Digital Transformation in the Property Management Industry: A Systematic Literature Review

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Abstract

The growth in the development of various types of property around the world directly affects the property management industry. As an industry that is a continuation of the property development business, the property management sector plays a strategic role in securing the value and physical assets of the property that has been built. With the various demands from property owners and the increasing variety of types of properties being managed as well as increasing competition in this industry, property management businesses must seek breakthroughs in improving the quality of services to stakeholders involved in the property. Inefficient and effective property management will lead to high costs and decreased service quality. Many institutions in the management of property management are competing to make various innovations to be able to make the property management process run effectively and efficiently. Information technology and IoT, which are growing rapidly, are now an important part used to achieve this goal. Digital transformation in the property management industry is an option in the industrial 4.0 era. Many human roles can be replaced by technology, and the application of technology such as Artificial Intelligence (AI), IoT, and various new technologies are increasingly complementing the role of technology, especially information technology in digital transformation in the property industry. management. By using the Systematic Literature Review (SLR) model, this paper wants to dig deeper into how the trend of applying digital transformation in the property industry is, which countries have implemented digital transformation a lot in their property industry, what models or frameworks are most widely used in the digital transformation process then what are the challenges in implementing digital transformation in this property industry. This paper is expected to provide an overview of the digital transformation conditions in the property management industry that have not been widely disclosed.

Keywords
Property, Property Management, Digital Transformation, Systematic Literature Review, IoT.

1. Introduction

Digital Transformation or DX is about adopting technology with the aim of increasing productivity, value creation, and social welfare. Many countries, multilateral organizations, associations, and industries have made strategic studies and plans as the basis for making long-term policies and starting to implement digital transformation. (Allen 2019), the property sector is no exception and in a wider area, city management (Barkalov 2020).

The property management industry is becoming increasingly important as the construction and development of different types of properties increases and new territories are opened around the world (Bajpai and Bagchi 2020) Investment growth in the property sector in the Asia Pacific region during 2021 grew 21% after the Covid 19 pandemic began to decline (Bogataj 2020). The growth of the property sector is widely used as a reference to see the economic growth of a country, the higher the investment growth in the economic sector indicates the country's economic growth is also high (Burnham 2006)

This Systematic Literature Review (SLR) tries to look at various articles from journals and proceedings that discuss digital transformation in the property management industry. The growth of various types of property and skyscrapers should be accompanied by the growth of the property management sector which leads to digital transformation (Cheryl Martin 2018), Without making these changes, the needs stakeholders in the property industry will find it difficult to monitor the performance and condition of the properties they own and this will result in the ROI of their investments in the property sector (Casado-Vara 2019).

This SLR also uses supporting tools to be able to analyze articles in terms of relationships and networks between keywords used in the selected articles. The tools used to analyze and visually describe trend papers based on author keyword data are using VOSViewer. This tool allows a summary of articles to be exported in RIS format into this tool and then the tool will provide a visual description of keyword clustering and links between keywords in all selected papers (Daissaoui 2021). There are 4 research questions in this study, namely: 1. Which countries (big 5) have discussed the most digital transformation in the property industry, 2. What types of properties are used as objects in research on digital transformation in the property management industry, 3. What are the trends in discussion of digital transformation in the property industry and 4. What models are used in discussing digital transformation in the property management industry? (Ermilova 2021).

2. Method

The Scopus database is chosen as the source for this SLR paper, this is because the Scopus database has been widely trusted by major institutions around the world, Scopus is the data source for Times Higher Education and QS rankings and is used by more than 84% of the top 100 universities. Scopus is easy to navigate, even for novice users. If users are familiar with search tools such as drop-down boxes and checkboxes, searching will become a simple task with an intuitive search system. The ability to search both forward and backward from a particular citation will be of great help to researchers. The multidisciplinary aspect allows researchers to easily search outside their disciplines (Gurbaxani 2022).

This Systematic Literature Review (SLR) refers to the SLR concept from Kitchenham (Henrique 2018) which divides it into three stages starting from the first stage, Planning, then the second stage is Conducting the review and the third stage is Reporting the review. These three stages can be seen in Figure 1 below.

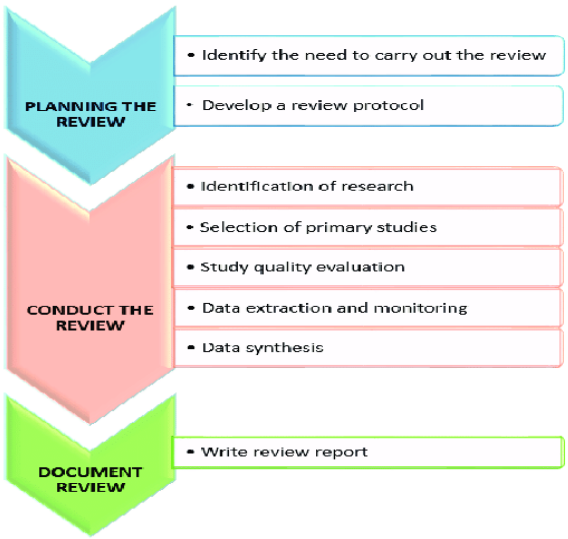


Figure 1. Kitchenham SLR stages

At the Planning stage, there will be 2 main jobs, namely identifying the need for a review and developing a review protocol during the research. In the development of this review protocol, a research question for this study was raised. Conducting the review stage consists of 4 parts: Identification Research, Study Selection, Data Extraction, and Result analysis the result will be presented in stage 3: Reporting the review. The articles that will be used in this SLR are taken from the Scopus Database. As an article database that has been recognized as having a world reputation with thousands of journals and conference proceedings, it is very feasible to source articles from the

Scopus Database. The selection and screening of articles that will be used for SLR in the Scopus database are based on the PRISMA method (Hussain, 2020) which provides a clear description of each stage in screening articles, as shown in Figure 2.

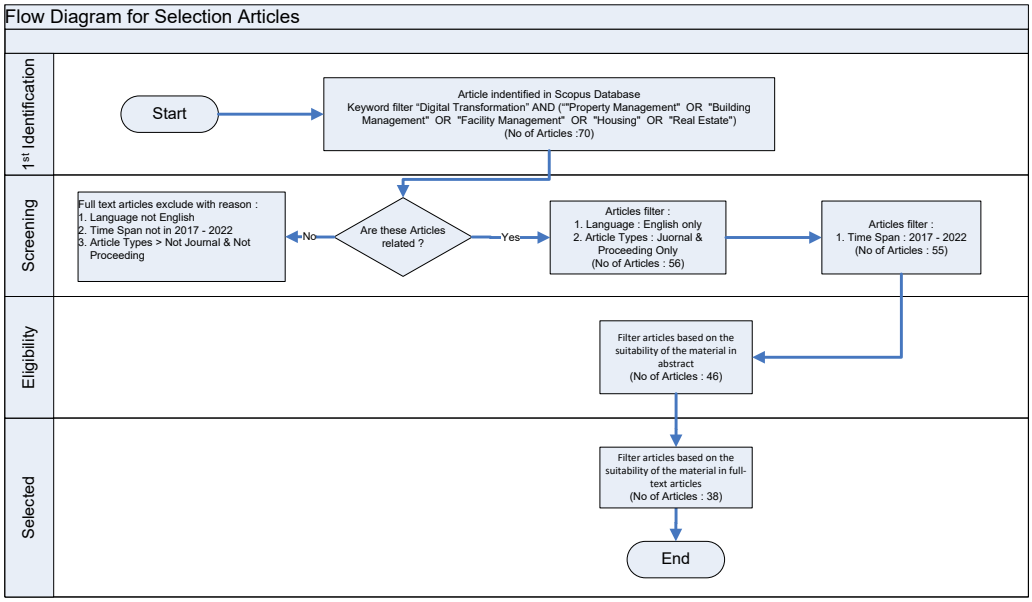


Figure 2. Articles selection in Scopus Database

3. Literature Review

As of lately, technology has a very vital role in accelerating progress in all fields exponentially. The world is being transformed by new technologies, which are redefining customer expectations, enabling businesses to meet these new expectations, and changing the way people live and work. Digital transformation, as it is commonly called, has enormous potential to change consumers' lives, create value for businesses, and unlock broader social benefits The digital era is a revolution that is happening in the world. This digital revolution is driven by the four technologies mentioned above which have been developed in recent years and continue to have a significant impact on the global economy. The digital revolution is also happening in Indonesia, although it is found that Indonesia is a bit slow in adopting digital potential compared to other countries (Kaushik Das 2004).

Digitization is one of the important keys to increasing productivity, namely by developing digital technologies such as remote sensors, intelligent machines, big data, and real-time communications that improve process efficiency, product, and service quality, and optimize resource allocation, thereby reducing processing time. to be faster, more streamlined operations, and better customer satisfaction (Kitchenham 2004). Digital transformation is an organizational change that involves people, processes, strategies, and structures, through the use of technology and business models to improve performance (Lokshina 2019). Digital transformation will bring about a lot of innovations that will change companies to be more effective and efficient in running their business (Moher 2009)

Technological developments put pressure on organizations to quickly carry out digital transformations because competitors are also massively adopting new technologies, technology has also empowered consumers in all fields to be more demanding and set higher standards of satisfaction than before, for example, better service. and faster whenever and wherever and with any device (Matt 2013)

Figure 3 illustrates that digital transformation touches organizations in three main areas, namely Customer Experience, Operational Processes, and Business Models. Customer Experience is broken down into three sub-segments: customer understanding, top-line growth, and customer touchpoints. In this section, the most obvious transformation is a new way of interacting with customers in the digital realm with the use of the web and smartphones, this allows companies to be able to understand customers better and even provide co-creation or co-creation. (MICHAEL 2013)

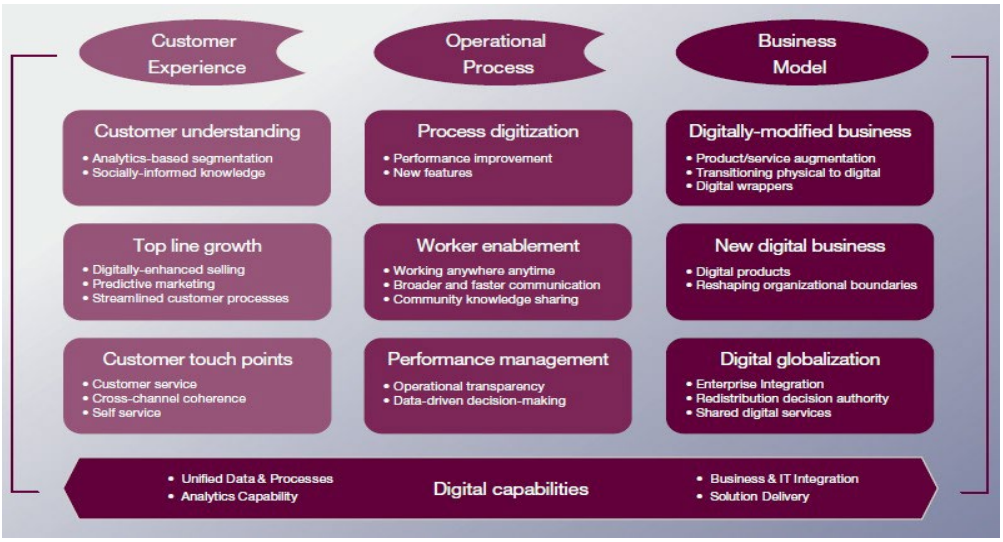


Figure 3. Building blocks of the digital transformation

Explanation of digital transformation framework (Naik 2013) which illustrates that there is a balance in the 4 important parts of the company shown in Figure 4, namely Changes in value creation, structural changes, Financial aspects, and the use of technology. These four components must be balanced so that the digital transformation process in a company runs well, including in the property management industry.

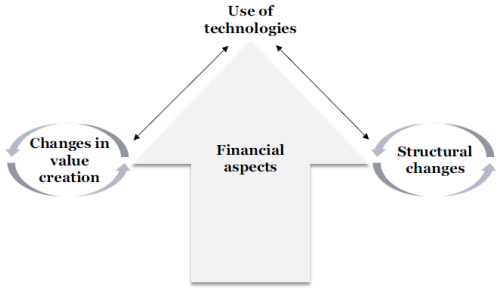


Figure 4. Digital Transformation Framework: Balancing Four Transformational Dimensions

4. Result and Discussion

The discussion on Digital Transformation for the Property Management industry in the Scopus Database for 2017 to 2022 only found 39 articles that matched the criteria. The highest number of articles published in 2021 is 15 articles and the lowest number is in 2017 and 2022, but 2022 has only been running for 5 months, so there is still a possibility that it will increase. The distribution of article data per year is shown in Figure 5.

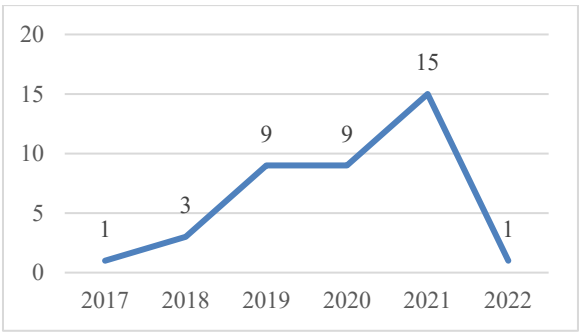


Figure 5. Number of articles on Digital Transformation in Industry Property Management per year on Scopus Database

Figure 6 shows a graph of the countries that produced papers on digital transformation in the property management industry. The Russian Federation produced 15 papers during the 2017-2022 period, then Italy with 6 papers, the USA with 5 papers, and Austria, China, India, and Slovenia with each producing 3 papers. Other countries are under 3 papers. This indicates that although the property is an industry that continues to grow, not many have exploited the potential for developing digital transformation for the property management industry, even in developed countries such as Europe.

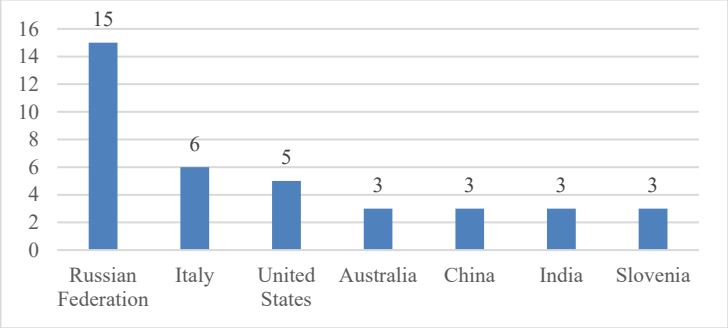


Figure 6. Number of articles on Digital Transformation in Industry Property Management by Country of Origin (Top 7)

In showing the trend in 38 articles regarding digital transformation in the property management industry using VOSViewer software, it provides the following description: all author keywords are grouped into 3 clusters (shown in 3 different colors) with networks and links between keywords (Reed, 2008) depicted in figure 7.

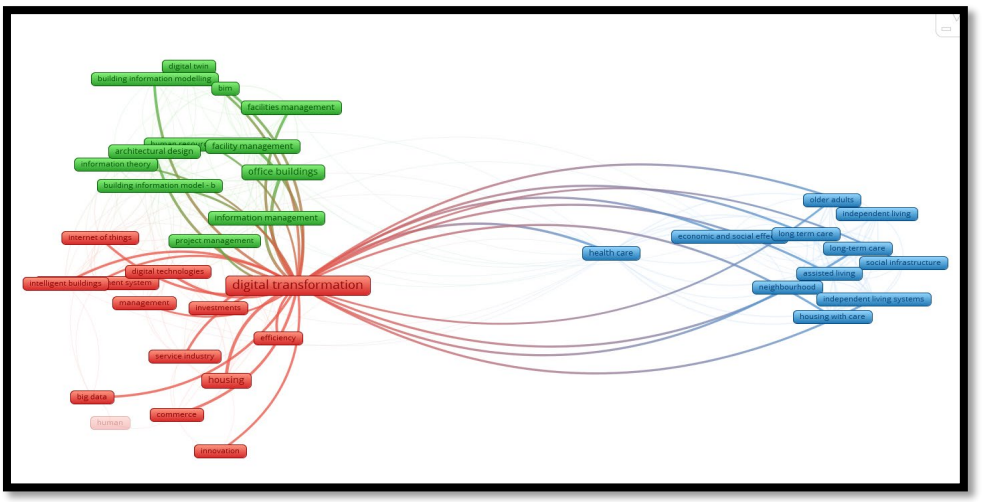


Figure 7. Network Visualization article Digital Transformation in Industry Property Management

Clusters with red color indicate the closest relationship to the main keyword, namely "Digital Transformation", the green cluster contains keywords that are the second level and the third colored cluster can have the least number of keywords mentioned compared to the first and second clusters.

Based on the types of properties discussed in digital transformation, they are grouped into several property types as shown in Table 1.

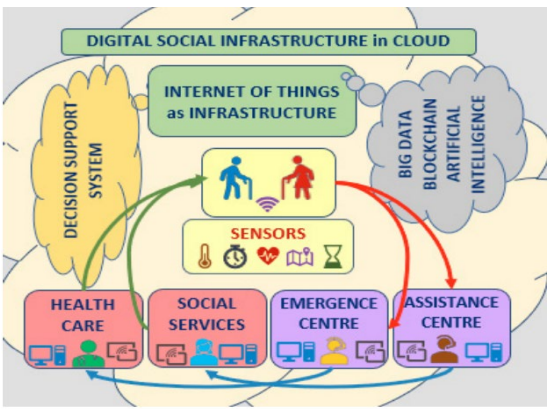
Table 1. Types of Property Types discussed in Digital Transformation in the Property Industry

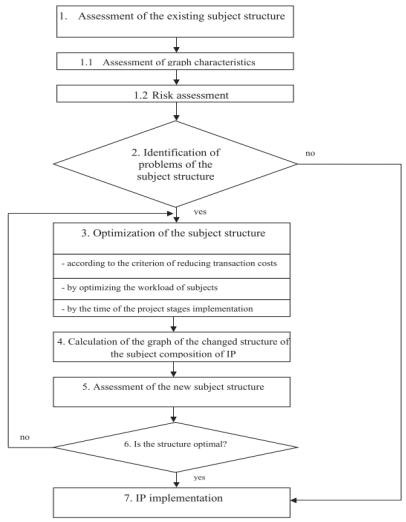
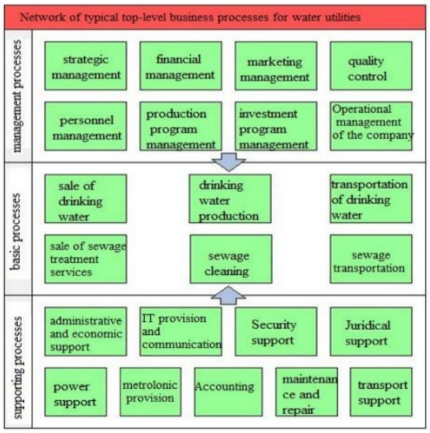
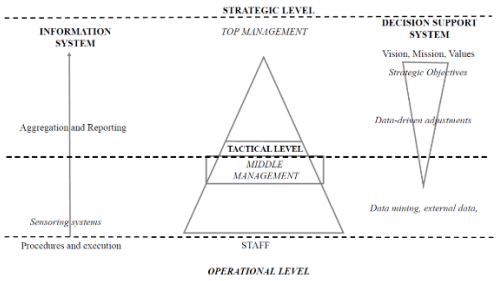
No.	Property Type	Articles	%
1	Housing	Rogelj, 2020.	31.6
2	General Property	Teizer et al, 2017, Moretti et al. 2021, Sahu et al, 2021, Rogelj et al, 2021,	10.7
3	Facility & Asset Management	Savvina et al, 2021, Rogelj et al. 2021, Ridley, 2019.Ma et al, 2018	26.3
4	Property/Building Management	Wernerova et al, 2018, Savvina et al. 2020.	13.6
5	Real Estate	Zhukova, 2021, Westerman, 2014, Siniak, 2020.	5.6
6	Warehouse	Zhou, 2019	2.6

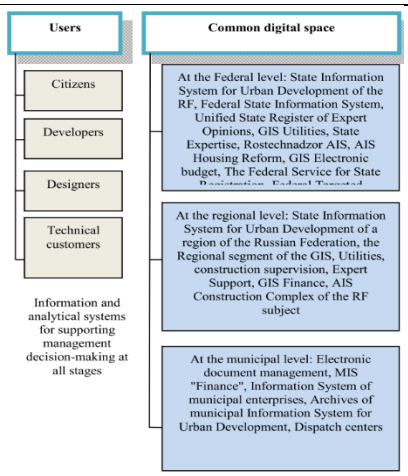
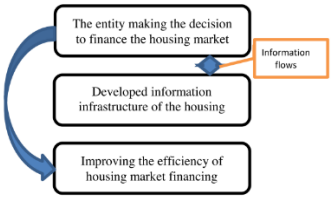
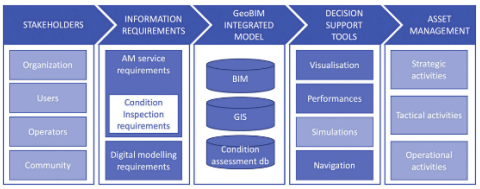
The discussion of digital transformation in housing types is still the most common. Meanwhile, in property and building management, there are only 5 discussions out of 38 articles, or only 13%. Challenges, as well as opportunities in SLR discussions regarding digital transformation in the property management industry, intersect with smart building (Brunet et al, 2019). Some articles display the keyword property/building management with Smart Building.

To understand how digital transformation is in the property management industry, several articles provide an overview of the model used. Of the 38 papers reviewed in this SLR, there are 9 papers showing the model. The model for the management of housing types can use the approach "7 steps of digitalization of business processes of enterprises of the housing and communal complex" (Bogataj et al, 2020) or using the model "Smart silver villages supported by digital platform"(Battisti et al. 2020). The model used in the paper regarding digital transformation in the property management industry can be seen in Table 2.

Table 2. Digital transformation in the property management industry

No.	Model Name	Description
1	Model of digitalization of business processes of enterprises of the housing and communal complex	There are 7 steps: 1. Definition of the process to be digitized 2. Determination of the information system in which the process is implemented 3. Tool integration 4. Collection of data from the information system and their subsequent processing Extracting 5. Extracting the sequence of actions for each case 6. Combining sequence of actions 7. Analysis of the process model
2	Smart City digital platform supporting integrated health and care services using sensors for monitoring of daily activities of older adults connected to emergence and assistance center	

3	Constructing the optimal subjective structure of innovation in the HCS industry in the context of digital transformation	
4	Generalized network of typical top-level business processes for water utility enterprises	
5	Model Strategic, tactical and operational levels in the facility in management	
6	Smart silver villages supported by the digital platform	
7	Digital space of housing management Model	

		
8	The impact of developed information infrastructure on financing the housing market in the context of the digital transformation of the economy	
9	GeoBIM integrated model	

5. Conclusion.

Digital Transformation in the Property Management industry has not become a concern for many parties. This is probably because there is still ambiguity between digital transformation and smart building. Only a few countries publish articles in journals and conferences regarding digital transformation in the property management sector, including developed countries. Indonesia has a very big opportunity to be able to contribute in this regard because of the very rapid growth of the property sector and the need for property management that must be effective and efficient but can provide good quality for stakeholders.

From the model shown in several articles, it is also illustrated that there is no standard model to be applied to digital transformation in the property management industry. Each article displays a different model and does not provide a comprehensive picture to be a solution in property management. Some models even only partially or partially discuss digital transformation in property management.

The results of this SLR are expected to illustrate that the opportunity to produce novelty in digital transformation in the property management industry is very wide open for both academics and practitioners. Especially for Indonesia, a digital transformation model can be made for the property management industry that is in accordance with social, economic, and cultural conditions as well as the rules and regulations that apply in Indonesia.

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