A bibliometric analysis of the relationship between dynamic capabilities and digital transformation

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Abstract

Digital transformation has become a necessity as a result of the COVID-19 pandemic and the difficulties in keeping people together. Digital transformation affects many sectors, facilities innovation practices, new business models, and customer relations. The dynamic capabilities of firms have the ability to facilitate their digital transformation process. However, it is still less clear the relationship between dynamic capabilities and digital transformation. This study aims to investigate the connections between the literature on dynamic capabilities and digital transformation. In this context, the Scopus database was searched by using "dynamic capabilities", "digital transformation", and "digitalization" keywords. A total of 329 studies between 2015-2024 consisted of the sample and analyzed in the "Biblioshiny" application of the open-sourced RStudio program. From the investigation, the number of studies dealing with dynamic capabilities and digital transformation between 2015-2019 is partially lower, but there has been an increasing trend since 2019. The main contribution of this study is to highlight the relationship between dynamic capabilities and digital transformation theoretically.

Keywords: Bibliometric analysis; biblioshiny digitalization; digital transformation; dynamic capabilities.

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1. INTRODUCTION

As a driver of competitive advantage, dynamic capabilities are critical elements of the firm’s success. The dynamic capabilities approach investigates the difference between the performances of firms for more than 20 years (Iris & Vikas, 2011). In the literature as an extension of the resource-based view, dynamic capabilities have been used to explain the superior performance of firms and they are the ability of firms to respond to changing environmental conditions (Eriksson et al., 2014).

In this study, the dynamic capabilities definition depends on Teece et al.’s (1997) study. Dynamic capabilities are expressed as the ability to build, integrate, and reconstruct the internal and external competencies of the firms by rapidly changing environmental conditions, or the ability to sense and seize opportunities and restructure by managing threats. As a part of dynamic capabilities, technological/digital capabilities are important in today’s changing world. These capabilities are considered useful tools for conducting the necessary basic research, conducting R&D activities, and ensuring quality in the product design and production process of a business (Ali et al., 2012). These capabilities include the elements of designing products, having the ability to produce products, having the necessary technical knowledge in the process, and managing this process (Ellonen et al., 2011). All these processes are related to the digital transformation level of the firms.

With the period of Covid-19 pandemic, it has become difficult for people to be together due to the intense risk of contamination. This challenge has required minimizing human interaction in many areas. In this process, technology and digitalization have become very important and technological devices began to be used in every field (Bakan Kıraç & Sahmurova, 2022; Shakhmurov & Sahmurova, 2021). For this reason, with the pandemic, more digitalized, artificial intelligence-based applications began to be needed. This process gained momentum to the need for digital transformation of the firms (Arora et al., 2020; Huang et al., 2021). In the period of the COVID-19 pandemic, digital transformation activities not only transformed businesses but also reshaped markets and industries. Reorganizing a company's organizational structure, culture, processes, capabilities, vision, and strategy in the context of developing a digital business can be defined as digital transformation (Gurbaxani & Dunkle, 2019; Arslan & Cruz, 2024).

Today, some digitalized business activities such as online products/services, the usage of machine learning, artificial intelligence, and recommendation systems, which are increasingly gaining momentum, are used by both firms and consumers at many points (Borek & Prill, 2021; Escoz Barragan et al., 2024). Digital transformation activities of firms that have achieved successful digital transformation consist of strategic vision, innovation culture, technical knowledge and intellectual property rights, digital capabilities, technological assets, and strategic alignment dimensions (Gurbaxani & Dunkle, 2019). Firms that want to realize digital transformation should create an artificial intelligence-oriented and data-oriented culture, successfully manage the changes that will occur during the digital transformation process, and implement the digital transformation strategy and vision (Borek & Prill, 2021; Zhang et al., 2024). According to Nadeem et al., (2018), who reviewed the articles on the relationship between digital transformation and organizational capabilities, and Liu et al., (2022), organizational capabilities that accelerate digital transformation include having digital leadership skills, performing agile and scalable operations, benefiting from digitalized customer applications, dynamic capabilities that can quickly respond to changing environmental conditions.

To date, several studies have investigated dynamic capabilities and digital transformation separately. Both dynamic capabilities and digital transformation have critical importance for firms that aim to gain sustainable competitive advantage in today’s world. However, much of the research up to now has not analyzed dynamic capabilities and digital transformation together through a bibliometric analysis of the literature. This study tries to fill this research gap and contribute to the literature by highlighting the relationship between dynamic capabilities and digital transformation by analyzing various research in the literature.

1.1. Purpose of the study

This study aims to analyze the development of the literature on dynamic capabilities and digital transformation by using bibliometric analysis. To illustrate the development of the literature on dynamic capabilities and digital transformation bibliometric analysis is a useful tool that shows the process through co-word and co-citation analysis, and mapping with a multidisciplinary approach (Diodato, 2012). By using this useful tool, the current research attempted to build an interdisciplinary perspective that may lead to a comprehensive conceptual framework in the future.

2. METHOD AND MATERIALS

To investigate the connections between the literature on dynamic capabilities and digital transformation, bibliometric analysis is done in this study. Bibliometric analysis which is a type of literature review is a mature and influential subject for revealing the development process and knowledge structure of publications (Cooper, 2015). Researchers have used bibliometric analysis for the analysis of large data pools in recent years (Cobo et al., 2015) and focus on assessing the structure of a particular research field (Block & Fisch, 2020).

Bibliometric analysis is based on statistical methods to analyze bibliographical sources such as articles, article publication years, authors, keywords, abstracts, and titles (Ozturk, 2020). Bibliometric analyses can be used to examine how disciplines, specialties, fields, and individual articles or other publications are related to each other and map these relations (Zupic and Cater, 2014). Also, bibliometric analysis brings measurability, objectively, to the development of scientific literature (Garfield, 1979) and is used to identify research networks (Crane, 1972).

For all the reasons explained above, the bibliometric analysis method is useful for discovering material relevant to our research. While Block & Fisch (2020) emphasize that the bibliographic database should be chosen carefully, and they state that Scopus has a broader journal coverage. This search strategy was developed specifically for the Scopus database. Article titles, abstracts, and keywords were searched for the most appropriate publications related to dynamic capabilities and digital transformation.

2.1. Data collection

The researchers used the open-sourced “Bibloshiny” application in the RStudio program (Aria & Cuccurullo, 2017). In the data collection, the Scopus database was searched using the keywords "dynamic capabilities", "digital transformation", and "digitalization". According to the Scopus database search with field limitations, the research sample consisted of a total of 329 studies between 2015-2024 in the fields of business, management and accounting, social sciences, decision sciences, economics, econometrics, and finance. The data collected from the studies were transferred to the

"Biblioshiny" application in the RStudio program. Using such keyword metrics, a map of the field was created (Block & Fisch, 2020).

3. RESULTS

According to the analysis, the distribution of publications by year is illustrated in Figure 1. When it comes to the distribution of publications by year, the number of studies dealing with dynamic capabilities and digital transformation between 2015-2017 is lower however there has been an increasing trend since 2017. The number of studies were conducted by 2024 for the first two months. The number of 2023 studies increased by 67% compared to the studies in 2022.

Figure 1

Annual Scientific Production of 2015-2024

The main research findings of the analysis are presented in Table 1. According to Table 1, a total of 329 studies were carried out from 2015 to 2024. Over seventy-four (74.16%) of the sample were articles, 5.47% were book chapters, and 12.15% were conference papers. The average number of citations per publication in the sample was 28.25. The parameters associated with the authors demonstrated that the scientific publications in question were authored by a total of 887 researchers. Thirty (30) researchers were single authors while 857 researchers were multiple authors in their publications in the sample.

Table 1

Main Findings
Table 2 shows the ranking of the top 10 most influential journals, which have published the studies used in the research sample, based on their h-indexes. According to this ranking, the most effective journal is the Journal of Business Research with an impact score of 9. It is respectively followed by Sustainability with 8 impact points, Technological Forecasting, and Social Change with 8 impact points, and the International Journal of Production Economics with 5 impact points. IEEE Transactions on Engineering Management, European Journal of Innovation Management, Journal of Manufacturing Technology Management, and Industrial Marketing Management journals have an h-index impact 4 of points.

**Table 2**

*Journals Impact*

<table>
<thead>
<tr>
<th>Sources</th>
<th>h_index</th>
<th>g_index</th>
<th>m_index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal of Business Research</td>
<td>9</td>
<td>11</td>
<td>1.29</td>
</tr>
<tr>
<td>Sustainability (Switzerland)</td>
<td>8</td>
<td>11</td>
<td>1.14</td>
</tr>
<tr>
<td>Technological Forecasting and Social Change</td>
<td>8</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>International Journal of Production Economics</td>
<td>5</td>
<td>8</td>
<td>1.2</td>
</tr>
<tr>
<td>IEEE Transactions on Engineering Management</td>
<td>4</td>
<td>6</td>
<td>1.33</td>
</tr>
<tr>
<td>European Journal of Innovation Management</td>
<td>4</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Journal of Manufacturing Technology Management</td>
<td>4</td>
<td>6</td>
<td>0.67</td>
</tr>
<tr>
<td>Industrial Marketing Management</td>
<td>4</td>
<td>5</td>
<td>0.8</td>
</tr>
<tr>
<td>International Journal of Information Management</td>
<td>3</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td>International Journal of Operations and Production Management</td>
<td>3</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Technovation</td>
<td>3</td>
<td>4</td>
<td>0.75</td>
</tr>
<tr>
<td>International Journal of Physical Distribution and Logistics Management</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Journal of Cleaner Production</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Journal of Computer Information Systems</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Journal of The Knowledge Economy</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

The citation and productivity analysis can be seen in Figure 2 on the next page. According to the citation and productivity analysis results, Sustainability and Technological Forecasting and Social Change are the first two journals that publish the most studies on dynamic capabilities and digital transformation. When Table 2 and Figure 2 are evaluated together, it is apparent that all of the top 10 ranked journals, except for the Journal of Business Research, have the highest impact level and publish the most studies. The results of these analyses show the strength and academic influence of these journals.

**Figure 2**

*Citation and Productivity Analysis*

Figure 3 which is given on the next page presents the list of the top 10 authors studying dynamic capabilities and digital transformation and their publication numbers. Chatterjee and Vrontis received the highest degree with a total of five studies. After these studies, with a total of four studies Chaudhuri, Parida, and Zhang are listed as the most relevant authors. The other relevant five authors in the sample are ranked below as Chirumalla, Okano, Proff, Pundziene, and Sjödin with their three types of research each.

Figure 3
Most Relevant Authors

On the next page, Table 3 illustrates the studies that have high impact levels. The top 10 studies that have the highest citations are shown in the table. The annual total citations per year is calculated by the average number of citations received by the study each year since its publication, whereas total citations show all citations of the articles.

The study titled “Understanding Digital Transformation: A Review and a Research Agenda” by Vial (2019) is positioned at the top of the list as can be seen in Table 3. Another study that stands out in the list is the study titled “Building Dynamic Capabilities for Digital Transformation: An Ongoing Process of Strategic Renewal” authored by Warner & Wager (2019). This study was second-ranked with 934 citations. The next ranked study is “Digitalization and its Influence on Business Model Innovation” authored by Rachinger et al., (2019) from the article of Journal of Manufacturing Technology Management with 468 citations.
In Figure 4, the top 10 keywords most used by the authors in publications containing dynamic capabilities and digital transformation are given on the next page. According to Figure 4, the most used keywords and their frequency of use are as follows; digital transformation was used 72 times, dynamics capability 65 times, enterprise resource management 59 times, digitalization 20 times, and...
innovation 28 times. The other most used words are competition, digital technologies, and digitization.

**Figure 4**

*Most Frequently Used Author’s Keywords and Keywords Plus (Top 10)*

The visualization of the author keywords in their publications containing dynamic capabilities and digital transformation is depicted in Figure 5. Figure 5 presents a word cloud of the keywords determined by the authors of the studies in the sample.

**Figure 5**

*Word Cloud of Author’s Keywords*
In Figure 6 the thematic map of the analysis is given below on the next page. In the thematic map, there are four types of themes such as motor themes, basic themes, emerging or declining themes, and niche themes. The themes that occur in the upper right section of the thematic map are known as motor themes. Motor themes are themes that are developed and important for the area. In our study, dynamic capability and technological innovation came to the fore as motor themes. The lower right section is known as basic themes, which are core themes for the field with different research topics. The basic themes of our study are sustainable development, decision-making, and innovation.

The themes in the lower left quadrant are known as weakly developed and marginal, emerging, or declining themes. In our study, corporate strategies, competitiveness, and human capital stand out as marginal themes. The emergence of human capital as a theme of declining importance in the thematic map reveals the importance of digital transformation. Finally, limited importance to the field is in the themes in the upper left quadrant are known as advanced and isolated themes, meaning. Corporate entrepreneurship, discontinuous innovation, and enterprise transformation stand out as niche themes.

Figure 6
Thematic Map
4. CONCLUSIONS

Challenging with more competition due to globalization and changing environmental conditions, successful firms with dynamic capabilities are performing digital transformation. Due to the importance of dynamic capabilities and digital transformation, there are many studies on these two major subjects. This study analyzed the development of the literature on dynamic capabilities and digital transformation by using bibliometric analysis.

The research sample of the study consisted of a total of 329 studies from the Scopus database between 2015-2024 in the fields of business, management and accounting, social sciences, decision sciences, economics, econometrics, and finance. Approximately 74.16% of the published publications of 887 authors’ studies are articles, 5.47% are book chapters, and 12.15% are conference papers. In this case, the field generally develops through scientific articles.

When the distribution of publications by year is examined, it is shown that studies dealing with dynamic capabilities and digital transformation have been an increasing trend since 2017, especially since 2019. This result can be related to the effect of the spread of digital transformation in the process of the COVID-19 pandemic. In the process of the COVID-19 pandemic, the need for digital
transformation has increased and this situation also could cause an increase in the number of studies on this subject. In the study, the most used keywords were digital transformation, dynamics capability, enterprise resource management, digitalization, and innovation. Considering that the keywords were selected in determining the sample within the scope of the study, it can be considered as an indicator that the keyword choices subject to analysis are suitable for bibliometric analysis. According to these results, it can be seen that the COVID-19 pandemic has increased the number and importance of studies and the number of citations related to technological development and digitalization in every field.

In our study, dynamic capability and technological innovation came to the fore as motor themes. Sustainable development, decision-making, and innovation are basic themes and corporate strategies, competitiveness, and human capital stand out as emerging, or declining themes, and entrepreneurship, discontinuous innovation, and enterprise transformation stand out as niche themes. Because these themes reveal topics that can be managed in different fields. In future studies, scholars can investigate these niche themes.

There are some limitations of the study, especially the fact that the study is conducted in the Scopus database and is limited to certain areas. In the future, these two limitations of the research can be overcome by including studies from different fields in the analysis and using data obtained from different databases.

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**Author Contributions:** All authors contributed to the study's conception and design. Data collection and bibliometric analysis were performed by Elif SIS ATABAY and Tuğba KAPLAN. All authors read and approved the final manuscript.

**REFERENCES**


