Digital Twin Technology: A Scoping Review Of Characterization And Implementation Through Business IT Perspectives

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ABSTRACT: Digital twin is revolutionizing technology and it will convert the physical world into a virtual world in the future. Digital twin technology is considered state-of-the-art, but full implementation has yet to be occurred due to technical challenges and delays. Since, many researchers and employees from some industries such as architecture, health care, and engineering still have not completely understood the technologies and tools used in digital twin technology. This paper illustrates scoping reviews of digital twin technology in business IT within 5 years period from 2018 to 2022. The objective of the paper is to understand specifically the characterization and implementation sectors of digital twin technology in real-world applications. Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) model have been used to implement the scoping review of the study. The study findings indicate a broad description of digital twin technology characterization, implementation, and its applications in the fields of smart cities, health care and medicine, and engineering. This will aid in establishing the criteria for the necessary models, data, and processes for updating the data-driven models.

Keywords: digital twin, characterization, implementation, application, scoping review

INTRODUCTION

During the Industrial Revolution 4.0, one of the evolving technologies is Digital Twin technology, which assists digital conversion by creating modern business strategy and decision support systems for the business IT. (Delen & Demirkan, 2013)Similar to other digitization creative ideas concerning cloud computing, the internet of things (Iot), augmented reality, artificial intelligence, and machine learning. The Digital Twin technology has owned a great concentration during the current period in both terms of academia and business industry due to the increment of academic articles, research paper publications, and sales and marketing. The previous sources of academic literatures illustrate the benefits of the Digital Twin technology which involved reducing cost, and risks 5 cultivating efficiency(Delen & Demirkan, 2013) [6], increasing service offerings, reliability, safety and security, and resilience (Karve et al., 2020); and enhancing the decision-making process(Macchi et al., 2018)(Zhou et al., 2021a, 2021b). However, there is a lack of academic literature about the definition and presentation of digital twin technology especially in architecture, healthcare and engineering sectors. In detail, the various uses of definitions about digital twin technology lead to confusion that weakens the notion and bounds the capabilities of technology. To reduce this uncertainty, there is a demand to define the exact explanation of the digital twin technology and the description of the idea that distinguished it from several types of similar technologies.

Additionally, it should be highlighted that a large number of present literature on a digital twin is mostly precise on analytical methodologies, technical methods, and the difficulties posed by data gathering and incorporation into the Digital Twin technology. Examples of actual implementations are required that consider deployment tactics and decision assistance to produce desired results with quantifiable advantages. A digital twin implementation strategy must also consider the present Digital Twins technology, which has both technical and cultural obstacles kept them from providing the benefits they promise. Finally, to implement Digital Twins, numerous enabling technologies and their technological development and maturity must be realized.

This study illustrates the current state of digital twin technology as a subset of a larger cluster of digitization initiatives meant to improve current workflows and support fresh services. The following are the contributions of this paper. First, existing definitions of the "Digital Twin" characterizations are examined in (Section 1), and then the term's primary implementation and attributes (Section 2). Then, the method and factors to be considered for characteristics and implementing digital twins for real-world applications are described (Section 3). Finally, recent difficulties, future requirements, and benefits for proper development are illustrated (Section 4). Finally, (Section 5) involves conclusion remarks.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Digital Twin Characterization

Based on his collaboration with John Vickers, Michael Grieves presented the concept of digital twin technology in the product life-cycle administration in 2003, as it first appeared. The inspiration behind Grieves and Vicker's creation of the goal remained to get away from primarily manual and paper-based product information to a digital representation of the product that would be necessary as a base for life-cycle management. Comparable ideas like Cypher Physical Systems (CPS) and Internet of Things (IOT) all concentrate on the notion of coupling an outer structure into figures of data, computational but does so from contrasting viewpoints such as CPS idea is from the IOT system engineering and IT networking standpoint, but the computational modeling was from the machine learning and artificial intelligence standpoint.

Vickers and Grieves initially defined the term "Digital Twin," claiming that it encompassed three elements: a physical object in reality, a computer-generated model of that product in virtuality, and the links of information and data that connected the virtual and real environments. Grieves' initial description, which this work aims to return to and generalize, has been diluted by the proliferation of definitions and characterizations that have resulted from the interest in digital twins over the past 20 years across a wide range of businesses.

According to the broad definition offered directly above, the Digital Twin technology can be divided into three main parts: (1) a physical object, (2) a virtual model, and (3) links that allow the virtual and physical models to communicate with one another.

These three elements are further covered in the following subsections.

The Physical Reality

The physical reality of interest has been described in the literature about Digital Twin technology using an extensive range of vocabulary, much of which is domain specific. This paper proposes the phrase "physical reality" as the most all-encompassing way to describe what may be tried to be modeled since physical reality comprises the known and unknown system. The whole thing can be reduced to its physical components- the system, the environment, and the developments.

Physical System

This is known as the collection of interdependent, interacting components that make up the physical system. The structure or function of this group of elements is frequently discussed, and it is distinguished from other types of technology by limits in time and space. The choice of the border often uses the natural divisions connected to the more conventional definition of the expression design. As is evident, the interest involved in the physical environment is often artificial, but as the Digital Twin technology spreads to other sectors like the administration of health(Mohammadi et al., 2018) and agriculture(Verdouw & Kruize, n.d.), it may also be a part of nature, environment, and the physical body of the humans.

Physical Setting

The environment in which the setting of interest was located in a physical environment. The physical process is dominated and surrounded by the physical environment, and the two interact. According to each unique design of the digital twin application, the difference between the physical environment and the physical setting is already established. This distinction may be straightforward in some situations but challenging in others, for instance, in the additive production process. In this instance, the 3D printer is the system of interest on a physical level. At the same time, the surrounding environment includes additional elements directly bearing on the process itself, such as noise, temperature, and humidity.

Physical Processes

Physical processes can be defined as the meaning of a system, its interaction with the outside world, and how its constituent parts experience state changes. For instance, casting, forging, welding, and other physical processes may be relevant in manufacturing. In the case of asset life-cycle management, the way the interest processing style may be degradation procedures, which might cause the physical setting states to change over time, or the system always setting effects on the loading process. Physical methods may also be characterized in the virtual environment, much like the real system and physical environment to facilitate simulations, optimization, and forecasting.

Virtual Representation

Virtual models should be definite models for physical things, reproducing their geometry, attributes, behaviors, and rules (Baruffaldi et al., 2019). The three aspects of geometric models depict a real-world object regarding its size, shape, tolerance, and structural relationship. Physical qualities, such as speed, wear, and force, are reflected in the entities of the physical phenomena, such as deformation, corrosion, fracture, and delamination. The behavior model has described behavior such as state transition, performance decline, and coordination, which are a few examples of actions and responses that entities use to deal with changes in the outside surroundings. The rule frameworks give DT logical skills, including reasoning, judgment, and independent making decisions, by adhering to the guidelines derived from past data or subject-matter experts.

Virtual System

The virtual system could be assumed as the element of the virtual representation. The virtual system includes the information and models of the relevant physical system entities at a selected degree of abstraction. It is vital to remember that the virtual system could include various abstract terms of the physical system, 18 and those kinds of models might or might not directly relate to one another. For instance, in an aeroelasticity analysis of an airfoil, the structure model may use the output way and the aerodynamics model as the input way (two-way coupling).

Virtual Environment

The virtual environment illustrates the natural environment, which looks like a virtual system. Due to the fact mentioned, the virtual illustration of the actual setting can be a specific degree of generalization.

Virtual Process

The abstract level selected for the virtual illustration; virtual processes designate how the virtual system expresses. A virtual representation of the relevant physical processes is the most typical format. These computer simulations of the physical state changes aid in developing the knowledge needed to assist decision-making.

The connection of input and output of a certain process that modifies system states (such as degradation processes, load application and system dynamics etc.) is utilized to build the computational models that are employed to achieve this. These processes' input-output connections are derived from well-established physical principles or data-driven models built using input-output information. The connection between physical setting and virtual setting

The connection between physical objects and virtual models where data and information are transferred in both verse versa. The connection is the last element of the idea of digital twin technology.

Physical To The Virtual Connection

The link between the real and virtual worlds enables the incorporation of newly acquired knowledge from the real world into the most up-to-date version of the state illustrations stored in the virtual world. There are three steps in establishing a physical-to-virtual connection concerning gathering the required data, interpreting the data, and updating the states of virtual representation.

The Internet of Things (IoT) and sensor technology are frequently mentioned when addressing data collecting for the Digital Twin in the first step(Canedo, 2016; Madni et al., n.d.; Verdouw & Kruize, n.d.) . Even though they are not strictly necessary, technologies that allow for more frequent and extensive measurement are often credited with increasing interest in Digital Twin concepts. The significant fact that needs to be highlighted is that manual data and offline data collection methods, such as repair records, visual inspection and non-destructive evaluation, are also pertinent in this context.

Interpreting the data acquired is the second phase in the process. Depending on the data, it may involve various steps, such as data processing, curation, and conversion. For example, consider how strain readings are obtained from measuring a power shift in a strain gauge. However, a more abstract depiction would require additional interpretation, such as converting strain data to load cycle counts.

Utilizing the data to be updated the steps of the virtual illustration is the third stage of the process. In the most straightforward scenarios, the virtual representation is updated to reflect the observed physical system step when the measured data precisely matches a state kept in it. The update of the critical unidentified step of the system and the measurement of the model design is frequently accomplished via system identification approaches.

Virtual-Physical Connection

To link the virtual world to the real world is to reverse the process by which information and data from the virtual world are transmitted to the real world and its actual things. In the digital twin context, it is important to note that the insight and decisions produced from the virtual environment needs to be comprehended closely in the physical environment. Either the data updates or additional information from the physical world needs to be updated time to the virtual world.

Digital Twin Implementation

A crucial element of Industry 4.0, digital transformation is seen as a catalyst for more inventive, optimized, and efficient products and processes. The use of digital twins in real life corresponds to the idea of digital transition, where developing an innovation of business model targets to represent the value of the data and how it behaves a wide range of technical components are present in Digital Twin components make up an implementation of a Digital Twin that we aim to generalize. Specifying is one of the fundamental components of a Digital Twin implementation which desired results, specifying the scope of the solution both identifying the physical development of the virtual world, the system of interest and layers of abstraction creating necessary data linkages and representation. A quick analysis of present adoptions of digital twins could be divided into three types: commercial off-the-shelf options, hybrid solutions with customized designs, and digital twin-component solutions. Many of the advertised Digital Twin product options were delivered by platform providers such as Microsoft, or by using a computer simulation or model businesses like Ansys. Typically, these companies promote Digital twin strategies that draw on their product offerings in part, it can be combined to provide a customized solution for digital twin implementation. The final is how the digital twin is built. Digital Twin products that are off the shelf are the next most popular category. Typically, these are supplied by original equipment manufacturers (OEMs), like GE(Power Digital Solutions, 2016), for examples of typical industrial use.

The last group entirely owns hybrid strategies, in which the user creates their frequently combined commercial and personalized items, as a solution. Since an organization uses a hybrid approach internally, it is difficult to estimate the extent of its industrial application. Despite this, it can be the most effective outcome since the abilities of the technology can be arranged and the functions can be managed with a regular increase. According to Myung-Sun Baek, Deuk Young Jeong (Jeong et al., 2022a) digital twin implementation process can be divided into five layers which is composed of 1. Digital virtualization, 2. Digital twin synchronization, 3. Modeling and simulation, 4. Federated digital twin and 5. Intelligent digital twin services.

Digital Virtualization

Digital virtualization is an essential component of digital twin technology. Among this component, the object's information and data in the physical environment are gathered and transferred to the virtual environment. Moreover, the digitalized data was managed to be analysed and visualized for intended objects. This layer is made up of eight different parts, including a virtual sensor, object recognition, data collection and processing, multidimensional data casual relation analysis and technology integration, and real-world data pre-processing; multidimensional data and object modelling; a processing and analysis framework; a digital object transferred storage solution; and sensor replacement optimization.

Digital Twin Synchronization

In this stage, physical things are related to the digital model in the virtual world. This process involves seven technological elements: data transmission at high speeds with minimal latency, management of data transmission and space-time synchronization technologies, reduction of workload, verification of data and information efficacy, object cleaning, actuation in the real world, and updating of data in real time. (Olatunji et al., 2021)

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Modeling and simulation

During the modeling and simulation process, physical object problems were solved within a digital model and several simulations are processed. In this layer, it must be considered both perceptible and impalpable objects. (Wright & Davidson, 2020). The elements involved in this stage are electronic physics displaying, the rule of the system technology, behavioral modeling, digital twin replication and modeling confirmation, instinctive state generation and tailoring, and certification technologies.

Federated digital twin

This stage involves a strategy to create huge-sized digital models originating from numerous types of small digital twin models. Consequently, internetworking and collaboration technologies of several digital twins could be the technical elements which is assumed for the administration of the digital twin technology, the organization for metadata formation and arrangement, intelligence federation and technologies for exchanging the data between digital twin models. (Rassõlkin et al., 2021)

Intelligent digital twin services

This stage relates to services and service management of digital twin technology which always uses the same podium. In the initial stage, high-speed visualization, managing service resources for intelligence and service information arrangement is associated with digital twin facility technologies. Other correlated examples are service assessment, problem discovery, and service preservation technologies. Eine Architektur (Ashtari Talkhestani et al., 2019) described the architecture and necessary parts for an intelligent digital twin such as plug-and-play, personal learning and curative prognostic conservation. The synopsis of the intelligence of the digital twin technology in use was presented in reference.(Olatunji et al., 2021)

Digital twin applications

The applications of digital twins can be divided into three parts in this paper. The primary technology areas are smart cities, health care, medicine, and engineering-related software conducted in digital twin technology.

Smart cities

As the number of "smart cities" grows, more digital twins will be used in the global IT community. In addition to this, digital technology may be guaranteed for smart cities' sustainability, citizen welfare, and economic growth. Additionally, it has applications in asset management, maintenance, and city planning for specific sectors. The quality of life, mobility, and citizen services may all be improved with the help of city-scale digital twin technologies.(Wright & Davidson, 2020). Instead of striving for economic efficiency, the digital twin approach focuses on bettering people's quality of life. From industries and constructions to stadiums and whole towns, Microsoft Azure's digital twins can combine heterogeneous assets and environments and glean information from them all.

Meanwhile, Dassault Systems pushes the envelope by including VR and 3D rendering into the system. According to White G(White et al., n.d.), The authors explain how traffic, transportation, electricity generation, utility provisioning, management of water sources, and trash management are just a few examples of the many data sources that modern cities generate. In today's more developed smart cities, the application of digital twin technologies has expanded.

Health care and medicine

Recent reports18 have surfaced in the literature on the use of digital twin technology in healthcare. Several possible use domains have already been identified, including fitness, (Barricelli et al., 2020) simulations of viral infections, and promoting healthy lifestyles in smart cities.(Laamarti et al., 2020) , healthcare administration(Laaki et al., 2019) and the potential of remote surgery (Laaki et al., 2019).

Digital twin technology has several applications in healthcare administration, including AI and data science methods for delivering individualized patient treatment. Implementing such technologies creates a digital copy of a person's physical form, complete with all their bodily data, which can then be accessed in the real world by mobile phones, online services, and wearable sensors.(Shengli, 2021)

Engineering

Digital twin technology is essential for process modeling, simulation, and cyber-physical system optimization(Guerra et al., 2019). It can enhance our understanding of intricate physical processes by providing their diagnosis, modeling, monitoring, optimization, prognosis, and health management services.(Qi et al., 2021a). As a result, DTs allow businesses to do more exact calculations, make the same choices, and make better arrangements (Tao et al., 2019). To predict a physical system's future behavior and performance, DT applications in engineering aim to provide valuable industry data, allowing or self-adaptive behavior from the machinery (predictive) (Bottani & Murino, 2017; Zhou et al., 2021a). AR and VR for simulation through the DT are safer techniques (with extra capabilities) that allow for working in risky conditions and remote access, even if a DT need not imply a spatial/visual model. (Rassõlkin et al., 2021). However, only around 18% of engineering DT applications are used for design. The remaining 35% find application in the industrial sector, 38% in prognostics and health management (PHM), and 9% elsewhere.(Tao et al., 2019). The manufacturing creation lifetime includes steps such as plan, manufacture, distribution, consumption, and even end of life, each of which may call for different considerations.(Singh et al., 2021).

RESEARCH METHODOLOGY

The scoping review of this paper us the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols Extension for Scoping Reviews) guidelines. The components of a scoping review are a review of relevant literature, curating relevant articles, extracting and analyzing relevant data, and discussing the consequences of the research questions.

Eligibility Criteria

The research question was structured according to the Population, Concept, and Context (PCC) framework shown in Table 1

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Table 1. PCC (population, concept, and context) criteria and definitions

PCC Criteria	Definitions
Population	“Relevant features of participants, such as age and eligibility requirements” You may not need to add this part if your inquiry does not include a narrowly defined condition or population.
Concept	The scope and breadth of the inquiry can be shaped by a well-defined central notion that is the focus of the scoping review. It may include information that is often included in a systematic review, such as information about the "interventions," and/or "phenomena of interest," and/or "outcomes."
Context	" Cultural considerations may involve geography and ethnic and gender-based preferences. In some circumstances, additional information regarding the physical location may also be included as part of the context."

Search Strategy

Previous literature was reviewed on 5 academic sources and databases: Google Scholar, SAGE journals, Elsevier; IEEE Access, and Springer Link. The initial search began on January 1, 2022 (1/1/2018) and will end on December 31, 2022 (31/12/2022). The four databases were carefully selected to provide comprehensive coverage of the study of digital twin technology and the analysis, description, and application. Finding pertinent articles from previous database searches, as well as grey literature and non-academic publications, required using the google search engine. Journals published by SAGE were used to provide background information about digital twin technology in fields including medicine, engineering, and technology. The digital twin application's future technologies and tools were found via Elsevier. Springer was used to identify the engineering field investing in digital twin technology using data gathered throughout for making a product.

The structure also includes a set of search phrases categorized into two broad categories: digital twin technology AND characterization OR implementation. Article titles and abstracts are analyzed to determine which keywords should be used in the search. The keywords and search concepts used in this review are shown in Table 2.

Table 2. The terms used in the search strategy

CATEGORY	KEYWORDS (IN TITLE OR ABSTRACT)
Digital Twin Technology	digital twin
Characterization	'characterization'
Implementation	'Implementation of digital twin' OR 'digital twin implementation' OR '

Inclusion criteria

Inclusion criteria for the review included studies that described the usage of digital twin technology and its characterization and implementation. No restrictions were placed on the number of copies that may be purchased because of the publishing year.

Exclusion criteria

Research published in languages other than English was not considered since it focused on using digital twins in medical, technology, and engineering fields. No consideration was given to articles that did not directly address digital twin technology.

Table 3. Data Extraction

INFORMATION OF ARTICLES	GENERAL STUDY INFORMATION
General study information	Publication Title Publication Year
Characteristics of digital twin technology	Digital twin Model Characterization Implementation

Process of Selecting and Vetting Articles

The search resulted in downloading academic journals, articles and papers, non-academic publications, and study case reports; duplicates were deleted. Duplicates were weeded out, and then the paper was viewed in three stages (title, abstract, and full text) using the inclusion and exclusion assessments mentioned above. The evaluation and selection procedures were documented in a PRISMA flowchart for future reference.

FINDINGS

Included research

When the elimination process is finished among in the database, 11 papers met the exclusion and inclusion assessments. The assessment involves removing duplicates and doing a preliminary screening of abstracts and full texts. The PRISMA - Scr checklist is provided in Appendix A, and the PRISMA - Flow diagram (Figure 1) illustrates the screening procedure.

Study characteristic

Some publications described digital twin technology and associated approaches, while others proposed a framework to facilitate cloud-based data storage that needed more testing. As a result, the publications are divided into two categories: those that provide a framework model (5/10) and those that provide a scoping assessment of the relevant literature (6/10).

Analysis and synthesis of data

The heterogeneity of the available data made it impossible to do a meta-analysis or statistical analysis. A narrative synthesis was used on the extracted data to review the literature on current digital twin technologies comprehensively. A summary of the results is presented in the discussion. It also discussed defining and applying digital twin technologies to draw conclusions and conduct follow-up studies.

Search Strategy for the Literature

The literature search resulted in 1760 citations (Fig. 1). After screening 782 potentially relevant full-text papers, 522 were excluded for not being a methodology paper or scoping review, 262 were excluded for not being reported sought for retrieval, and 5 were excluded for not being retrieved. Subsequently, 255 papers included full citations and complete data. Among them, 126 papers were excluded not enough information and 74 were extracted for specific industries and 44 were excluded from different perspectives. Finally, 11 papers were included in this scoping review, 4 were framework/model papers, 4 were review papers, 1 is a literature review paper, 1 comprehensive review paper and 1 framework/case study. All the 11 different types of papers were for the 1260 scoping reviews.

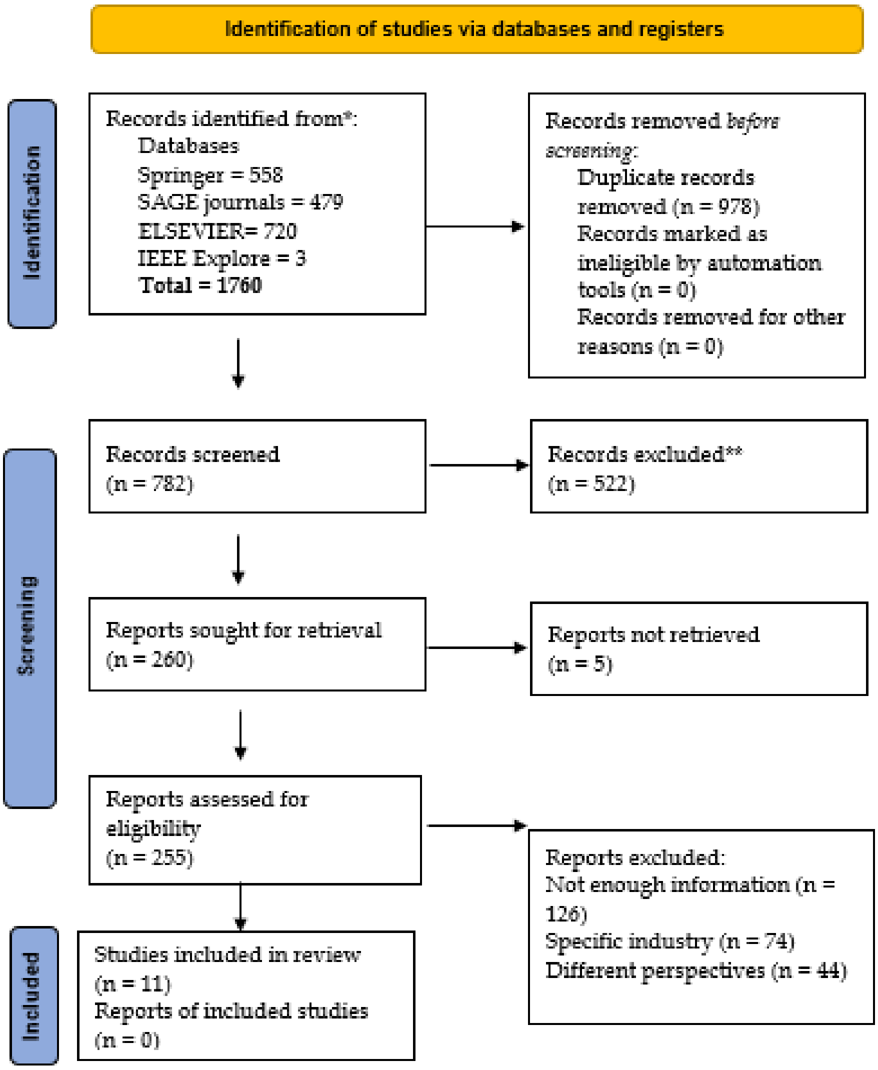

Figure 1. Flow diagram for the search strategy: Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)

Discussion

The paper conducted a comprehensive scoping review that included 1260 papers on scoping reviews. The results highlight an explosion in the number of scoping reviews produced between 2018 to 2022. However, variability in the reporting and conduct of scoping reviews was observed, which may impact digital twin technology. Most of the scoping reviews were completed with funding, often from a public organization, suggesting that decision-makers are requesting these reviews. As such, improved quality of reporting is imperative for scoping reviews. Our results also suggest that the methodology used by the scoping reviews can be improved. When we compared the methods employed by the 522 scoping reviews, we identified a lack of compliance on key items recommended by the Joanna Briggs Institute in their methods guidance for scoping reviews. Indeed, many scoping reviews reported shortcuts in their methods, making them similar to those included in our recent scoping review of rapid review methods (Bottani & Murino, 2017; Zhou et al., 2021a). However, given that the Joanna Briggs Institute only recently published its methods guidance, this could suggest a lack of awareness of the methodological rigor required to conduct a scoping review, such as the use of a protocol, which was not mentioned in the previous guidance. Taking the newly available guidance into account, a future update of our scoping review will help to identify any improvements in the conduct of scoping reviews. We are aware of a previous scoping review of scoping reviews.

The lack of compliance with key steps outlined in the Joanna Briggs Institute manual could also be an issue of poor reporting; perhaps the authors of scoping reviews were unaware of the items necessary to report. This is particularly problematic, as 34 % of the included scoping reviews reported some policy implications concerning their findings. Scoping reviews have some limitations because the focus is to provide breadth rather than depth of information on a particular topic. As such, the conduct of a meta-analysis is generally not conducted in a scoping review. However, this method was appropriate because our objective was to map out the evidence on scoping reviews in the literature.

The study results will be of interest to knowledge users, including journal editors and researchers who conduct scoping reviews. The study plans to use its results to create an online educational module for trainees, peer reviewers, and journal editors on conducting and reporting scoping reviews. The ultimate goal is to create a guideline in the form of a checklist for reporting scoping reviews and their protocols using the methods outlined by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA). The study plan is to have the scoping review reporting guideline (and checklist) specific to the characterization and implementation of the digital twin technology

CONCLUSION

To categorize what is and is not a digital twin, this work has attempted to characterize digital twins broadly. It comprehensively describes digital twin technology characterization, implementation, and its applications in smart cities, health care and medicine, and engineering. The procedure in which Digital twins can be utilized practically was explored after providing a description and characterization, highlighting the applications and implementation strategies.

Desired results should guide the advancement of a Digital Twin with the involvement of the specifics of its parts (s). This will aid in establishing the criteria for the necessary models, data, and process updating the models depending on the data. Several distinct enabling technologies must be included in digital twin deployments. It is still difficult to combine these technologies using commercially available tools to create a Digital Twin, build one out of commercial parts, or adopt a hybrid technique.

LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

The study suggests that further education is necessary for researchers conducting scoping reviews, journal editors, peer reviewers, and funding agencies on the important components of a scoping review. For example, online modules can be shared with these important stakeholders. Since a reporting guideline for scoping reviews was not identified, this is another initiative that may boost reporting of scoping reviews. Members of our research team are currently seeking funding to produce a reporting guideline for scoping reviews.

More research and development are needed to solve some of the digital twin's technological challenges. Other difficulties are cultural and necessitate changing the way things are done now and how people think. The variety of newfangled sectors and used studies point out that Digital Twins are being functionalized to clearly shows that the concept is continually growing. A further indication of this concept's ongoing evolution is the dearth of real-world instances that illustrate Digital Twins' undeniable advantages. Despite the idea's widespread acceptance, there are concerns about the technology's capacity to improve upon current procedures. Successful technological value demonstrations are necessary to provide the answers to these issues.

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