisation through BIM.
- **Application**: BIM is mainly used in the design and construction phases, while it is less common in maintenance, renovation and demolition.

Use of digital BIM twins

- **Management and scheduling**: Digital BIM twins are primarily used for construction site management and scheduling.
- **Cost management and security**: The use for cost management and security aspects is less common.

Interest in internal BIM processes

- **Development of internal processes**: There is great interest in the development of internal BIM processes for the digitalisation of company processes.
- **Challenges**: Training requirements and technological investments are major challenges.

Activity in the demolition process

- **Inventory and selective dismantling**: Organisations are particularly active in the inventory and selective dismantling of materials.
- **Usefulness of digital platforms**: Digital platforms linked to BIM models are seen as very useful for managing demolition processes.

Further training and training requirements

- **High demand**: There is a high demand for training in digital data and information management (BIM).
- **Focal points**: Training courses on the topics of introduction to BIM, deconstruction, management of an exchange platform and reuse of materials are particularly in demand.

Detailed component data and model update

- **Importance**: Detailed component data in BIM libraries is important for effective end-of-life management.
- **Processes for updating**: There are processes for continuously updating the BIM model throughout the entire life cycle of a building.

Simulation of the dismantling process

- **Optimization of material recovery**: A BIM model that can simulate the dismantling process is considered important in order to optimise material recovery.