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Digitization of the property development industry: overview of current literature and research gaps

Digitalización de la industria del desarrollo inmobiliario: descripción general de la literatura actual y las lagunas de investigación

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Abstract: The construction industry has a high status in Germany. Property developers historically come from the construction industry. In terms of digital maturity, however, they lag well behind the general construction industry. In this paper, the author analyzes the current literature on digital transformation and digital maturity, focusing on the construction industry and property developers. The method he chose was a structured literature review. The aim is to identify the current state of research, particularly on the topic of 1) digitization of the construction industry and 2) digitization within the property development sector. The question arises as to why the topic of digitization is so underrepresented among property developers. Even without considering the impact of the COVID-19 pandemic, recent years have seen no acceleration in the use of digitalization among builders than other industries. The literature review shows that developers need to change their business strategies to reposition their business and respond to environmental changes. The current good economic situation overshadows any further digitization pressure caused by the Covid-19 pandemic, but to achieve competitive advantages in the long term, digitization of the value chain is necessary. In this context, gaps in current research will also be identified, which will be the starting point for future research.

Keywords: property developer; digital transformation; digital maturity; construction 4.0; literature review.

Resumen: La industria de la construcción tiene un alto estatus en Alemania. Los promotores inmobiliarios históricamente proceden de la industria de la construcción. Sin embargo, en términos de madurez digital, están muy por detrás de la industria de la construcción en general. En este artículo, el autor analiza la literatura actual sobre transformación digital y madurez digital, centrándose en la industria de la construcción y los promotores inmobiliarios. El método que eligió fue una revisión estructurada de la literatura. El objetivo es identificar el estado actual de la investigación, particularmente en el tema de 1) digitalización de la industria de la construcción y 2) digitalización dentro del sector de promoción inmobiliaria. Surge la pregunta de por qué el tema de la digitalización está tan poco representado entre los promotores inmobiliarios. Incluso sin considerar el impacto de la pandemia COVID-19, los últimos años no han visto una aceleración en el uso de la digitalización entre los constructores que otras industrias. La revisión de la literatura muestra que los desarrolladores necesitan cambiar sus estrategias comerciales para repositionar su negocio y responder a los cambios ambientales. La buena situación económica actual eclipsa cualquier presión de digitalización adicional causada por la pandemia Covid-19, pero para lograr ventajas competitivas a largo plazo, es necesaria la digitalización de la cadena de valor. En este contexto, también se identificarán las lagunas en la investigación actual, que será el punto de partida para futuras investigaciones.

Palabras clave: promotor de propiedades; transformación digital; madurez digital; construcción 4.0; revisión de literatura.

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1. Introduction

Property developers are part of the real estate and construction industries. A digital transformation is coming to this sector as well. Changes in technology, the economy, and society are initiating it (Pfnür & Wagner, 2020). The COVID-19 pandemic and environmental changes are accelerating the transformation (Priyono et al., 2020). The property development industry has not yet adapted to the change – in particular, changes in capital raising and service lack preparation. Notably, there is a lack of user orientation, i.e., demand behavior has not changed. The economic situation in the construction and real estate industries has been favorable for years, and the shortage of skilled workers is triggering this digital lethargy in the industry. The pressure to act has not yet been recognized (Pfnür & Wagner, 2020).

It is primarily the opportunity to achieve competitive advantages that have not yet been sufficiently recognized (Thordsen et al., 2020). Efficiency gains, for example, could be realized in better workflows (Priyono et al., 2020). Digital transformation is changing strategy in particular, as well as IT, supply chains, and marketing (Verhoef et al., 2021). Property development companies are all structured very differently, ranging from family-owned businesses to large enterprises. In science, the digital maturity level plays a significant role. This leads to the question of the most suitable digital maturity level for each company to best balance their risks and opportunities and finds individual growth strategies? Of course, the COVID-19 pandemic has intensified the pace of digital transformation. However, the need for digital transformation also results from the emergence of the World Wide Web and its global spread. Further, more and more accompanying technologies have emerged. Also, the competitive situation has changed due to new technologies. Pressure to reform also results from changing consumer behavior in response to digital changes (Verhoef et al., 2021).

There will be a displacement of established companies that cannot take advantage of the opportunities arising from the changing circumstances. They will be replaced by companies that use digital technologies and creatively leverage digital transformation to generate economies of scale, for example (Svahn et al., 2017); (Priyono et al., 2020). On the other hand, housing is an essential need, and demand continues here. However, there is a big problem that the COVID-19 pandemic has shown: organizations need to improve their digital maturity level. The less digitally mature organizations are, the more vulnerable they are – a high maturity level increases market players' flexibility (Fletcher & Griffiths, 2020).

Incumbent companies are facing a critical challenge. Digital technologies are needed to leverage new business models. To this end, existing capabilities, structures, and corporate culture must be subjected to a review. It is necessary to identify the relevant technologies and implement them as processes (Saarikko et al., 2020). Digitalization has become essential, and it is a necessity to deal with the required digital maturity (Fletcher & Griffiths, 2020).

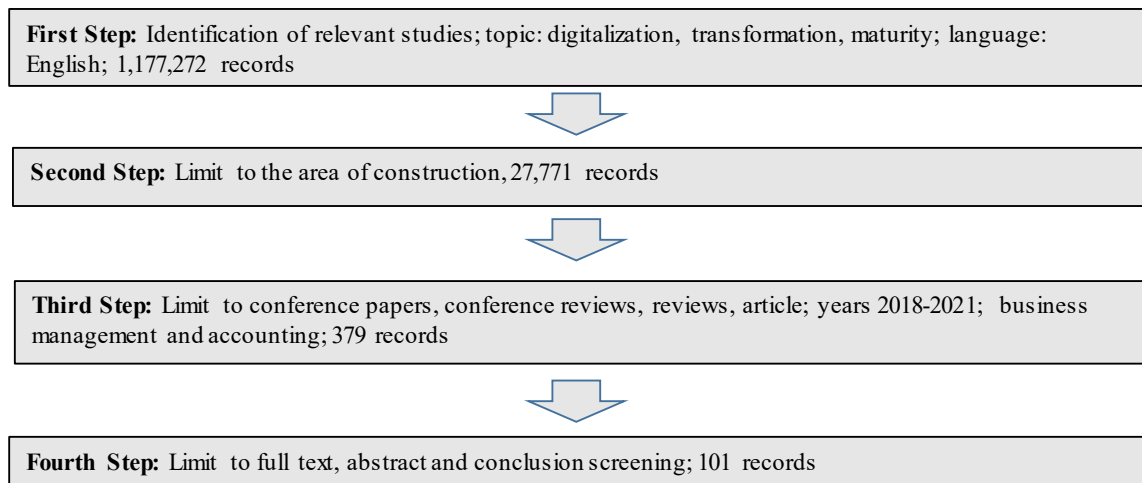
The following structured literature review will highlight the current research state in this area and identify relevant literature. This is the basis on which further research can focus. The conclusions drawn from this will identify research gaps that can be used for further research. The conclusion concludes with limitations and a summary of findings. In the references, the literature used is listed chronologically.

2. Literature Review

In the paper, a structured literature review was conducted to determine the current state of research. The author researched the field of digitization, focusing on the construction industry. To use only high-quality literature, only papers listed on the Scopus database were selected.

The keywords “transformation, “digitalization” and “maturity” were searched for, limited to the area of “construction”. Only English-language literature from the years 2018-2021 was selected. A further restriction was placed on the area of “business management and accounting”. To obtain only high-quality literature, the author limited the search to conference papers, conference reviews, reviews, and articles. The metasearch was recorded as follows: (TITLE-ABS-KEY (transformation) OR TITLE-ABS-KEY (maturity) OR TITLE-ABS-KEY (digitalization) AND TITLE-ABS-KEY (construction)) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018)) AND (LIMIT-TO (SUBJAREA , “BUSI”)) AND (LIMIT-TO (DOCTYPE , “ar”) OR LIMIT-TO (DOCTYPE , “cp”) OR LIMIT-TO (DOCTYPE , “re”) OR LIMIT-TO (DOCTYPE , “cr”)) AND (LIMIT-TO (LANGUAGE , “English”)) AND (LIMIT-TO (FREETOREAD , “all”)).

Figure 1. Structure of systematic literature review



Source: Developed for this research

In a second search, the author selected the same search parameters but replaced “construction” with “property developer.” Two search results were returned, one of which overlapped with the previous search.

The metasearch was recorded as follows: (TITLE-ABS-KEY (transformation) OR TITLE-ABS-KEY (maturity) OR TITLE-ABS-KEY (digitalization) AND TITLE-ABS-KEY (property AND developer)) AND (LIMIT-TO (FREETOREAD , “all”)) AND (LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018)) AND (LIMIT-TO (SUBJAREA , “BUSI”)) AND (LIMIT-TO (LANGUAGE , “English”))

3. Methodology

In this paper, the author examines a structured literature review about the digital transformation of property development. For this purpose, current research studies are evaluated by way of a structured literature review and the identification of possible perspectives for future research (Andreini & Bettinelli, 2017).

4. Results and Discussion

To identify the relevant articles, the abstract and conclusion were screened first. In the further course, the relevant papers were read in their entirety to prepare and analyze the research results.

The following table provides an overview of which of the selected journals focus on digitizing the roles of architects, construction, or developers. The first row contains the source, followed by architecture, construction, and property developer. Analysis was conducted to determine which industries were covered in which articles. Construction received the most articles, followed by architecture. Only a few articles dealt with property developers.

Table 1. *Literature review*

source	A	C	P
(Ernstsen et al., 2021)		x	
(Pfnür & Wagner, 2020)	x		x
(Olowa et al., 2020)	x	x	
(Ghosh et al., n.d.)		x	
(Qian & Papadonikolaki, n.d.)		x	
(Morgan, 2019)	x	x	
(Papadonikolaki et al., 2019)	x	x	
(Zeltser et al., 2019)		x	
(García de Soto et al., 2019)	x	x	
(Bosch-Sijtsema & Gluch, 2019)	x	x	
(Ayinla & Adamu, 2018)	x	x	
(Lavikka et al., 2018)	x	x	
(Zou et al., 2018)	x	x	
(Lazoroska & Palm, 2019)			x
(Lindblad & Gustavsson, 2020)		x	
(Aleksandrova et al., 2019)		x	
(Lammers et al., 2018)		x	
(Hosseini et al., 2018)		x	
(Chan, 2020)	x	x	

*(A=Architecture; C=Construction; P=Property Developer)

Source: Developed for this research

In the following table, the search result is divided by keywords listed by Scopus. Most hits come from the area “construction industry”, followed by “architectural design”. The high number of hits for construction is, of course, also due to the search parameters described above.

Table 2. *Number by keywords*

Construction Industry	20	20%
Architectural Design	13	13%
Construction	11	11%
Building Information Modelling	9	9%
Construction Projects	8	8%
Information Theory	8	8%
Innovation	8	8%
Project Management	8	8%
Decision Making	8	8%
Design/methodology/approach	8	8%

Source: Developed for this research

The table below shows the results of the search by article and conference paper. Conferences were underrepresented and the results were mostly articles.

Table 3. *Number of document types*

Article	94	94%
Conference Paper	4	4%
Review	3	3%

Source: Developed for this research

The following chart shows the published literature in Scopus from 2018 to 2021. The number of publications has been significant over the years. 2019 presented the most publications with 37 search hits. Overall, it becomes evident that digital transformation has been dealt with extensively over this period, which shows the topic's increased relevance. The year 2021 is significantly under-represented, but this is due to the research's timing at the beginning of the year.

Table 4. *Numbers of papers published per year*

2018	27	27%
2019	37	37%
2020	32	32%
2021	5	5%

Source: Developed for this research

This paper examined the literature on current research in the construction and development industry. Scopus was chosen as the sole search medium. After reviewing the abstract and conclusion, a total of 19 relevant papers were found. The constant high number of papers in recent years shows the prevailing topicality of this subject for some time, especially in the construction industry. Overall, the literature search threw up a sufficient number of papers to conduct a representative search.

Property developers are an important group but still less researched. From the literature search, only about 10% of the journals found discussed property developers. The topic of digital transformation has already been widely researched, but the transfer of technologies to the property development industry is lacking. The field of architecture and construction, on the other hand, can be found in the literature. From practical experience, it can be seen that very significant numbers of developers come from construction or architecture backgrounds. Future research could address whether developers could be classified in the AEC (architecture, engineering, construction) group, possibly because most developers come from construction or architecture.

In this context, further research looking at digital maturity among developers would be of interest.

5. Conclusions

The digital transformation of property developers has grown in importance. This is not only due to Covid-19; there is also a changing demand behavior. Established companies must address the change in their corporate strategy to improve workflows in their value chains and thereby generate competitive advantages. The literature review was conducted to identify important research issues and to show that future research is relevant. In particular, a definition and assignment of property developers seem helpful. In the literature, the good economic situation in the real estate sector and the industry's rather traditional nature were cited as barriers to digital transformation. Here, it would be interesting to provide empirical evidence of further barriers. This could be, for example, the lack of uniform standards and platforms.

Furthermore, no substantial positive effects of digitization could be found in the existing literature using specific examples. The high importance of digitization was reported, but not the direct benefits for developers and which areas in the value chain are affected. To ensure that the literature

search is structured and comprehensible, the author has limited himself to evaluating the literature found from a Scopus search. Further research may provide more detailed or differentiated insights.

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