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BIBLIOMETRIC ANALYSIS OF DIGITAL TRANSFORMATION SUCCESS

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ABSTRACT

Digital Transformation is a hot and trending topic, and many organizations are trying to learn and implement. Some of them are successful, but there are also those who have not succeeded in carrying out Digital Transformation. There are quite numerous articles and researches on Digital Transformation Success, yet none of them focus on how Successful Digital Transformations Standard should be developed. For this reason, it is necessary to map the articles and research progress on this topic by carrying out a Bibliometric Analysis. We found 76 articles focusing on Digital Transformation Success by "title" published between 1996 to 2022 with search strings ("digital transformation" AND success). With this methodology we identified how authors have made collaborations on this topic and most related significant terms. The present study provides insight and reveals what things have been explored and discussed, and we found a necessity for further research with a purpose of determining a Reliable Standard for Successful Digital Transformation. However, this paper has limitations because it is only based on Google Scholar database.

Keywords: *Digital Transformation, digital-transformation success, digital-transformation strategy, success factor, success*

1. INTRODUCTION

In recent years, Digital Transformation is a topic that is increasingly drawing attention from both practitioners and academic researchers. Research on Digital Transformation (DT) Success is becoming increasingly important as a result of the world's increasingly digital environment (Schneider and Kokshagina, 2021). This change was accelerated and driven by the COVID-19 pandemic, where every organization and every individual inevitably had to carry out activities online due to restrictions related to the pandemic (Wiliandri, 2020). Digital Transformation has become a must for organizations that do not want to be crushed by changes that occur due to developments of digital world.

In fact, not all organizations or entities that have tried to carry out Digital Transformation have experienced DT success. It was even found that Digital Transformation has a high failure rate (Ramesh and Delen, 2021). Carrying out Digital Transformation of course requires financial support and other resources. Failure to carry out Digital Transformation will for sure be detrimental to the organization, not only from a financial perspective but in terms of spirit and mentality, as well as opportunities being lost. In other words, failure to adopt digital technology and carry out Digital Transformation may risk organizational failure (Chan, 2020).

So, to increase the opportunities of success in Digital Transformation, appropriate steps need to be taken, so that failure can be anticipated. For this reason, it is necessary to know what are the determinants for the success of Digital Transformation (Ghobakhloo and Iranmanesh, 2021). And most importantly, a generally applicable as well as reliable standard for successful Digital Transformations is necessary to develop. This fact leads us to the research question:
RQ1: How should a reliable standard for a Successful Digital Transformation be developed?

To answer this question, we need to explore success factors and related issues of Digital Transformation Success.

Challenges of Digital Transformation

Despite of existing diverse researches on Digital Transformation, both from the technical side and from the actor side, yet, Digital Transformation requires a crystal-clear step by step guidance to avoid failure. Certainly, there must be critical success factors that determine the success of an organization's Digital Transformation (Osmundsen and Iden, 2018). Furthermore, by considering those factors a "reliable standard" for Digital Transformation Success can be developed right from the stage of formulating Digital Transformation Strategy to its implementation and even operational procedures. For this reason, it is necessary to dig deeper to find out what have been researched and what have been found, so that they can provide direction for further researches in order to develop such a standard.

Growth Importance of Digital Transformation and Need for Standardization

Digital Transformation can be described as a tool for transforming business processes, cultures, and organizational aspects to meet changing market requirements brought about by digital technologies (AlNuaimi et al., 2022). In the beginning, not many people or organizations paid attention to Digital Transformation, but with the development of digital technology, especially with the emergence of smartphones, social media, cloud computing, big data and websites, more and more activities can be done electronically. Furthermore, as technology develops, more and more organizations are striving to using digital technology to improve their competitiveness (Leão and da Silva, 2021). Digital Transformation has also accelerated with the disturbance of the long Covid-19 pandemic (AlNuaimi et al., 2022).

Digital Transformation is no longer exclusive to the concern of business organizations or institutions. Digital Transformation has become a concern for countries around the world. Digital Transformation is one of the strategies to increase national competitiveness (Bickauske et al., 2021). Chinese government for instance, considers the digital economy as a national strategy and conducts a series of supporting policies because it is expected to be a new driver for China's economic growth and a new tool for industrial transformation and upgrade (Wang et al., 2020). Digital Transformation, which is also often referred to as "Digitalization", is related to several important things in organizations, namely mastery of digital technology (digital technology literacy), changes in business processes and value creation, organizational structure and culture and financial support. In other words, digitalization is no longer only related to Information Technology Systems, but concerns the organization as a whole including organizational structure and culture, business processes and products as well as finances. They are called the key dimensions of Digital Transformation (Hess et al., 2016).

Despite this development, at the moment, there is no distinctively applicable and at the same time reliable standard for Digital Transformation to ensure its success. Therefore, in order to reveal necessary elements for developing the standard, we need to explore researches on this topic by conducting Bibliometric study. Bibliometric analysis is a technique that is part of the Systematic Literature Review which has the ability to analyse the development of a research topic, including the most influential articles, the most influential authors, collaboration between researchers/writers, the terms that appear most frequently, and so on. for a good insight into the development of the topic being discussed (Donthu et al., 2021). This is done with a bibliographic map which is part of bibliometric analysis (Linnenluecke et al., 2020).

2. METHODS

This Bibliometric Analysis Research of "Digital Transformation Success" was carried out by extracting the database from Google Scholar using the "Publish or Perish" (Windows GUI Edition 2023) software application with a time span of 1996-2022 (Fauzan and Soegoto, 2023). We did not include data from 2023 because 2023 is still ongoing so it is not yet complete to carry out quantity comparisons per year of related articles. The papers taken are in the form of articles and book chapters by searching using the "Advance Search" tool of Google Scholar and specifically on the "paper title" which contains the words Digital Transformation Success with the search string [“digital transformation” AND success]. The flow diagram is as follows:

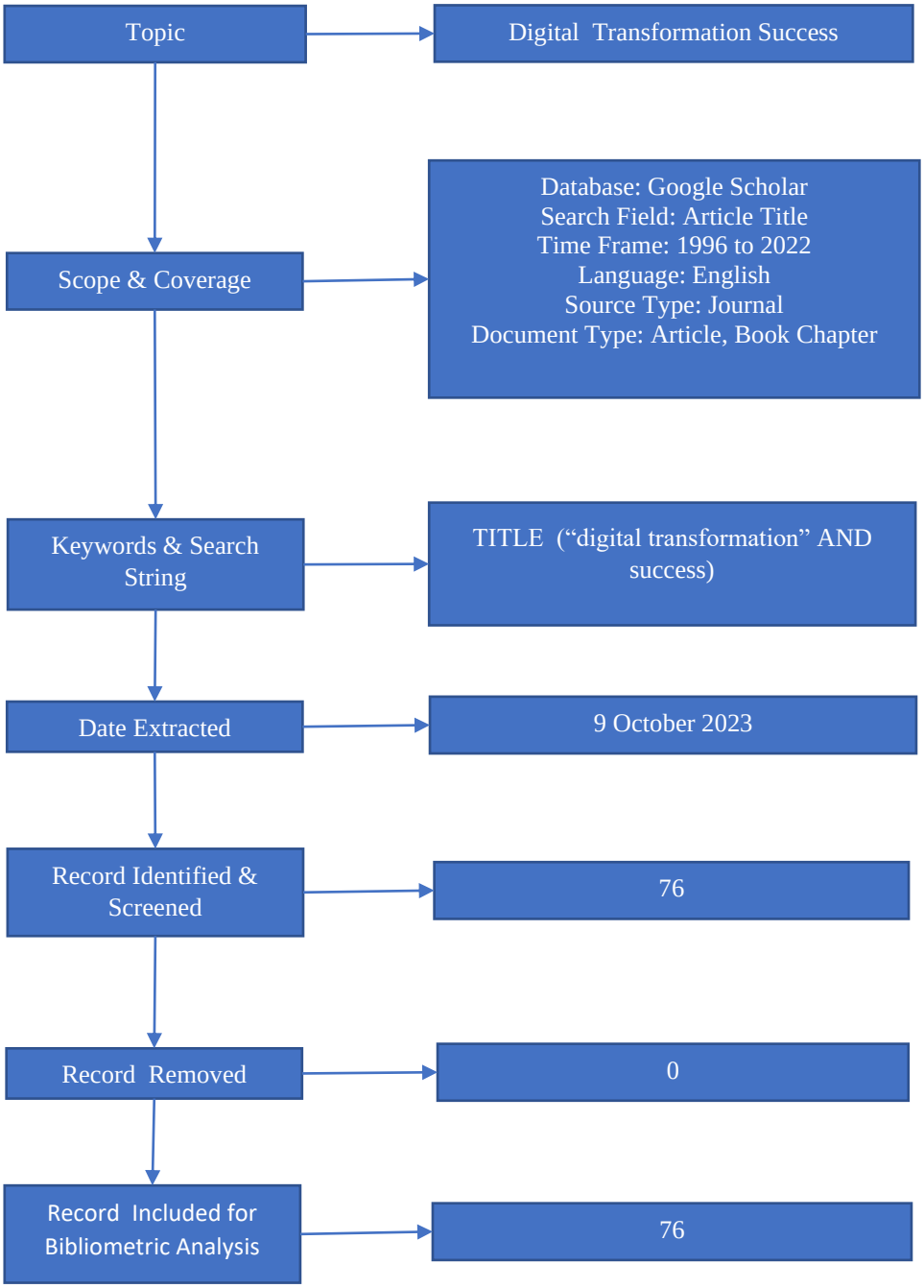

Figure 1. Flow Diagram of The Search Strategy

From the results using keywords and search strings, data processing is carried out using Microsoft Excel to find out some significant issues including:

- 10 (Ten) most influential and popular articles or papers as in Table-1.
- The trend of research development related to "Digital Transformation Success" every year from 1996 to 2022, as in Figure-2.

The extracted data is then processed using VOSViewer (Version 1.6.19) to display a cloud map of "co-authorship" and "terms with high occurrence" to facilitate understanding of what is happening with related researches and how researchers/authors collaborate. Furthermore, the terms that appear most often and the relationship between one term and other terms are also displayed using VOSviewer. The terms that appear most frequently are of course the sub-topics or factors most related to Digital Transformation Success (Van Eck and Waltman, 2010), (Van Eck and Waltman, 2021).

3. FINDINGS, ANALYSIS, AND DISCUSSIONS

Findings

Documents found by searching using the "Advance Search" tool from Google Scholar and specific to the "paper title" which contains the words Digital Transformation Success with the search string ("digital transformation" AND "success) with a time span of 1996 until 2022, there are 76 documents and all of them are in English. Of these 76 documents, all of them are relevant so none of them was removed. The next analysis is carried out using the steps described below.

Analysis

Ten Most Influential Articles / Writings

After processing the extracted data using Excel Worksheet, based on the number of citations, ten most influential articles were found in the order shown in Table-1 starting from the most popular at the top.

Table 1. 10 (Ten) Most Cited Articles

No	Cites	Authors	Title	Year
1	306	K Osmundsen, J Iden, B Bygstad	Digital Transformation: Drivers, success factors, and implications	2018
2	265	M Cichosz, CM Wallenburg	Digital Transformation at logistics service providers: barriers, success factors and leading practices	2020
3	153	M Ghobakhloo, M Iranmanesh	Digital Transformation success under Industry 4.0: A strategic guideline for manufacturing SMEs	2021
4	85	R Morakanyane, P O'Reilly, J McAvoy, A Grace	Determining Digital Transformation success factors	2020

5	82	J Bughin, J Deakin, B O'Beirne	Digital Transformation: Improving the odds of success	2019
6	75	N Sahu, H Deng, A Mollah	Investigating the critical success factors of Digital Transformation for improving customer experience	2018
7	51	GM Jonathan	Digital Transformation in the public sector: Identifying critical success factors	2020
8	43	A Florek-Paszkowska, A Ujwary-Gil.	Business innovation and critical success factors in the era of Digital Transformation and turbulent times	2021
9	31	K Liere-Netheler, K Vogelsang, S Packmohr.	Towards a framework for Digital Transformation success in manufacturing	2018
10	29	C Tungpantong, P Nilsook.	A conceptual framework of factors for information systems success to Digital Transformation in higher education institutions	2021

Articles by Year

From the results of processing data extracted from Google Scholar using the "Publish or Perish" software application, it was found that before 2015 there had not been a single article focused on "Digital Transformation Success". There was only one article that included this as the title in 2015, written by a student regarding Digital Transformation in tele-communications companies. In 2016 and 2017 there were no scientific articles published, only in 2018 there was an increase, namely 7 articles in 2018, 8 articles in 2019, 15 articles in 2020, 19 articles in 2021 and 26 articles in 2022. The trend increases since 2020 is supposed to be due to influence by the Covid-19 pandemic which is one of the drivers for accelerating Digital Transformation. Graphic visualization is shown with a line diagram in Figure-2.

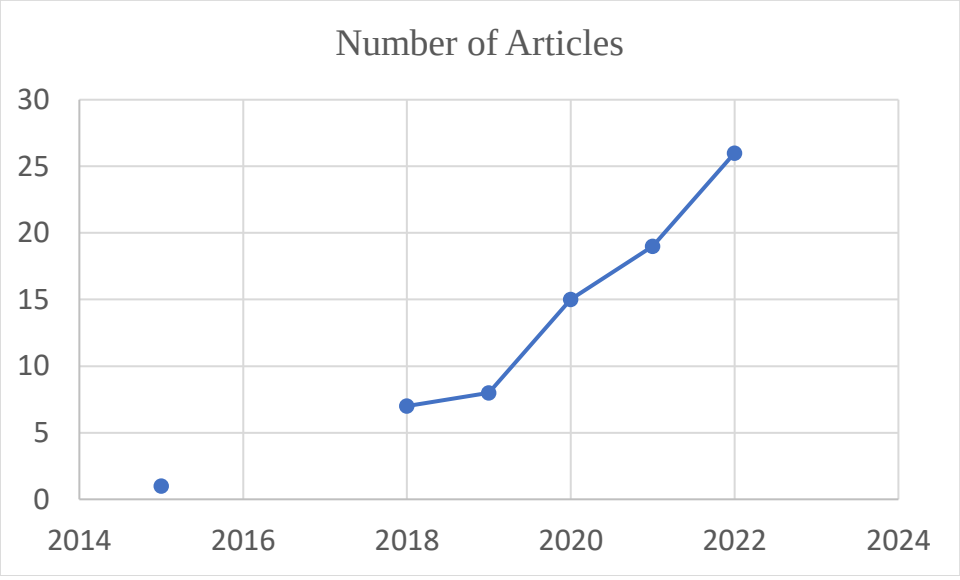

Figure 2. Numbers of Articles by Year

Co-Authorship & Collaboration

Of the 146 authors, it turned out that only 6 authors collaborated with each other. And only two of them are connected to 5 other authors, namely Betzwieser B. and Levkovskyi B., while the other 4 authors are only connected to 3 other authors. This shows that collaboration between researchers is still not very closely connected. To provide maximum results, better and stronger collaboration between researchers and practitioners is needed. Visualization of the relationship between authors or co-authorship is shown with a cloud diagram as shown in Figure-3.

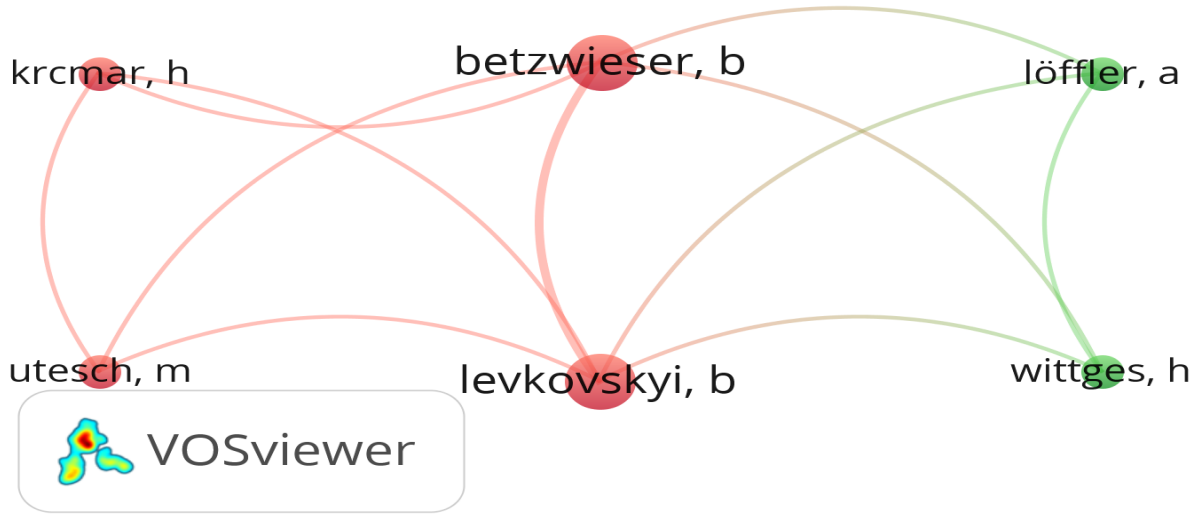

Figure 3. Link Strength of Co-Authorship

Most Popular Terms Cloud Map

Of the many terms that appeared in all articles, analysis was carried out using VOSViewer and it was found that there are 10 terms dominating as shown in Table-2. The relationship between these terms is shown in the form of a cloud map as shown in Figure-4. This Cloud Map shows that successful Digital Transformation is closely related to existing strategy, organization, leadership, processes and guidelines.

The terms Organization and Organization are actually the same. Likewise, Leader and Leadership are very related or identical things, which in turn will determine organizational strategy. With this assumption, the order of the top 5 most important and most frequently appearing terms is:
1) Digital Transformation
2) Leadership
3) Organization
4) Digital Transformation Success, and
5) Process

Being formulated in one key sentence, it may be arranged as following: *"The success of Digital Transformation is largely determined by leadership which will determine organizational strategy so that the success of Digital Transformation processes and projects can be maximized."*

Of course, this is a very interesting and important thing that can be used as a reference for future researchers and provide guidance to practitioners in implementing Digital Transformation in the organizations or entities they lead. This strengthens the proposition which mentions that Digital Transformation is indeed made possible by technology but what makes the transformation take place is not technology but humans, because humans are the ones who lead and determine strategies and make decisions (Nadkarni and Prügl, 2021). This could be one of the most important issues when developing a standard for Successful Digital Transformation.

Figure 4. Key Terms Cloud Map

Table 2. Most Relevant Terms

No.	Term	Occurrences	Relevance Score
1	Digital Transformation	65	1.7522
2	Organization	36	1.08
3	Leadership	27	1.4427
4	Leader	23	1.1736
5	Organisation	13	1.677
6	Digital Transformation Success	13	0.3309
7	Process	10	0.3363
8	Digital Transformation Project	7	0.9021
9	Digital Transformation Strategy	7	0.7991
10	Paper	5	0.5062

Discussions

From the above findings and by reading the most influential articles we found that none of them focus on a step-by-step guidance which can be used as a standard for implementing Digital Transformation in order to maximize its success. But thanks to the findings, we can use

them to support future researches with a purpose of developing a Successful Digital Transformation Standard.

4. CONCLUSIONS

Digital Transformation Success is increasingly drawing attentions as Digital Transformation is "no more a choice but a must" in the world's increasingly digital environment. In fact, Digital Transformation is largely determined by leadership which is the drive of organizational strategy so that the success of Digital Transformation processes and projects can be maximized. This provides a good basis and strong recommendation to dig deeper on leadership dan organizational aspects of Digital Transformation.

Attention to technological aspect is important, but focus on human resources as actors of transformation is much more important to foster a successful Digital Transformation. It is highly recommended that further empirical researches shall be carried out by making a deep consideration to the facts found in this study in order to develop a reliable Standard for Successful Digital Transformation. With this standard available, we believe that organizations can maximize their success in implementing Digital Transformation.

This bibliometric analysis has limitations because it only uses one database, namely Google Scholar. In future researches it would be more comprehensive if it could be complemented with other databases such as Scopus, Web of Science, etc.

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