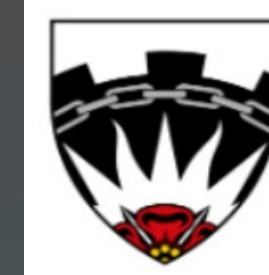


Digital Information Management System for Facilitating Construction and Demolition Waste Management



Funded by the
European Union



University of
Salford
MANCHESTER

Industry 4.0 for Construction & Demolition Waste Management

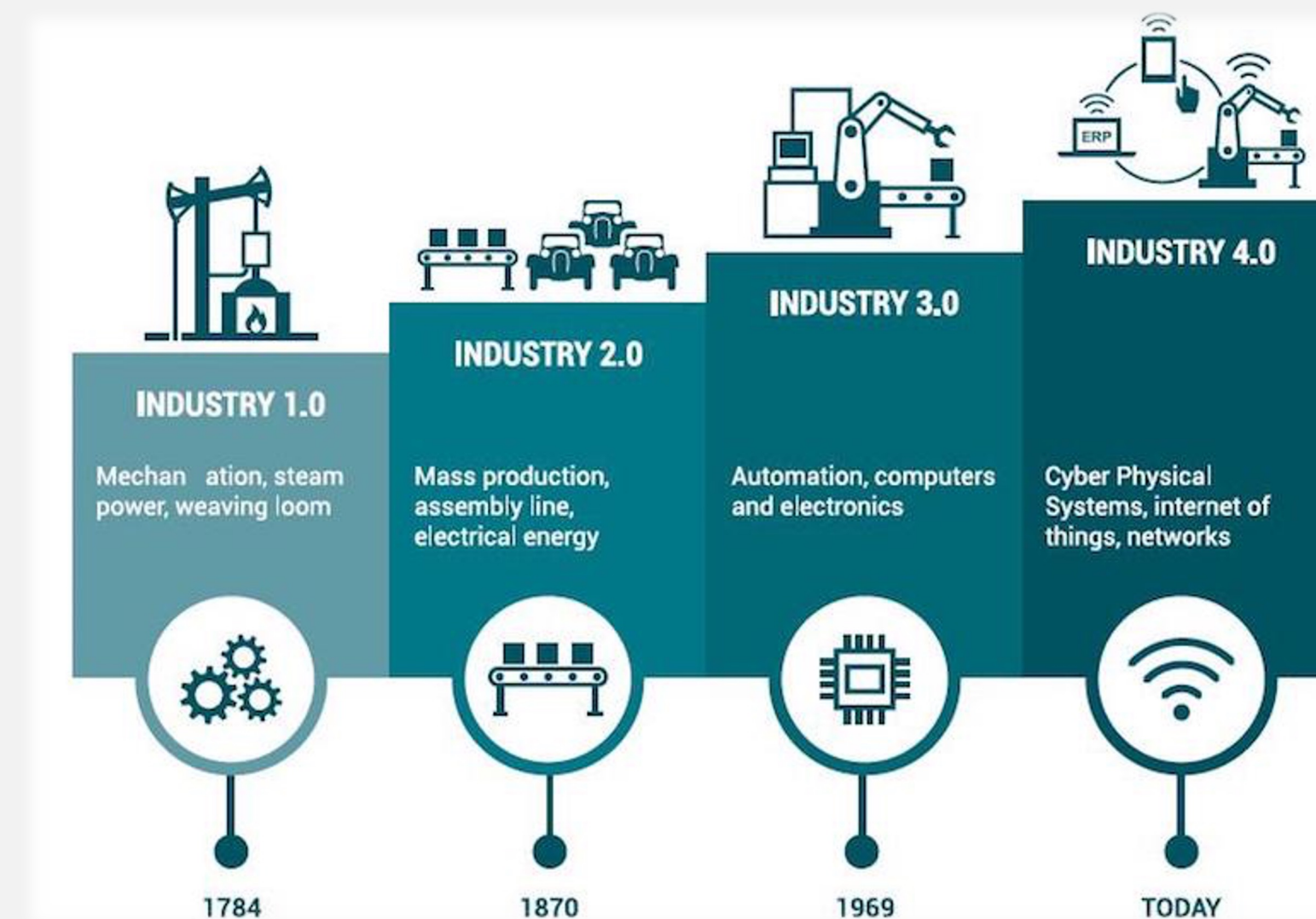
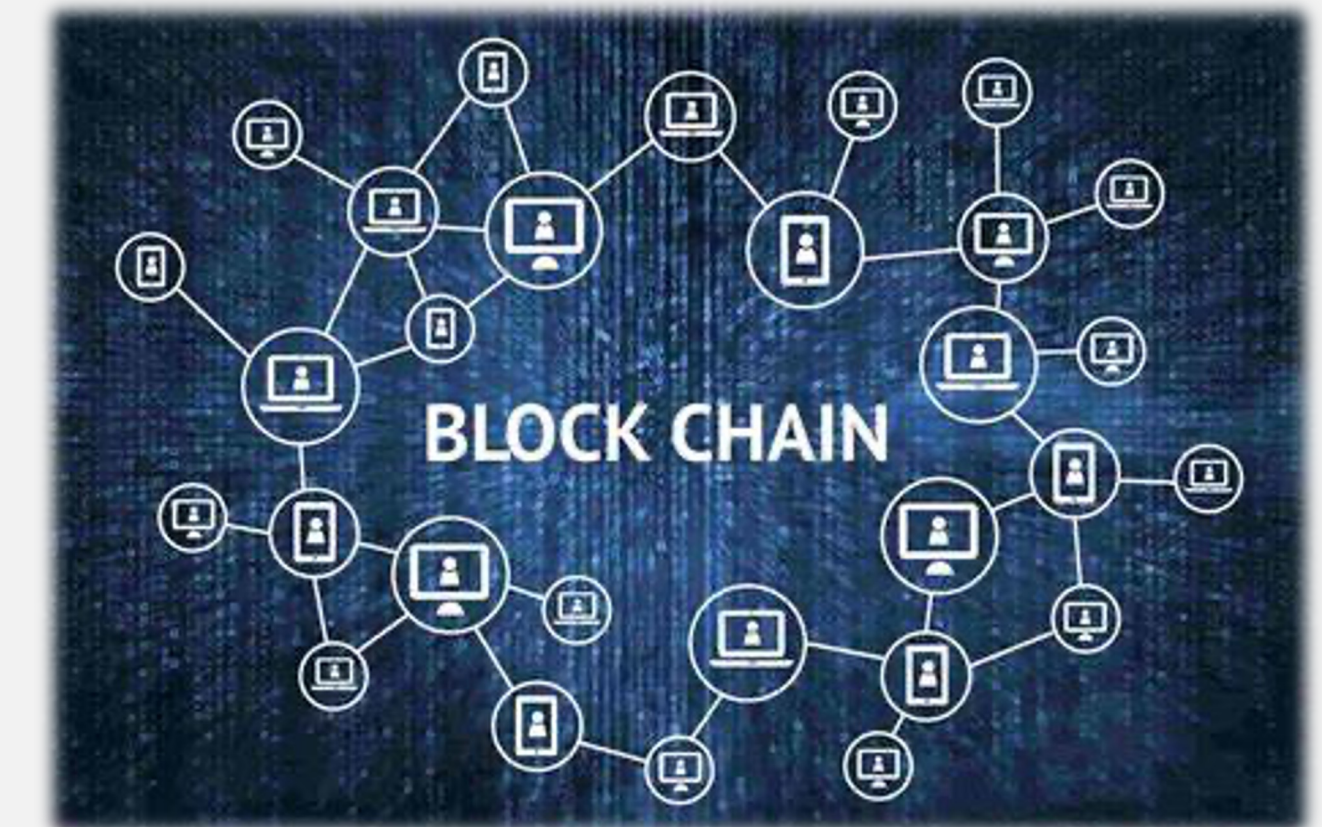
BIM



IoT



Blockchain



Industry 4.0 for Construction & Demolition Waste Management



Funded by the
European Union



In a non-integrated scenario:

- Waste management practices remain fragmented.
- Collaboration and information sharing among stakeholders become difficult, which hinders effective decision-making and resource optimisation.
- Transparency and accountability are compromised, making it challenging to track waste generation, disposal, and recycling.

BIM



IoT



Blockchain



State of the Art of Industry 4.0 Integration

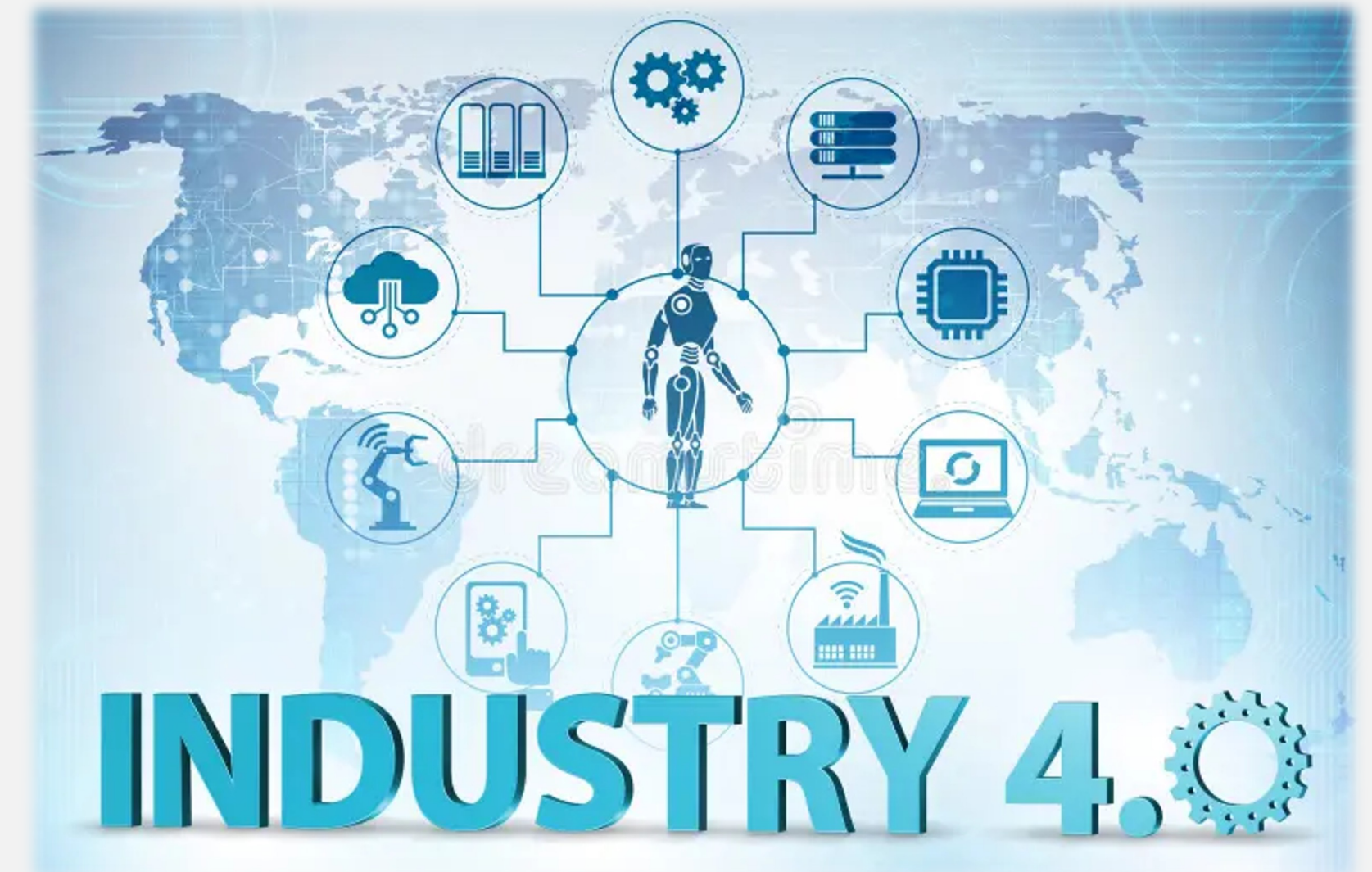


Funded by the
European Union



Extant literature identified a research gap concerning the integration of Industry 4.0 technologies to support construction waste management:

- Absence of a comprehensive digital information management system that encompasses the entire project lifecycle
- Lack of clarity regarding the roles and engagement of various stakeholders within these digital systems.
- Lack of digital systems that focus on Material Flow Analysis and its utilisation for decision-making in moving towards a circular economy.



Research Aim

... develop a DIMS that integrates Industry 4.0 Technologies such as BIM, Blockchain, and IoT to facilitate C&DWM, to facilitate material flow analysis, as a decision-making tool for moving towards a circular economy.

... will address the identified gaps in the extant literature by providing a comprehensive digital solution that covers the entire lifecycle of the project, defines the roles of stakeholders, clarifies their engagement within the digital system, ensuring real-time data collection, and data security.



Research Objectives



Funded by the
European Union



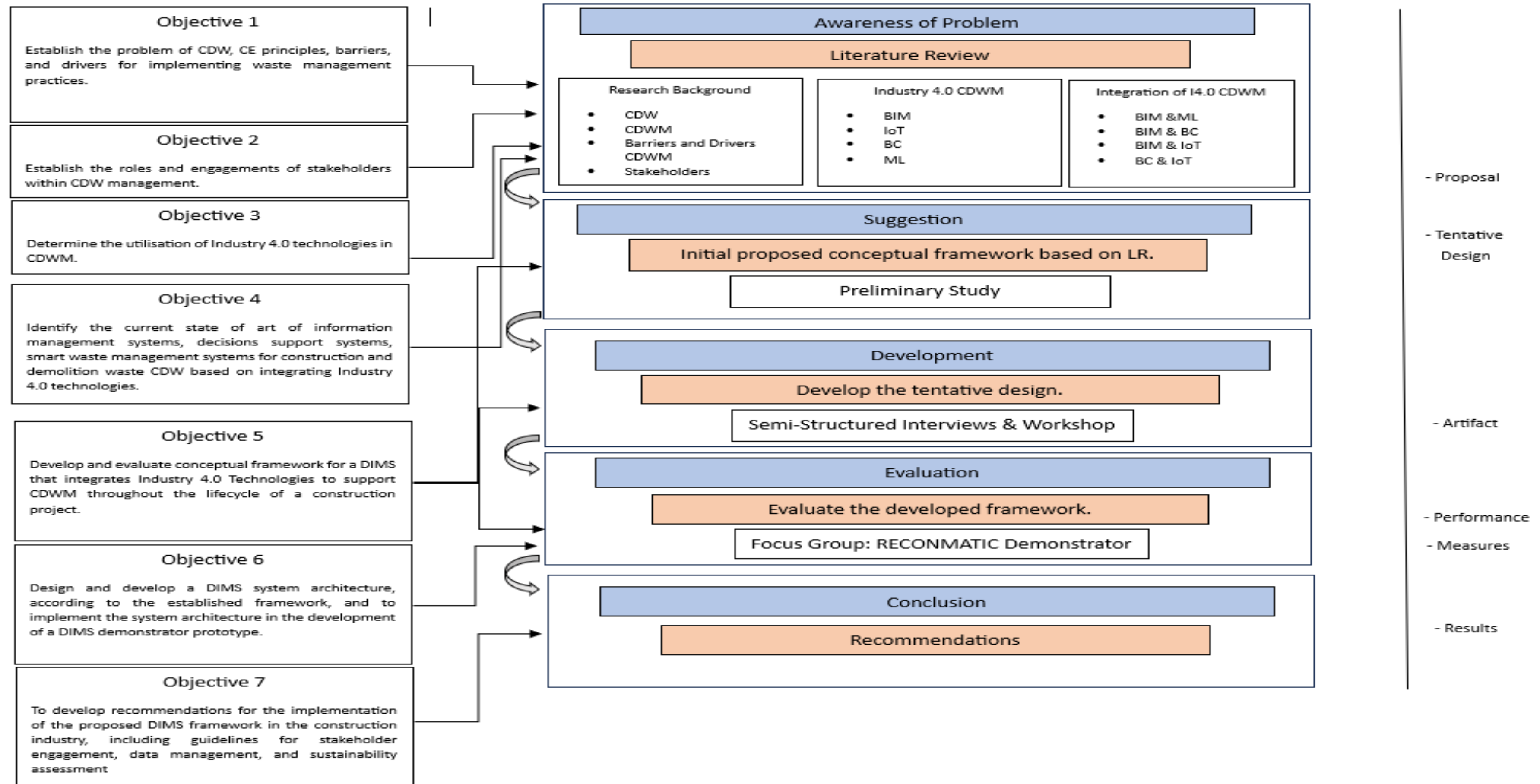
1. Establish the problem of CDW, CE principles, barriers, and drivers for implementing waste management practices
2. Establish the roles and engagements of stakeholders within CDW management.
3. Determine the utilisation of Industry 4.0 technologies in CDWM.
4. Identify the current state of art of information management systems, decisions support systems, smart waste management systems for construction and demolition waste CDW based on integrating Industry 4.0 technologies.
5. Develop and evaluate conceptual framework for a DIMS that integrates Industry 4.0 Technologies to support CDWM throughout the lifecycle of a construction project.
6. Design and develop a DIMS system architecture, according to the established framework, and to implement the system architecture in the development of a DIMS demonstrator prototype.
7. To develop recommendations for the implementation of the proposed DIMS framework in the construction industry, including guidelines for stakeholder engagement, data management, and sustainability assessment



Design Science Research Process



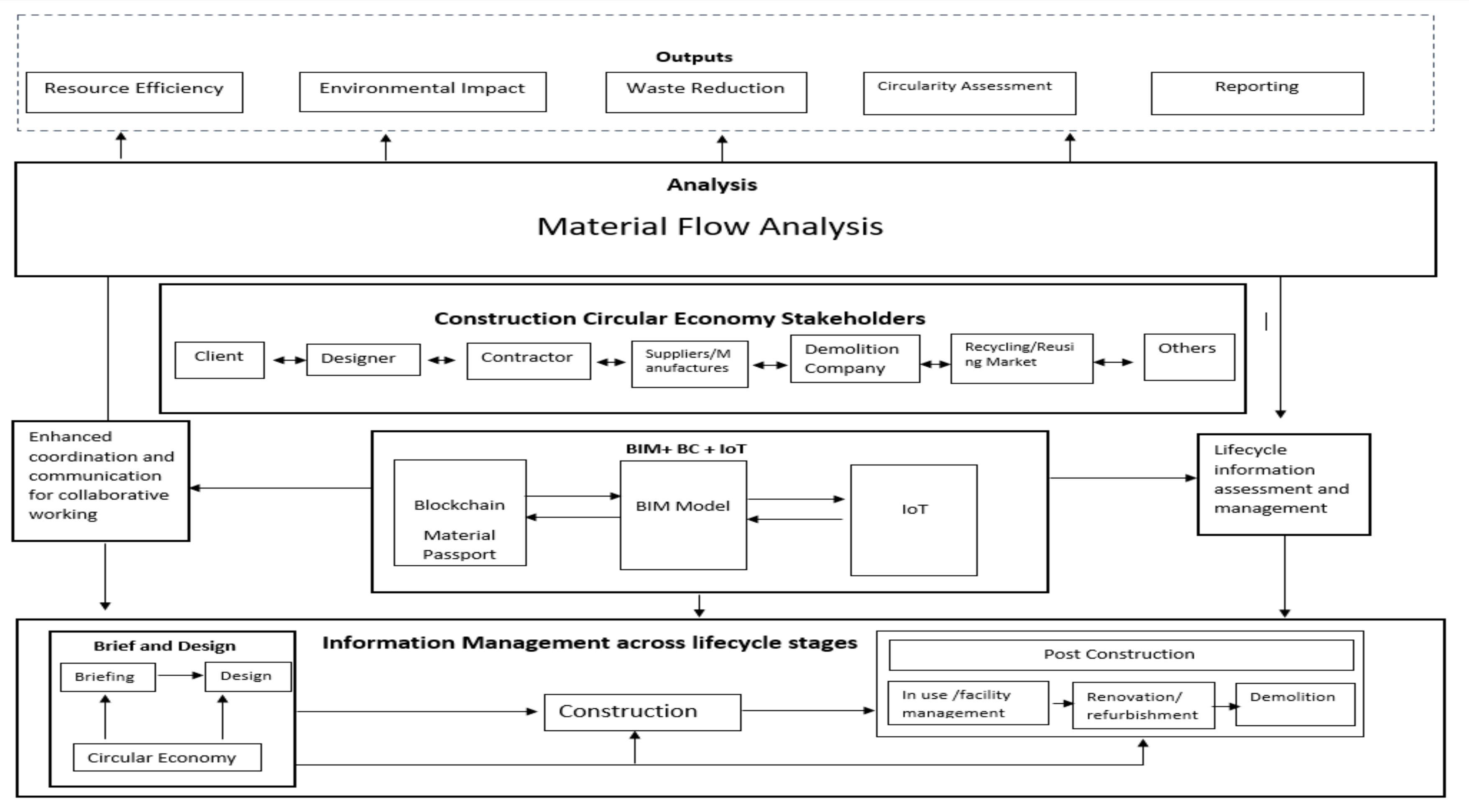
Funded by the European Union



Work Done To-date



Funded by the European Union



Preliminary Study Survey



Funded by the European Union



- Issues and barriers in C&DWM.
- Importance of Material Flow Analysis and its application in C&DWM to facilitate moving towards a circular economy.
- Potential utilisation of Industry 4.0 technologies and their integration to support material flow analysis.

Digital Information Management System for Facilitating CDWM

The aim of this project is to develop a Digital Information Management System to facilitate the implementation of Construction and Demolition Waste Management, as part of a PhD study and the Horizon Europe Project RECONMATIC. The purpose of this questionnaire is to conduct a preliminary study to assess the existence of problems and the applicability of suggested solutions in this field before proceeding to the development of the system.

* Required

Participant Information Sheet

Thank you for considering participating in this study 'Digital Information Management System for facilitating Construction and Demolition Waste Management' as a part of a PhD study and Horizon Europe RECONMATIC Project. This PhD is taking place under the supervision of the university of Salford. Please carefully read the following information, ask me if there is anything that is not clear or if you would like to get more information, and decide if you would like to contribute. This survey is expected to take between 10-15 minutes.

The aim of this project is to develop a Digital Information Management System to facilitate the implementation of Construction and Demolition Waste Management, as part of a PhD study and the Horizon Europe Project RECONMATIC. To assess the existence of problems and the development of the system. truction industry, and your insights are invaluable for the integration of digital technologies for CDWM. any time without giving a reason. By participating, nd presentations. There are no expenses associated n, questions about CDWM problems, and digital

Digital Information Management System for Facilitating CDWM

* Required

Problems in Construction & Demolition Waste Management (CDWM)

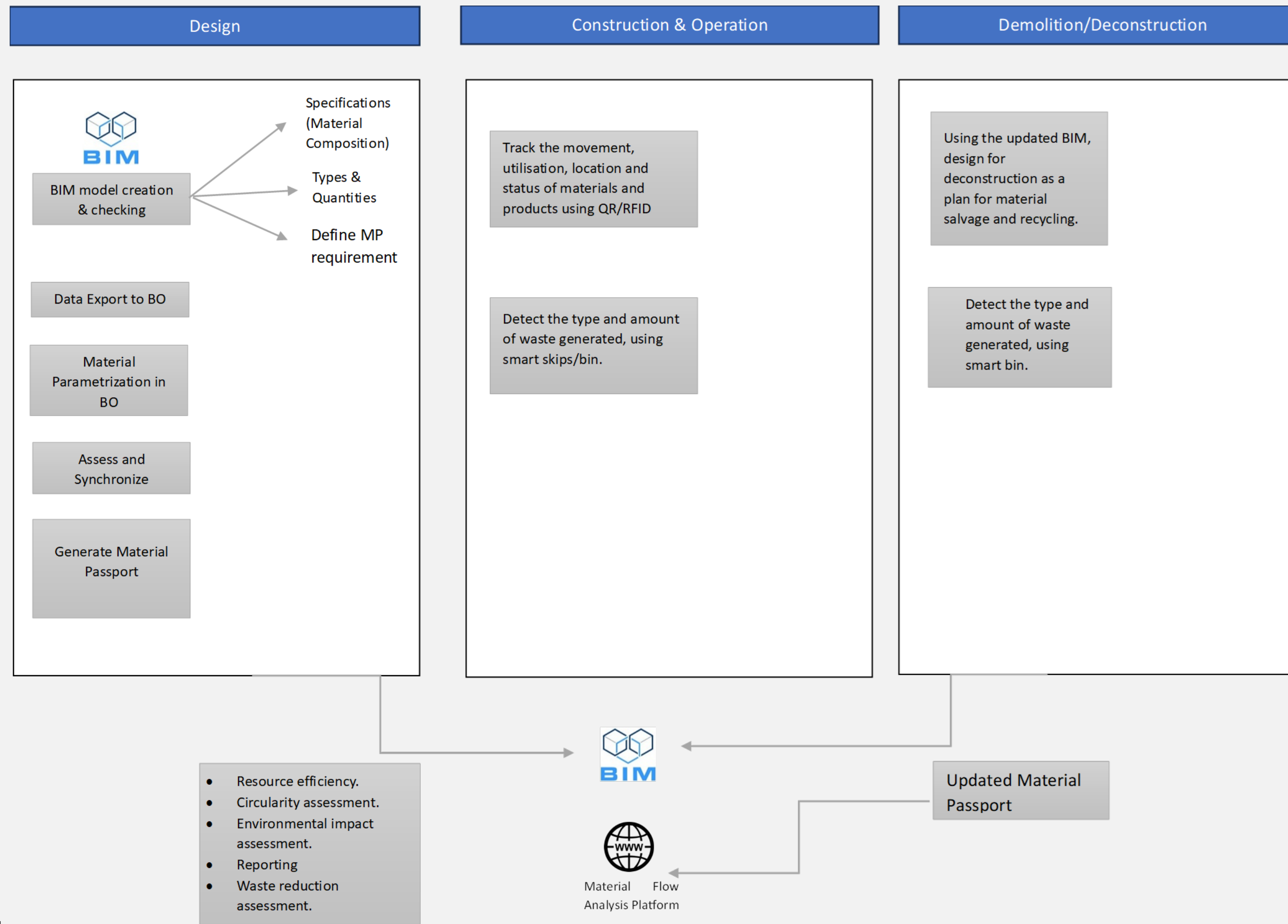
4. Please indicate your level of agreement with the following statements in Construction and Demolition Waste Management (CDWM) *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is poor cooperation, collaboration, and communication among stakeholders in (CDWM)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is lack of data transparency and information sharing within (CDWM)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is absence of participative networking, along with a lack of trust and support among stakeholders within (CDWM)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is insufficient Integrated (CDWM) processes, tools, and practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is lack of efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Activity/Process & Information Flow Mapping



Funded by the European Union



Research Contribution



Funded by the
European Union



- Bridge the gap between C&DWM and cutting-edge digital technologies.
- Deep dive into the integration of Industry 4.0 principles to facilitate the tracking of construction materials and construction waste, a topic of paramount importance in the industry's ongoing digital transformation.
- Develop a complete understanding of stakeholders' roles within this DIMS, facilitating its implementation by the industry professionals.
- Validation through a real-world case study will provide practical insights into the potential impact and feasibility of DIMS.
- Build a foundation for future researchers to start from and add to, ensuring ongoing progress in the field.



