# The COVID-19 Crisis and Digital Transformation, Paving the Way for the Future of Digital Leadership in the Post-COVID-19 World

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## Abstract

The current study seeks to examine the fundamental digital leadership competencies required for the post-COVID-19 future of digital leadership. We employed the Scanalysing base for the literature published on the COVID-19 outbreak to shape the future of digital leadership by analyzing existing research on digital leadership, educational leadership, and health system leadership. The PRISMA statement 2015 is used for record selection and rejection, which is a globally accepted approach. The final 61 articles were picked for the review, and VOS viewer software was used to categorize the literature on digital leadership and the COVID-19 pandemic. The researcher's choices and the results of the VOS viewer program revealed four primary categories. According to the study's conclusions, digital skills are required for employees and organizational leaders to prepare for future technological revolutions. Digital leaders must be able to understand digital technologies and make sound decisions to achieve business objectives.

**Keywords:** Digital Leadership; Digital Transformation; Health System; COVID-19

## 1. Introduction

Digital technologies have profoundly disrupted companies for decades, and the velocity of technological progress is affecting everyday occurrences. Fast-growing technologies impact organizational structures, societal values, and decision-making from individual to top-tier leadership (Kraus et al., 2019). The impact of digitization is not confined to a single field or industry; from retailers to the corporate world, digital solutions are enhancing operations. Digital technologies have significantly impacted people's communication and interactions with their environment. Mobile devices, personal computers, self-driving cars, drones, intelligent television screens, wearables, smartphones, and smartwatches are examples of technological innovations and personalized gadgets that are changing the way civilizations receive and distribute information (Büyüközkan & Göçer, 2018). The impact of these advanced technologies gradually improved the quality of life in communication and health. The influence of these advanced technologies steadily enhanced the quality of life, particularly in communication, education, and health. However, the latest COVID-19 outbreak posed a significant challenge to digital technologies and techniques. Worsley's supply chain and health systems crumbled due to the lockdowns (Navia et al., 2021).

The COVID-19 virus outbreak wreaked havoc on both industrialized and developing economies, causing significant harm to both. That indicates that digital technologies need more potential to support the infrastructures (Huang & Luk, 2020). According to (Faraj et al., 2021), the outbreak has also highlighted digitization's insufficient and restricted nature. When people or organizations were obliged to digitize their working process swiftly and totally in reaction to the virus, these limitations became apparent. Many businesses that were regarded as technology leaders experienced problems in transitioning to a digitalized manner of operations. In addition to this, the COVID-19 pandemic, characterized by severe effects on lives and company performance, also shows the enormous digital divide between weak and decadent, rural and urban locations, and advanced and emerging nations (Amankwah-Amoah et al., 2021). However, due to the stress caused by viral transmission, the necessity of digitalization is recognized by everybody. The disease outbreak has catapulted necessity transformation across a range of industries, as well as principally changing consumer behavior, from in-store visits to online purchases; the latter allows for far more data to be obtained on buyers, even further trying to undermine the position of resellers lacking such detailed insider information and business intelligence capabilities (Domingo et al., 2020).

Digital penetration is accelerating rapidly around the corporate environments to health systems, and educational institutes are transforming the medium of teaching. According to (Dwivedi et al., 2020), COVID-19 is the most disruptive, world-changing event in live memory for many corporate executives and managers. COVID-19 has evolved as the ultimate decision-making exam for political leaders, senior corporate executives, and healthcare operational-level managers. It is, without a doubt, the most challenging assignment for evaluating their decision-making ability. In a technological age, the significance of digital abilities and capacities is a critical trait for leaders. In the future, the duties of digital leaders will be completely different, as will their skill set (Pettersson, 2018). According to (Kapur, 2021), leaders should have various digital and human skills to overcome the challenges of digital transformation, such as the ability to communicate effectively in a digitalized context, encourage initiative and change attitudes, and deal with complex and quick problems solving.

During the pandemic crisis, digital transformation has made a substantial contribution to health and education. The current research is assessing the existing literature on digital leadership, educational

leadership, and the health system during the COVID-19 outbreak using the Scopus database to guide the future of digital leadership. The current study seeks to investigate the critical digital leaders' competencies necessary for the post-COVID-19 future in digital leadership.

## 2.  Materials and Methods

The present study includes material from the well-known database used by scholars worldwide, Scopus. For our literature survey, we used the search terms "digital leadership" AND "COVID-19," "Health system," "Education," AND "Global crisis." In the beginning, 101 records were retrieved. As described by (Moher et al., 2009) and depicted in Figure 1, the PRISMA framework filters the documents. Some of the essential specific criteria used for this research were published papers in English that have been relevant to the spectrum of digital leadership and COVID-19. The review articles, conference proceedings, and book chapters are not included in the evaluation. Stage 1 consists of 83 conclusive investigations that are applied for keyword cloud and keyword occurrence. Subsequently, a comprehensive selection was made for each discovered categorization to evaluate related documents, and only 61 publications were chosen to be included in the assessment to synthesize it. Figure 1 depicts the complete PRISMA statement selection and rejection procedure of the current study in detail.
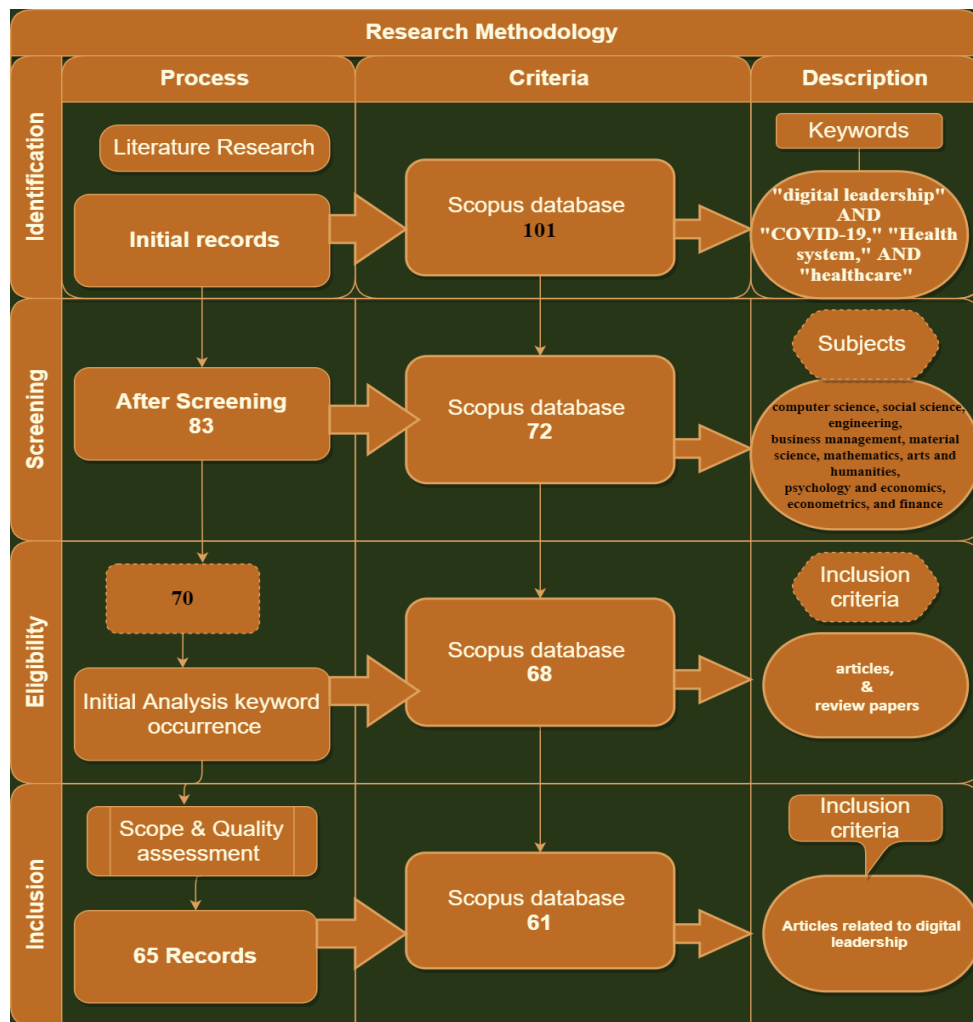


**Figure 1.** Review methodology.

## 3.  Results

### 3.1. Descriptive Analysis

Subheadings may be used to separate this area. That should contain a brief and accurate explanation of the empirical observations, their explanation, and the empirical inferences that may be made.
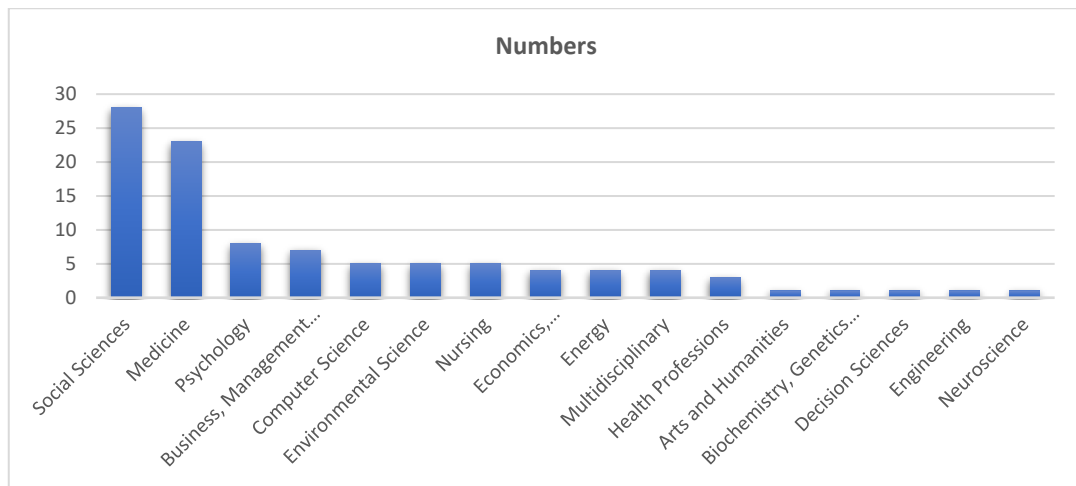
**Figure 2:** Showing the results of the subject

Figure 2 depicts the interdisciplinary character of the study issue and highlights the participation of the many fields in digital leadership and Covid-19. With 28 studies included in the analysis, social science is the most contributory field, accompanied by medicine with relevant studies, psychology with seven studies, and business, management, and accounting with 6. The remaining contributions come from various fields of study such as computer science, environmental science, nursing, economics, econometrics, finance, and energy.

The records extracted from 2019 to 2021 and the Year-based publication are shown in figure 3. This is essential for assessing the impact of digital technologies in COVID-19 healthcare research. Figure 3 indicated the growing increase in the number of published articles each year, with the highest frequency of publication count in 2021 at 65%. A total of 61 articles recorded 33% from 2020, and only 2 % records from 2019.

Figure 3 depicts the retrieved records from 2019 to 2021, as well as the Year-based publishing. This is necessary for evaluating the impact of digital technology in COVID-19 healthcare research. Figure 3 depicts an increasing number of articles published every year, with 2021 holding the most significant publishing count frequency at 65 percent. Sixty-one articles were recorded, with 33 percent from 2020 and only 2% from 2019.
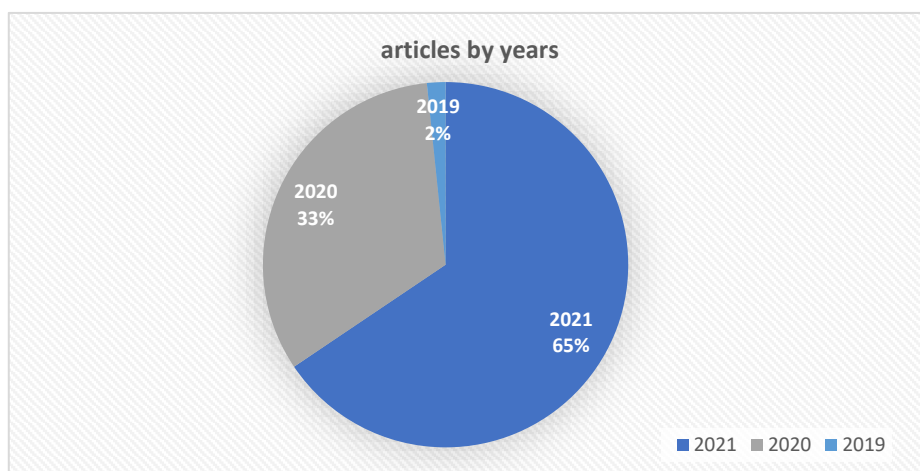


**Figure 3:** Distribution of records year base

The country-based distribution is a significant indication for demonstrating the role of nations in the viral outbreak. Figure 4 depicts a map of the nations that have made the most contributions to digital leadership and the influence of COVID-19 on the health system. The current analysis included 18 publications provided by scholars from the United States. The United Kingdom also made a substantial contribution, with 11 documents linked to the present review. Australia, China, Indonesia, and India are the other nations that participated in the current study. Figure 4 depicts the geographical location that was provided for the current study.
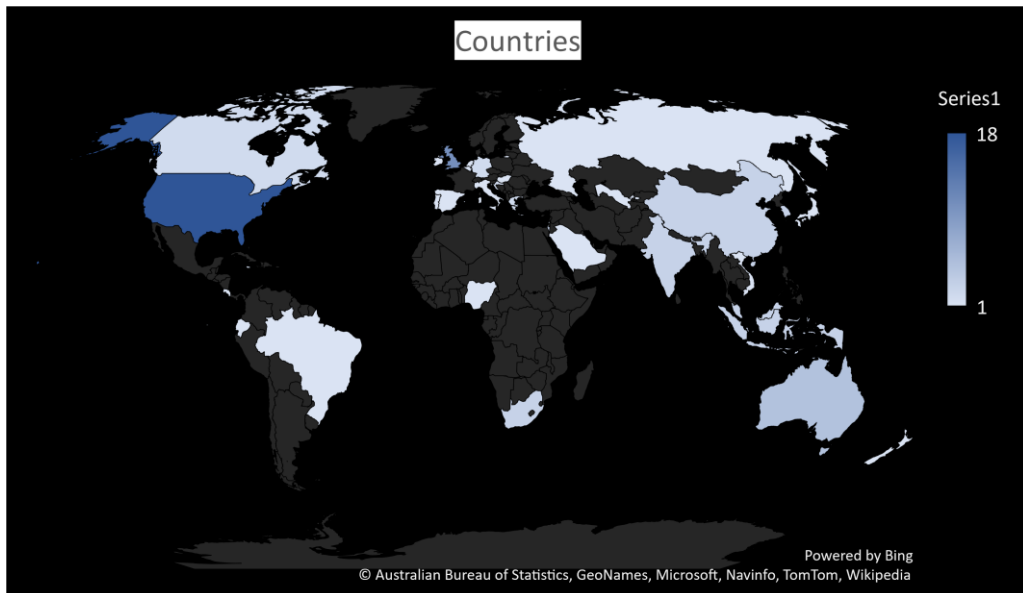
**Figure 4:** Map of the countries that contributed to the current study

**Table 1.**   Source titles and citation percentage

| Source Title | Articles | Cited by | Percentage |
|---|---|---|---|
| Emerging Science Journal | 3 | 7 | 6% |
| Frontiers in Psychology | 3 | 5 | 4% |
| Sustainability (Switzerland) | 4 | 44 | 37% |
| Journal of Academic Librarianship | 2 | 9 | 8% |
| Journal of the American Medical Informatics Association | 2 | 21 | 18% |
| Journal of Service Management | 3 | 32 | 27% |

## 4.   Reviewing the Literature

Today's working world is quickly changing due to increased digitalization, presenting leaders with new problems. Digital leadership is an essential component in addressing these issues, and it has emerged as a significant idea in the debate over what types of capabilities leaders require for digital transformation (Zeike et al., 2019). Additional classification of material guides the research literature and researcher perspectives on digital leadership adaptation in the post-COVD-19 world. To identify the most used terms in the research, we utilized the keywords "digital leadership" AND "COVID-19," "Health system" AND "Education" AND "Global crisis." As previously stated, there were 61 studies incorporated in the keywords during the first phase of the literature review; moreover, these records were utilized to recognize the material categories from these keywords., as Table 2 shows. Based on the term co-occurrence author classified the literature into four significant categories, Global crisis, health system, educational leaders, and digital transformation.

**Table 2.**   Table2: Term occurrence, classification, and percentage

| Term | Occurrences | Classification | Occurrence percentage classification | Occurrence percentage within a classification |
|---|---|---|---|---|
| Change | 17 | Digital transformation | 30% | 0.4828 |
| Collaboration | 11 | | | 0.8629 |
| Communication | 12 | | | 0.4219 |
| Digital transformation | 9 | | | 0.8915 |
| Employee | 9 | | | 1.4361 |
| Future | 9 | | | 1.1613 |
| Home | 7 | | | 2.0614 |

| Term | Occurrences | Classification | Occurrence percentage classification | Occurrence percentage within a classification |
|---|---|---|---|---|
| Importance | 10 | | | 0.3348 |
| Important role | 6 | | | 1.5366 |
| Interest | 8 | | | 1.2171 |
| Interview | 9 | | | 0.9506 |
| Literature | 13 | | | 0.426 |
| Member | 13 | | | 0.7872 |
| Order | 8 | | | 1.7371 |
| Organization | 10 | | | 1.5405 |
| Originality value | 6 | | | 0.8152 |
| Skill | 9 | | | 0.8041 |
| Stakeholder | 11 | | | 1.0137 |
| Success | 12 | | | 0.3765 |
| Survey | 10 | | | 1.0444 |
| | 199 | | 22% | |
| Author | 8 | Educational leadership | | 0.8085 |
| Design methodology approach | 6 | | | 0.8152 |
| Factor | 12 | | | 0.8556 |
| Faculty | 6 | | | 1.1512 |
| Framework | 14 | | | 0.3122 |
| Higher Education | 10 | | | 0.5743 |
| Knowledge | 8 | | | 0.8507 |
| Lesson | 8 | | | 1.3031 |
| Student | 18 | | | 0.7918 |
| Teacher | 13 | | | 2.6471 |
| Teaching | 14 | | | 1.9587 |
| University | 12 | | | 0.9682 |
| Work | 17 | | | 0.783 |
| | 146 | | | |
| Area | 9 | Global crisis | 25% | 0.5036 |
| Barrier | 8 | | | 0.8073 |
| Business | 8 | | | 0.7482 |
| Case study | 10 | | | 0.9183 |
| Country | 13 | | | 1.2009 |
| Digital divide | 8 | | | 1.9364 |
| Effort | 6 | | | 1.6543 |
| Individual | 7 | | | 0.6905 |
| Issue | 12 | | | 0.3315 |
| Learning | 21 | | | 0.8741 |
| Number | 9 | | | 0.6413 |
| Participant | 10 | | | 0.6479 |
| Social medium | 9 | | | 0.3628 |
| Society | 11 | | | 0.834 |
| Team | 16 | | | 0.3967 |
| World | 7 | | | 0.5356 |
| | 164 | | | |
| Context | 17 | Health system | 24% | 0.6198 |

| Term | Occurrences | Classification | Occurrence percentage classification | Occurrence percentage within a classification |
|---|---|---|---|---|
| Evidence | 10 | | | 0.6201 |
| Face | 8 | | | 1.0362 |
| Field | 7 | | | 1.8335 |
| Health | 17 | | | 0.6324 |
| Health system | 8 | | | 1.6941 |
| Information | 13 | | | 0.912 |
| Outbreak | 9 | | | 0.9916 |
| Part | 6 | | | 1.0743 |
| Person | 11 | | | 0.7359 |
| Risk | 9 | | | 0.452 |
| School | 10 | | | 3.3947 |
| Spread | 8 | | | 0.7715 |
| Staff | 9 | | | 0.6061 |
| Term | 8 | | | 1.556 |
| Trust | 8 | | | 1.2654 |
| | 158 | | | |
| **Total** | 667 | | | |

Furthermore, data were evaluated using content analysis to develop the categories of the author's research. VOSViewer program examines the content of academic research clusters generated on the material to central group ideas. According to the current study, investigators' keywords and keywords in greater depth in the publications' indexing method specified in the database are equally correct for bibliometric analysis aimed to expose the patterns of the investigating topic. As a result, we included both classes of terms for the co-occurrence analysis within the research region related to digital leadership and COVID-19. The investigation included 61 documents in total, and the data provided 72 terms. We meticulously determined and picked just the most prevalent 65 keywords repeated in at least six entries. The content analysis findings are depicted in Figure 4—the group displayed four large clusters, which are depicted in various colors in Figure 4. The blue cluster is most closely connected with the health care system, the country, and information. Green is the color of digital change, digital technology, and the future. Finally, the purple cluster represents education, teaching, and universities. Finally, yellow represents a worldwide epidemic, transformative leadership, and teamwork. In the next part, each cluster is explored further to discover digital leadership.
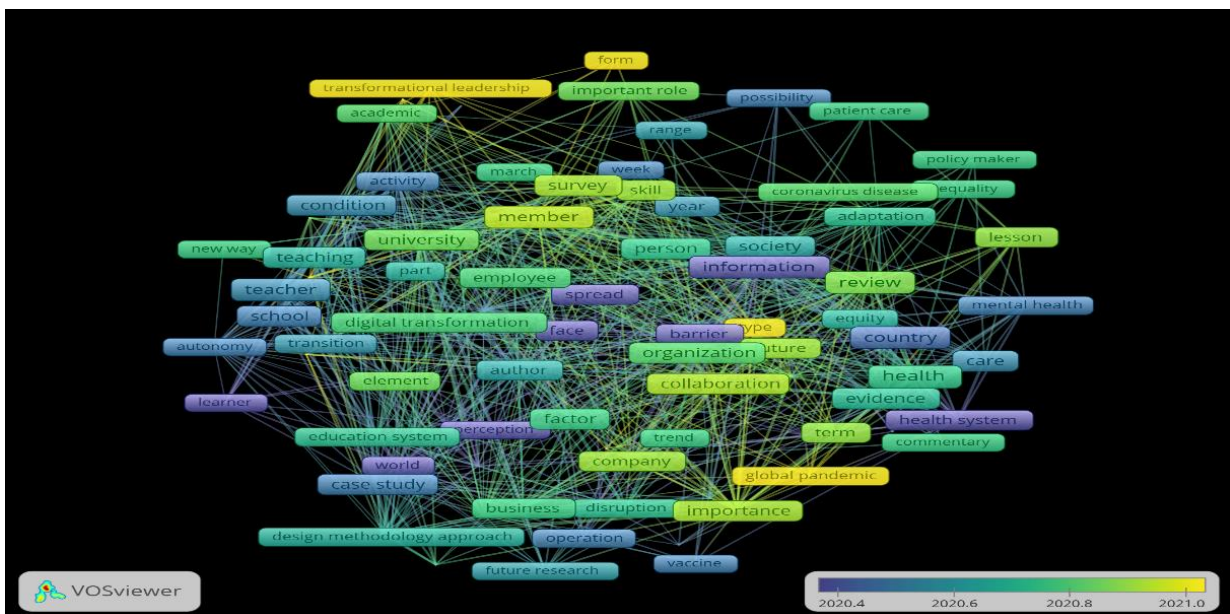


**Figure 5:** The VOS viewer is used to categorize literature.

## 4.1. Global Crisis:

COVID-19 virus was discovered in December 2019; no one expected what would happen next. By the end of January 2020, the virus had spread over Asia, Europe, and America, changing into a worldwide pandemic. Since then, the modern socioeconomic environment has been forced to shut down for an extended period, impacting healthcare, education, culture, and society on a short, medium, and long-term basis (Azman & Abdullah, 2021). The biggest crises were health-related. Any health-related crisis demands the rapid establishment and distribution of clinical practice standards and the preservation of open and secure communication networks (Sivananthan et al., 2021). Due to a lack of emergency facilities, the present infrastructure could not manage the global pandemic catastrophe. However, some countries responded immediately to the pandemic crisis by using digital technologies and technological advancements. According to (Heo et al., 2020) Korean government's quick answers to emergency clearances and prompt R&D funds allow for undertaking as many COVID-19 tests as feasible. Only three weeks following the release of the COVID-19 genetic sequence, the government issued emergency use authorization for test kits on February 4.

Gradually the pandemic enabled the nations to adopt integrated efforts to respond to the crisis. Initially, it was only a health emergency; later, social and economic challenges occurred. Gradually, the pandemic enabled nations to respond to the problem with coordinated efforts; originally, it was simply a health emergency, but social and economic issues subsequently emerged (Szunomár, 2020). Social distance and lockdowns substantially impact both developed and developing economies' social and economic infrastructures. The leaders' probable answer was to modify technology to deal with the problem (Tham et al., 2020).

**Table 3.** Author details, citations, segment, and settings of global crisis literature

| Authors | Cited by | Segment | Settings |
|---|---|---|---|
| (Pring et al., 2021) | | industries and organizations | crises |
| (Sivananthan et al., 2021) | | Healthcare | patient care |
| (Okech et al., 2020) | 3 | digital media | future surges |
| (Garro-Abarca et al., 2021) | 32 | virtual work | employees' work performance |
| (Permana et al., 2021) | | construction service industry | transformational leadership |
| (Azman and Abdullah, 2021) | 1 | higher education | disruptions |
| (Tham et al., 2020) | 5 | crisis leadership | leadership roles |
| (Szunomár, 2020) | 1 | economic growth | technological leadership |
| (Weiner et al., 2020) | | service-learning | learning competencies |
| (Heo et al., 2020) | 4 | health policy | digital technologies |

According to (Pring et al., 2021), the effectiveness of digital technologies is witnessed during the COVID-19 pandemic. Many services providers and some essential service providers' back-department operations had to transform quickly to create a virtual work environment and keep their businesses running using digital technologies. Employees are separated in various ways (e.g., geographically) and engage in digital work arrangements both within and outside their organization. While highly transformative environments, such as digital transformation, provide challenges to leaders, pandemic-induced and forced shifts caught service providers off guard, compounding the difficulties of running a service organization and its leadership (Garro-Abarca et al., 2021). The unrelenting speed of the COVID-19 pandemic has resulted in a change in market paradigms, posing a challenge to executives dealing with technology and digitalization.

In working from home and monitoring performance, the pandemic issue presents a dilemma for leaders and employees. Practical and creative bidirectional communication techniques were necessary because of social distance and the remote work environment (Permana et al., 2021). The current issue has created an opportunity for natural leaders and decision-makers in the health industry to advance their skillset and acquire knowledge in this subject. A "mega-crisis" like the present outbreak needs competent leadership and different capabilities than in the past (Weiner et al., 2020). The leading cause is the difficulties associated with technology management in the health industry. Although many advanced nations use digital technology in their healthcare systems, there was still a gap in dealing with the current viral outbreak (Okech et al., 2020). Healthcare systems are still trying to use digital technology to control pandemic situations in low-income and developing nations.

## 4.2. Health System

The recent pandemic crisis tested the capabilities of the worldwide health system in terms of patient management response and outbreak control. According to (Stark et al., 2020), As the COVID-19 pandemic unfolds over time, a centralized information source that provides doctors with up-to-date information for the management of COVID-19 patients can enhance patient care. However, many nations responded significantly to the COVID-19 outbreak from the patient care perspective. According to (Levin-Zamir, 2020) Israel has a one-of-a-kind healthcare system, which has helped provide a firm foundation for the COVID-19 immunization effort. Importantly, all inhabitants in Israel have access to universal health care. The necessity of a dependable healthcare system and digital infrastructure, openness between politicians and the public, and constant and consistent communication, both low-tech and high-tech, are essential for establishing public confidence.

Many experts feel that the reaction of digital health care to the latest pandemic was much better, and damage control was also lower than in the traditional health system (Bhatia et al., 2020). On the other hand, many states failed to respond to the situation in a healthy way. The healthcare system response is a consistent process to progress, and leadership plays a vital role in healthcare infrastructure development (Vilendrer et al., 2020).

During the COVID-19 epidemic, digital health has boomed, including mobile health applications, telemedicine, and data analytics to enhance health systems (Figueroa et al., 2021). The development of digital apps and infrastructure facilitates virus control and the safety of health professionals (Ouellette et al., 2021). However, COVID-19 greatly influenced the healthcare business, draining resources and people, and disrupting routine health issues for patients. Although crisis management is a difficult task, it is split into phases by many practitioners and scholars, and crisis management models all emphasize the necessity for action before, during, and after a crisis (Newman & Newman, 2021). According to (Obaid et al., 2021), the outbreak of COVID-19 was a genuine demand to add a new layer to competencies, namely crisis-based learning and practice. Public health emergencies give opportunities to consider medical practice from an interdisciplinary and interprofessional perspective and train people to function as part of a larger, internationally responsible team. It also promotes innovative teaching and learning approaches, such as digital and online learning materials to augment learning. After the pandemic, the relevance of digital health care has grown, and more apps and sources are permeating the health-related environment (Dawes et al., 2021).

During the new coronavirus pandemic, digital health technologies are considerably improving healthcare capacities. However, there is a significant skill gap between what is accessible and necessary to manage these digital health apps and technologies (Myeong & Shahzad, 2021). According to (Subash et al., 2021), Innovative educational solutions to reduce schooling have also climbed to the top of the list of criteria for the digital health system. While opportunities to network, understand systems, and meet in person with stakeholders to advance conventional efforts have decreased, the rapid transformation of many health system procedures has been helped mostly by technology and digital health advances. Digital platforms were assessed for learner accessibility and potential use in a virtual classroom.

**Table 4.** Author details, citations, segment, and settings of health system literature

| Authors | Cited by | Segment | Settings |
|---|---|---|---|
| (Levin-Zamir, 2020) | 3 | vaccine uptake | digital media |
| (Stark et al., 2020) | 1 | hospital protocols | clinicians |
| (Myeong and Shahzad, 2021) | | air pollution | smart cities |
| (White et al., 2021) | | virtual surgical pathology | pathology |
| (Subash et al., 2021) | | clinical informatics | health informatics |
| (Renfrew et al., 2021) | 2 | healthcare education | digital learning |
| (Dawes et al., 2021) | 2 | digital technologies | distancing, self-isolation |
| (Rodin et al., 2020) | 2 | digital workflow | distributed leadership |
| (Bhatia et al., 2020) | 5 | global tuberculosis | digital tools |
| (Vilendrer et al., 2020) | 21 | telemedicine | operational leadership |
| (Newman and Newman, 2021). | | library leadership | digital divide |

Digital interactions (Zoom, Zoom Video Communications, Inc, San Jose, California; Microsoft Teams, Redmond, Washington; and Skype, Microsoft) were rated subjectively for full slide picture resolution and quality and are available to health system practitioners (White et al., 2021). According to (Renfrew et al., 2021), due to the Covid-19 pandemic, the environment of healthcare and healthcare education has altered dramatically. The effect on people's lives, population health and well-being, and healthcare services and personnel is unparalleled. The sense of urgency to solve COVID-19 fuelled the rapid shift of care from traditional to digital platforms, allowing several other critical enablers to become created in the health system. The COVID-19 pandemic has created substantial disruption in healthcare and harm at all levels of society; yet, it has also spurred agile and quick change, as well as a chance for disruptive innovation, which is unusual in healthcare education for future healthcare professionals (Rodin et al., 2020).

## 4.3. Educational Leadership

The current pandemic is posing unprecedented challenges to educational institutions globally, from primary to secondary. It creates a situation in which educational leaders must exhibit leadership to offer instruction via digital media. The world of education is getting increasingly complex, particularly in the digital era, necessitating the promotion of digital technology in school administration and management by school administrators (Hafiza Hamzah et al., 2021). According to (Khan, 2021) owing to the difficulties of communicating during a rapidly evolving crisis in which information must, by necessity, change as circumstances change, it may be interesting to hear the perspectives of educational leadership and decision-makers on how the crisis impacted their roles, and perhaps to contrast this with the perspectives of teachers and students on how successful leaders' communication. Many schools and universities have turned to online learning as a substitute for conventional means of education, and mini-videos, online consultation time, and live streaming have become the new standard during the COVID-19 lockdowns. Although the concept of online teaching is appealing and is seen as a way to save the academic year, numerous countries mistakenly believe that their school systems are prepared for emergency online teaching, despite teachers and students having almost no skills or experience in the use of the new mode of learning (Molise & Dube, 2020). Researchers like (Farrell, 2021) believe that schools are critical locations for the growth of adaptive competencies, such as the ability to integrate digital technology into teaching, learning, and assessment; the report warns that "the reality in our classrooms lags significantly behind the promise of technology." While instructors are expected to use digital technology in teaching, learning, and evaluation, this is not always the case.

The researcher's findings (Lantsoght et al., 2021) suggested that managing academic work and childcare was vital for academic parents during the COVID-19 pandemic since typical daycare options were severely constrained. Managing the duty of providing or supporting children's education while also caring for the physical and social well-being of children under lockdown were additional parental challenges. Simultaneously, the digital skills gap is not confined to instructors and learners; parents were also put in a difficult position owing to their inability to use advanced digital tools for Education (Colpitts et al., 2020). However, that is required a collaborative approach to deal with the educational competencies. Researchers are keen to introduce training programs to upgrade digital technologies using skills for students and teachers. However, dealing with educational skills necessitates a collaborative approach. Researchers are eager to provide training programs for students and instructors to update digital technologies (Day et al., 2021).

Furthermore, several scholars suggest that the function of leadership is critical for the educational perspective during the pandemic. Immediate challenges for principals during CCOVID-19 included directing preparation for online education by ensuring students had access to the device, and teaching professionals felt prepared and supported. Staffing schools with an increasing number of staff who could not report to work in the days preceding the lockdown was also a challenge for some. Concerns about student safety and well-being and the length of time schools would be physically shuttered were also raised (Thornton, 2021).

The importance of the school principal as a leader, one of the primary responsibilities of school leadership is to bring together the many stakeholders in a school, continually reflect on the current growth processes, and work toward future skill-required goals. Digital abilities are becoming increasingly crucial in today's economy for all vocations (Delcker & Ifenthaler, 2021). According to (Antonopoulou et al., 2021b), the leader's position and importance in the foundation's improvement and effectiveness. The COVID-19 outbreak, which continues to afflict communities throughout the world, has highlighted the essential need

for educational leaders and the academic community at all levels to be digitally literate. Educational leadership in academic settings, mindsets, and situations without including digital leadership qualities does not advance higher education or the careers of all those who represent it. Educators must always be attentive, stay updated on new technologies and digital tool capabilities, and participate in elevated training/retraining programs, needing to be progressively integrated into educational leadership (Antonopoulou et al., 2021a).

**Table 5.** Author details, citations, segment, and settings of educational leaders' literature

| Authors | Cited by | Segment | Settings |
|---|---|---|---|
| (Lantsoght et al., 2021) | | academic parents | digital skillsets |
| (Khan, 2021) | | learning, teaching, and assessment | collaborative cultures |
| (Day et al., 2021) | | crowdsourcing | community input |
| (Thornton, 2021) | 5 | School principals | online teaching and learning |
| (Antonopoulou et al., 2021b) | 7 | educational leadership | transformational leadership |
| (Antonopoulou et al., 2021a) | | educational leadership | transformational leadership |
| (Hafiza Hamzah et al., 2021) | | education system | digital teaching |
| (Farrell, 2021) | 1 | teacher education | digitally enhanced learning |
| (Delcker and Ifenthaler, 2021) | 3 | school leadership | digital teaching |
| Sá M.J., Serpa S. | 19 | educational institutions | transformational leadership |
| (Molise and Dube, 2020) | 3 | Emergency online teaching | Relational leadership |
| (Colpitts et al., 2020) | 2 | digital shortcomings | disruption |

## 4.4. Digital Transformation

As the world witnessed the virus spread, the significance of digital technology has never been more apparent. Long before introducing highly efficient technologies, there was stated that there would be a technological boom (Parc & Kim, 2020). However, contemporary pandemic emergencies have demonstrated that digital technologies fail to provide a complete digital infrastructure (Abusaada & Elshater, 2020). According to (Park et al., 2021), the conventional world is rapidly changing, and the digital transition is anticipated to accelerate as ICTs advance and commercialize associated technologies. Digitization is bringing about new company models and altering market competition. Unforeseen events, such as the COVID-19 pandemic and shifting consumer habits, have hastened the digital revolution. In addition to this, (Obrenovic et al., 2020) "Business as usual" is rarely an option whenever a crisis hits. Instead, a crisis mode should be activated. It is critical that digital tools are readily available and connected to the Internet and associated hardware to ensure continuity in terms of resilience in the face of adversity, the capacities of an organization or country are solely dependent on the leadership. The recent pandemic problem relies heavily on the nations' communications infrastructure (Lavadenz et al., 2021). According to (Armitage et al., 2020), social media and digital communication channels have an enormous capacity to help healthcare practitioners adapt to COVID-19 by disseminating up-to-date and accurate information. To accomplish this, people need to be able to seek reliable information instead of disinformation.

The future of the healthcare system, education, and business is heavily reliant on digitalization and technology. Traditional market leaders are evolving into technological enterprises, and adaptability to technology is critical for everybody (Wexner et al., 2020). Digitalization is already impacting various employment types and sectors, and companies must incorporate new technology and alter business strategies to stay competitive (Ng et al., 2019). According to (Ratten, 2021), the COVID-19 outbreak brings digital growth plans to focus on using appropriate measurements and targets. The technology of information systems has been improved to deal with the real-time challenge. These advances have transformed the healthcare industry and provided new economic opportunities. Technology start-ups exploit the opportunity in a great way to facilitate societies. In this situation, organizations are being pushed by digital transformation to make significant changes to their strategy and organizational structure.

However, digitization has its constraints and challenges in terms of transforming the whole infrastructure. COVID-19 outbreaks necessitate a rapid reaction to minimize losses, and digital solutions present problems in meeting this demand (Joseph et al., 2021). According to (Hai et al., 2021), the lack of workforce skills to operate in digital settings is one of the critical issues confronting executives of companies in both the

commercial and public sectors confronting digital transformation. Businesses need a robust data technology basis for effective digital transformation, and both executives and employees need digital understanding, expertise, skills, and abilities. The skills and abilities also changed the parameters for the digital leadership requirements.

It is undeniable that technology is driving the world's growth and disasters. On the one hand, technology development creates demands for leaders, requiring them to take on new tasks and develop their leadership capabilities in response to changing situations (Pramono et al., 2021).

**Table 6.** Author details, citations, segment, and settings of digital transformation literature

| Authors | Cited by | Segment | Settings |
|---|---|---|---|
| (Ratten, 2021) | 5 | Innovation and futuristic | Future research |
| (Hai et al., 2021) | | Public and private organizations | Transformational leadership |
| (Obrenovic et al., 2020) | 25 | Innovative | Distributed leadership |
| (Wexner et al., 2020) | 1 | Digital communications | Surgical care of patients |
| (Armitage et al., 2020) | 6 | Spread of information | Social media and digital information |
| (Ng et al., 2019) | 3 | Online learning and teaching | Primary, secondary, and tertiary institutes |
| (Park et al., 2021) | | Internet | Management and innovation |
| (Lavadenz et al., 2021) | | Distance learning | Collaborative virtual leadership cultures |
| (Pramono et al., 2021) | | Innovation | Technology usage plays |
| (Trenerry et al., 2021) | | Future of jobs and organizations | Resilience |
| (Garro-Abarca et al., 2021) | 1 | Virtual teams | Future research |

Adoption and deployment of new technologies, in particular, have been highlighted as essential drivers for beginning disruptive changes in work teams and organizations, which frequently results in the reconfiguration of traditional managerial procedures and member opposition (Trenerry et al., 2021). In addition to this, (Garro-Abarca et al., 2021) future direction and effects of technology implementation and digital transformation are also influenced by leaders.

## 5. Discussion and Conclusion

The global expansion of COVID-19 has raised consumer and investment anxiety among various stakeholders, including consumers, educators, health professionals, and technology manufacturers. During the pandemic's peak hours, the healthcare system was subjected to tremendous strain and infrastructural deficiencies (Madurai Elavarasan et al., 2020). When the lockdowns were implemented in most regions of the world and borders were closed. The situation exposed the societal capacities of digitalization and technology (Djalante et al., 2020). The scenario forces technology firms and corporate organizations to fill the technology gap, even though it is challenging to transform the entire structure of society and adapt to digitalization overnight. According to (Ciarli et al., 2021), due to the COVID-19 pandemic, many in-person events were compelled to go online in a relatively short period. In a couple of weeks, the usage of digitalization that had previously had a limited influence, such as telemedicine, was dramatically boosted. During the pandemic, technology's impact grew steadily, and the only way to deal with the crisis was through digital contact between individuals.

The rapid advancement of technology presents several problems for consumers and businesses, most notably digital leadership in the post-COVID-19 environment. The present study looked at the existing literature on digital leadership during the COVID-19 pandemic. The overarching goal was to comprehend the future digital leadership skills and abilities necessary for the digital workflow. The PRISMA statement 2015 was utilized by the author to select and reject material. We extracted published work from the Scopus database and selected it using a quality method. The VOS viewer software was used for the research methods section, and four critical clusters linked to digital leadership were discovered from the literature.

Generally, experts show that the global pandemic problem is a significant worry for governments and organizations. During the pandemic crisis, they emphasized the importance of leadership (Tourish, 2020). Their function is becoming increasingly important in advancing the health system and infrastructure development to prevent future pandemics and outbreaks. The recent viral outbreak put the healthcare system's ability to deliver services to the test. Digital health services are vital to minimize the workload

from hospitals and face-to-face visits. Telehealth and digital care may be incorporated into the medical system to increase the efficiency of healthcare delivery. It encourages social distancing measures and assists medical centers in managing long wait times and the danger of illness development (Bokolo Anthony Jnr, 2020).

Most academics feel that the present pandemic highlights the need for digital transformation in society for any future global disaster. However, digital transformation necessitated significant financial expenditures in technology advancement and talent gap filling (Azevedo & Azevedo, 2020). Digital skills are necessary for employees and organizational leaders to prepare for future technological transformations. Digital leaders must be able to grasp digital technology and make appropriate judgments to meet corporate goals. In addition to this, future digital leadership training the workforce entails recruiting and developing new talent and re-skilling current employees through training programs and re-designing work procedures to reduce the skill mismatch between positions and people. Figure 6 shows the details of the literature outcome on digital leadership and the COVID-19 pandemic.
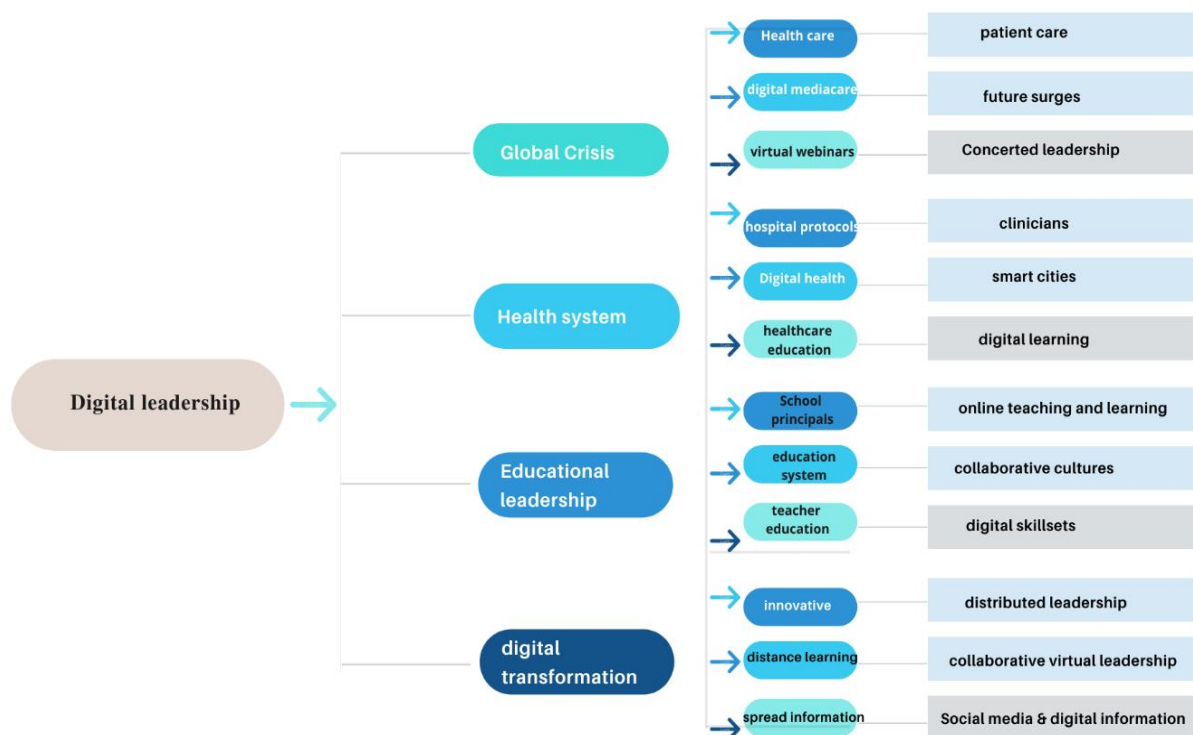


**Figure 6:** literature outcomes

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