

-RESEARCH ARTICLE-

## PROJECT RESILIENCE: CURRENT TRENDS AND FUTURE PROSPECTS FOR PROJECT IMPLEMENTATION: A BIBLIOMETRIC ANALYSIS

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### —Abstract—

This study aims to conduct a systematic review of research references from 1985 to 2022 pertinent to project resilience. This event illustrates how complex the problem of project resilience has become, particularly if implemented across multiple industries.

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This study will examine the development trend of project resilience research in various sectors and identify the prospects for project implementation, particularly in Indonesia, based on data. This study employed a qualitative approach incorporating bibliometric techniques and a systematic literature review. This study utilized 172 datasets gathered via web scraping and derived from the Google Scholar database of international publications from 1985 to 2022 containing the keywords project resilience. Various classifications, including the g-index, the h-index, and the citation index, were used to evaluate the articles used as data. According to the findings of this study, the greatest increase in project resilience topics occurred between 1996 and 2005. Most of these issues were published by journals with a background or scope in policy, economics, psychology, or even public policy, based on the network of articles. This analysis reveals that project resilience is rarely discussed within management. Any prospective project that maintains project resilience in management should be the primary focus of explanation under this condition. The purview of the articles used in the study, which were obtained from the Google Scholar database, is a study limitation. In the future, in addition to conducting research using broader literature sources, the recommendations made in this study can be used as hypotheses to facilitate extensive and in-depth follow-up research. The findings of this study are anticipated to be useful to academics researching project resilience. This resilience literature and bibliometric studies initiative is Indonesia's first systematic literature review.

**Keywords:** Project resilience, project implementation, current trends, prospects, bibliometric analysis

## 1. INTRODUCTION

The COVID-19 pandemic has temporarily halted construction, delaying the project's completion. Project disruptions can lead to surprises, project vulnerabilities, and ultimately project failure. The ability to effectively manage disruptions in initiatives is essential for success (Sombultawee et al., 2022). Managing these disruptions requires a recovery strategy that includes vulnerability reduction, response, and preparedness through capability (Ritchie & Jiang, 2019). Most project approaches concentrated on reducing vulnerability, while only a few focused on response and preparedness to help manage shock effects. In other words, this approach concentrates on recovery rather than merely reducing vulnerability, whereas the project's recovery perspective is broader, namely utilizing its resources to manage disruptions. According to Zhou, Endendijk, and Wouter Botzen (2023), recovery lessens a population's vulnerability to future hazards. In a broader sense, research on project resilience will clearly identify the ground reality to determine how the project manages disruption by identifying the dimensions (capabilities) and antecedents required to manage disruption.

Diverse definitions of resilience and 'dependence' on nature complicate the organization of resilient initiatives (Duchek, Raetze, & Scheuch, 2020). In ecology, for instance, the greater the number of available species, the greater the likelihood that other species will be stable and able to adapt to their environment (Wang et al., 2022). This is not the case with the project's personnel, however. According to Cheng et al. (2023), the consistency and stability of a project increase as more personnel from various organizations are assigned to make crucial decisions. Incorporating this analogy into project management may therefore hinder the growth of resilience.

The concept of organizational resilience is the concept of resilience that is most closely related to project management. In contrast, the antecedent that led to this concept's use in organizations was absent in project organizations. This is because project delivery teams are temporary, cross-functional, and geographically dispersed (Larson et al., 2022). It is, therefore, essential to investigate these obstacles and determine if the concept of organizational resilience can be incorporated into project management or if new avenues for infusing resilience into project management must be investigated.

Alvarenga et al. (2019) note that the concept of resilience in project management dates back to the 1800s when it was used to characterize the ability of steel to withstand stress. In addition, experts have devised a variety of resilience construct definitions that compete for excellence in various research domains. According to researchers including Boshier (2008), Seville (2006), Burnard (2013), and McManus et al. (2008), there is diversity and variation in the definition of understanding. In organizations, resilience is also ambiguously defined. Carpenter et al. (2001), Bhamra, Dani, and Burnard (2011), and Gunderson (2000), on the other hand, clarify that resilience is a contingent concept (i.e., organizational resilience is the concept of resilience most relevant to project organization).

According to organizational resilience researchers, project organizational resilience depends on fundamental principles such as the adaptive capacity of organizational personnel (McManus et al., 2008), flexibility (Settembre-Blundo et al., 2021), and coping ability (Imani et al., 2021). Therefore, it is essential to establish a personnel structure that enables the organization to expand its capabilities. Organizational resilience is driven by the project organization's capacity to continuously promote knowledge management, situational awareness, and organizational learning. The objective is for organizations to adapt to disruptions, seize potential opportunities, and reduce uncertainty and risk (Carpenter et al., 2001; McManus et al., 2008; Seville, 2006).

To discover the trends in business resilience, it is necessary to identify the most effective strategies and policies implemented to enhance resilience in a particular sector, particularly in Indonesia. This knowledge can be used to design and implement more effective and efficient resilience projects and determine future implementation. This study employs a literature review approach to identify the current trends of project

resilience for project implementation in Indonesia. The utilization of a literature review in this study seeks to contribute to the development of a solid evidence base for the implementation of project resilience in various fields. By synthesizing and analyzing the findings of multiple studies, researchers can gain a more comprehensive understanding of the factors that contribute to resilience, current trends, and the design and implementation of new programs or initiatives, ensuring that they are effective, efficient, and sustainable for Indonesia.

It is essential to conduct this type of research to comprehend the current trends and prospective prospects for project implementation in Indonesia. It assists in identifying extant obstacles and opportunities in the field of project implementation in Indonesia. By examining current trends, researchers can gain insight into the prevalent practices, methodologies, and approaches used in various industries and sectors. This information is crucial for policymakers, project managers, and stakeholders to make informed decisions and develop strategies that align with the current environment. According to [Kodir et al. \(2021\)](#), the current president of Indonesia is in charge of several infrastructure initiatives. In addition, the capital city movement in Indonesia heads the country's megaproject. Therefore, it is necessary to determine the project's resilience for its implementation in Indonesia. By analyzing the changing requirements and demands of the Indonesian context, researchers can anticipate future trends and devise proactive responses to them. This proactive approach ensures that projects can adapt to altering circumstances and accomplish their goals.

Several studies have been conducted to ascertain the project's resilience through a literature review. First, [Rahi \(2019\)](#) researched to strengthen current project risk management practices and enhance a project's ability to deal with disruptive events. [Barrett et al. \(2021\)](#) researched the theoretical and methodological foundations and empirical applications of resilience as the concept has been applied to the well-being of individuals and households in low- and middle-income countries. However, previous research has only examined project resilience in particular disciplines and countries.

Consequently, this event illustrates how complex the issue of project resilience has become, particularly if implemented across multiple industries. Consequently, the purpose of this study is to investigate systematically, from 1985 to 2022, research references associated with resilience projects in various industrial sectors. This study will use Google Scholar data to examine the development trend of resilience project research in various sectors. Based on this objective, this study will examine the publication pattern, the increase in the number of publications, and the emerging themes of the resilience project. This study is anticipated to reveal research patterns on these topics and provide a comprehensive understanding of project resilience issues in various industrial sectors. This is the first project literature and bibliometric study on resilience in Indonesia, which is cited as the novelty of this study.

## 2. LITERATURE REVIEW

Resilience is defined by Coronado-Hijón (2017) as "the human capacity to face and overcome adversity." Hatala et al. (2020) provide definitions of resilience and adaptation, as well as adversity, organizational culture, norms and norms, and organizational learning and transformation. Resilience is the capacity of an individual to locate resources that support sustainability, such as opportunities for well-being and survival. The five main categories of resilience are organizational resilience as an organization's response to external threats, organizational reliability, human resource strength, the capacity to adapt business models, and design principles that can mitigate vulnerability to supply chain disruptions.

In addition, Wu et al. (2021) define resilience as an organization's capacity to swiftly and easily recover from environmental shocks. When a company confronts severe business challenges, declares bankruptcy or collapse, and then recovers, it has achieved organizational resilience. It becomes significantly stronger and more potent compared to its pre-fall state. According to Messier et al. (2019), resilience is a combination of or function of agility. Organizations must always be adaptable to provide many alternative processes and products or services promptly. According to Tam et al. (2020), project resilience is achieved through complex adaptive systems, group development, organizational culture development, agile leadership, and continuously developed innovation (Tibay et al., 2018).

## 3. METHODOLOGY

This study employed the qualitative approach (Sekaran & Bougie, 2016), combining bibliometric methods with a literature review (see Figure 1). The bibliometric method is a quantitative research technique that analyzes scholarly publications and citations to examine patterns, trends, and relationships within a particular field of study. Utilizing bibliographic information such as publication titles, authors, journals, and citations, it measures scientific literature's impact, influence, and productivity. A systematic literature review is a research technique that seeks to identify, evaluate, and synthesize the existing literature on a particular research question or topic. It employs a predetermined and systematic method to search for, select, and critically evaluate relevant studies and analyze their findings to draw meaningful conclusions.

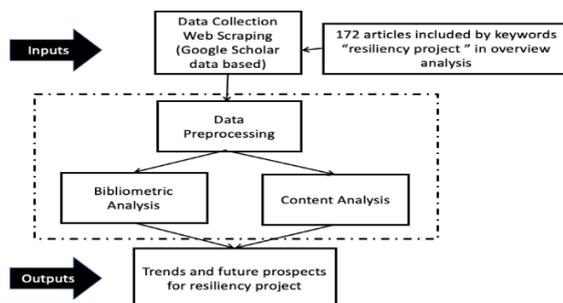


Figure 1. Bibliometric flow chart

This study compiles data from international publications containing the keywords project resilience from 1985 to 2022 (see [Figure 2](#)), which were collected via web crawling and retrieved from the Google Scholar database ([www.google.com](http://www.google.com)). The data articles were screened using various classifications, such as the g-index, h-index, and citation index, yielding 172 resilience projects-related articles. The collected data was then processed according to bibliometric and content analysis.

The bibliometric analysis required for this research consists of (1) data extraction and analysis, which involves extracting key data from the selected studies, such as study characteristics, methods, and findings, and systematically analyzing and synthesizing the data to identify patterns, themes, or trends for project resilience, (2) assessing study quality, which involves evaluating the quality and reliability of the included studies using appropriate assessment tools or criteria, and (3) imputation, which involves determining the number of studies that were included in the bibliometric analysis and Then, the trends and prospects for resilience project's outputs are obtained.

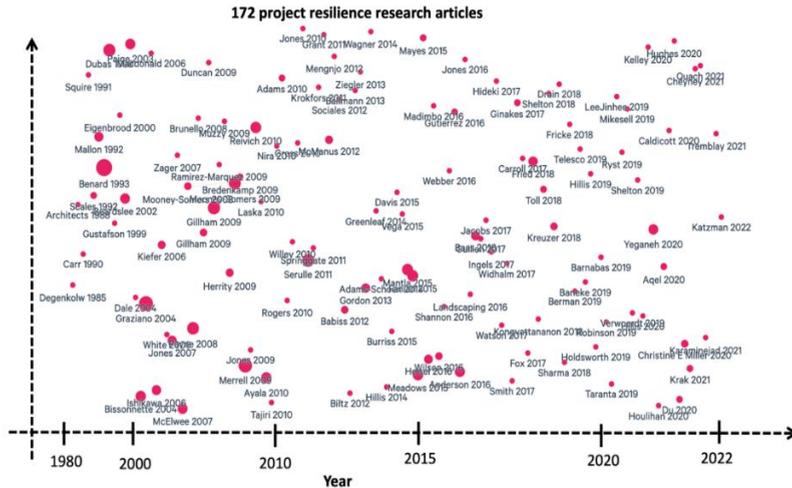
Publish or Perish was also used to analyze data regarding the number of publications per year, journals with articles, authors, and subjects. In addition, the software VOSviewer is utilized to analyze the development trend of international publications, followed by qualitative content analysis. VOSviewer is software for the construction and visualization of bibliometric networks. These networks can be constructed utilizing citations, bibliographic aggregations, co-citing, and co-authoring relationships. VOSviewer also includes text mining functionality for creating and visualizing co-occurrence networks of important terms in scientific literature.

## 4. RESULTS AND DISCUSSION

### Corpus Profile

According to the context, [Figure 1](#) depicts the number of articles utilized in this investigation. From 1985 to 2022, the number of studies on project resilience increased consistently, according to the review. Even though its popularity has not been as prevalent as that of other subjects, it remains a popular topic. This distribution pattern, conversely, indicates that academics and researchers from various disciplines are beginning to pay attention to this topic. In the first decade, from 1985 to 1995, only three articles were published on project resilience, according to the statistics. In the subsequent decade, from 1996 to 2005, there was an increase of 900 percent or 30 articles. Between 2006 and 2016, the number of articles published on this topic increased to 58. This indicates that the interest of academics and researchers in project resilience issues increased by 90 percent over the third decade. Even though the percentage appears to be declining, the number of publications associated with this context has increased steadily over the past decade. This increase is consistent between 2017 and 2022, with 68 cited articles. The research

tendencies in this field are rising steadily. The figure below depicts the distribution of the resilience project literature topic.



**Figure 2.** Trends in the distribution of scientific literature on project resilience for the period 1985-2022

Academics continue to be interested in project resilience research, as shown in Figure 1. At the very least, this is evidenced by a consistent distribution from year to year. However, the picture portrayed by the network of articles reveals that neither researchers nor articles dominate the scope of the resilience project's research. A few node or circle illustrations in each article appear larger than the rest, but this is insignificant.

Based on the results of a bibliographic analysis conducted with the Litmaps software, the review reveals that, while each piece of literature has had an impact or has been cited by multiple articles, no single piece has dominated the field. This analysis demonstrates, however, that the majority of articles on the subject of project resilience are independent. That is, neither author references the other. This trend is intriguing because it indicates that this subject is extremely broad and that no singular article serves as the primary reference. Therefore, Context and case studies play a significant role in selecting references when investigating project resilience issues in greater depth.

### The Current Trend of Project Resilience Research

The content of the articles or references used will be scrutinized, particularly their title and context. During this phase, the entire corpus of literature will be regarded as a text or corpus, which will be subjected to topic and context-based analysis and classification. This review's text mining procedure yields DTM in word frequency, visualized and qualitatively analyzed using VOSviewer.

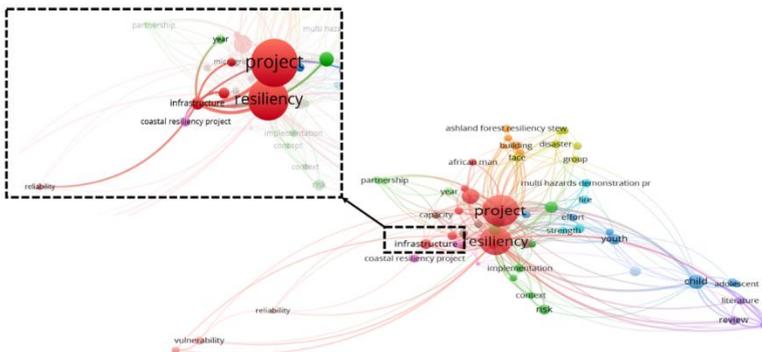
## The most recent journal on project resilience

From 1985 to 2022, 172 publications were retrieved using Google Scholar data based on search results for the keywords project resilience in the article title, abstract, and keywords categories. Based on this number, it is evident that Policycommons.net, with 11 articles, is the online publication with the most publications. The World Bank document, which contains five articles, comes in second. The Journal of Psychology in the Schools and the Annual Meeting and Expo of the American Psychological Association tied for third and fourth place with three articles each. The Journal of the United States Agency for International Development is ranked fifth with two articles. The average journal devoted to resilience initiatives has a background or scope in policy, economics, psychology, or public policy. This data demonstrates that project resilience is rarely discussed in infrastructure management.

## Comprehensive Network Analysis of Project Resilience Research

All articles will be analyzed bibliographically throughout this session using the VOSviewer application. This analysis will visualize the network and density of articles. Based on co-word analysis, Figure 3 depicts the evolution of the Google Scholar project resilience topic area from 1985 to 2022, which can be divided into twelve clusters.

Cluster 1 is colored red and contains ten subject headings, including African man, family, infrastructure, microgrid, project, project resilience, resiliency, project resilience, training, and the United States. Cluster 2 is depicted in green and includes eight topics: community healing intervention, community resilience, concept, context, implementation, risk, Salt Lake City, and study. Blue cluster 3 contains seven topics, including adolescent, child, effort, Oregon resilience project, Penn resilience project, use, and young people. Cluster 4 is colored yellow and contains seven subject headings: catastrophe, face, final report, group, lesson, port resilience program, and preparation.

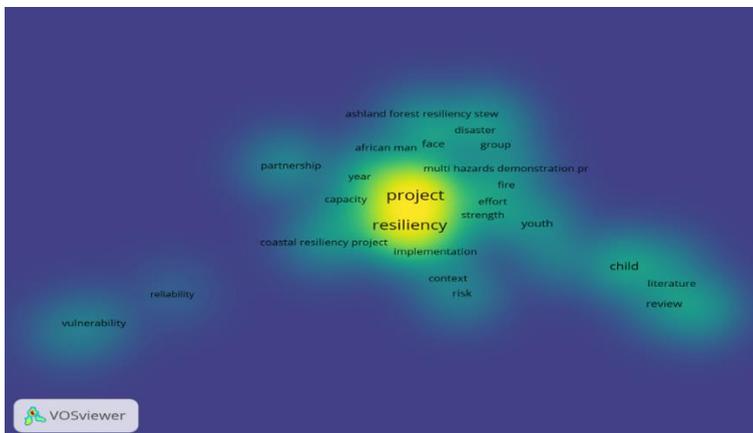


**Figure 3.**Text network analysis of project resilience research  
**Source:** The author's study, 2022

Cluster 5 is purple and comprises five subject headings: family partnership project, toughness, literature, optimism, and review. Cluster 6 is light blue and comprises five subject headings: evaluation, fire, multi-hazards demonstration project, southern California, and strength. Cluster 7 is orange and comprises five subject headings: Ashland Forest resilience stewardship project, building, covid, effect, and part. Cluster 8 is colored pink and comprises five subject headings: capacity, community, indigenous resilience project, paper, and university. Climate change, a coastal resilience initiative, and a strategy comprise Cluster 9's three topic items, displayed in purple. Cluster 10 is light blue and comprises four topics: global maternity care covid, reliability, project task force, and vulnerability. Cluster 11 is green and contains the following four topics: partnership, wellness, wrapping, and year. Cluster 12 is light blue and contains a single topic item concerning the independent investigation.

According to the findings of the inter-cluster analysis, Africa and the United States are frequently associated with the issue of project resilience in the infrastructure sector. In addition, contexts associated with microgrid projects, resilience projects, and training programs are frequently investigated.

Figure 4 depicts the network analysis results, which reveal that the correlation between nodes was divided into eight network clusters. Inner cores are clusters characterized by many nodes and thick edges. This cluster is a visual representation of the most frequently discussed concerns regarding the resilience of the undertaking. In contrast, an outer core is a cluster with a low node occurrence frequency and edge weight. This cluster represents the topics that have received the least attention in the literature regarding the resilience project.



**Figure 4.** Density analysis of project resilience research

This analysis has shown how the weights of nodes and edges in the inner core network vary, as illustrated by the size scale of circles and connecting lines. The higher the weight or degree, the thicker the line connecting the two nodes and the larger the circle.



As stated previously, most concerns pertain to an organization's or institution's capacity or capability to respond to, prepare for, mitigate the impact of, and restore and ensure the successful completion of a project's objectives. Because only a few sectors, such as management, have been examined, there is a significant opportunity for this issue to be studied in other fields. The accompanying table lists several studies examining project resilience from a management perspective.

**Table 1: Project resilience research in management scope**

Year	Title	Author	Variable	Definition
2007	Organizational Resilience: Towards a Theory and research agenda	Vogus and Sutcliffe (2007).	Resilience defines the mechanisms of resilience toward a research agenda.	A characteristic or capacity of individuals or organizations, or more specifically (1) the ability to absorb strain and preserve (or improve) functioning despite the presence of adversity (both internal adversity - such as rapid change, lousy leadership, performance and production pressure-and external adversity - such as increasing competition and demands from stakeholders), or (2) an ability to recover or bounce back from untoward events.
2003	Enterprise resilience: managing risk in the networked economy. Strategy and business	Starr, Newfrock, and Delurey (2003).	Enterprise Resilience, Managing Risk, Networked Economy, interdependencies, The Adaptation Imperative, enterprise risk management, corporate agility.	The ability and capacity to withstand systemic discontinuities and adapt to new risk environments; the ability to effectively align its strategy, operations, management systems, governance structure, and decision-support capabilities so that it can uncover and adjust to continually changing risks, endure disruptions to its primary earnings drivers and create advantages over less adaptive competitors.
2008	Organizational resilience in new zealand.	McManus et al. (2008).	Organizational, resilience	A function of an organization's overall situation awareness, management of keystone vulnerabilities, and adaptive capacity in a complex, dynamic, and interconnected environment.
2011	Developing a capacity for organizational resilience through strategic human resource management.	Lengnick-Hall and Griffith (2011).	Organizational resilience, Strategic human resource management, HR principles, HR policies, Individual contributions	The firm's ability to effectively absorb, develop situation-specific responses to and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten the organization's survival.

Year	Title	Author	Variable	Definition
2011	Organizational resilience and health of business systems. International	<a href="#">Pal, Torstensson, and Mattila (2011)</a> .	Organizational resilience, ORes, Altman's Z-score, business 'health,' recovery, textile and clothing, economic crisis, turnaround	The system can maintain a growing or constant healthy state over time, despite being subjected to negative and/or destructive events or make a quick positive turnaround from one state to another to finally enter the healthy state.
2014	BS 65000:2014 Guidance on organizational resilience	British Standard	Organizational resilience, ICS categories	The system can maintain a growing or constant healthy state over time, despite being subjected to negative and/or destructive events or make a quick positive turnaround from one state to another to finally enter the healthy state.
2004	Resilience, adaptability, and transformability are in social-ecological systems.	<a href="#">Carpenter et al. (2001)</a> .	Resilience, Adaptability, Transformability, Social-ecological Systems	The capacity of a system to absorb a disturbance and reorganize while undergoing change and retaining the same function, structure, identity, and feedback.
2006	Resilience engineering: Concepts and precepts.	<a href="#">Hollnagel, Woods, and Leveson (2006)</a> .	Resilience engineering, definition, typology	The ability to sense, recognize, adapt, and absorb variations, changes, disturbances, disruptions, and surprises.
2015	Project Resilience: Moving beyond traditional risk management.	<a href="#">Turner and Kutsch (2015)</a>	Project Resilience, traditional risk management.	The art of detecting changes in the project environment, understanding these changes, planning answers, minimizing damage when a change occurs, and adapting to a new reality

Even though the variable of project resilience has been studied by several researchers, as shown in [Table 1](#), the variable is still understudied. However, the perspective, context, and variables utilized vary considerably. [Vogus and Sutcliffe \(2007\)](#) stress the significance of flexible resources, learning, and diverse perspectives for organizational resilience. The concept of redundancy is essential to resilience because adequate redundancy is required to respond to unforeseen events and operate beyond comfortable redundancy for an extended time ([Vogus & Sutcliffe, 2007](#)). According to [Lengnick-Hall, Lengnick-Hall, and Abdinnour-Helm \(2004\)](#), organizational resilience has three dimensions: cognitive, behavioral, and contextual. He then describes it from a human resource management perspective ([Lengnick-Hall & Griffith, 2011](#)). Economic development, social capital, community competence, information, and communication, according to [Norris et al. \(2008\)](#), are the four fundamental capacities that contribute to community resilience. On the other hand, [Pal, Torstensson, and Mattila \(2011\)](#) develop a theoretical framework for organizational resilience comprising four main factors: assets and resourcefulness, dynamic competitiveness, learning, and culture.

Due to delays and disruptions, numerous construction projects have been affected, either wholly or partially, by the pandemic. According to [Russo et al. \(2023\)](#), the project team should consider the following actions to resolve and mitigate project impacts, such as identifying and assessing applicable local and state restrictions on construction activities. Additionally, he suggests identifying and assessing the pertinent contract terms. This involves identifying, evaluating, and mitigating project impacts. Other suggestions include considering contract notification requirements, project suspension and termination options and claims for time extensions and delayed damages.

Moreover, [Junkin \(2020\)](#) lists five best practices for safeguarding construction employees during the pandemic. The five strategies are following reliable prevention recommendations, understanding and adhering to OSHA standards, utilizing standard training, considering social distancing measures, and creating a pandemic preparedness plan. In addition, [Table 2](#) provides a snapshot of recent project resilience articles' citations. Notable is that most citations pertain to project resilience in the context of sustainability and supply chain.

**Table 2: Citation Analysis**

Citation	Title	Cited by
<a href="#">Rahi (2019)</a>	Project Resilience: a conceptual framework	32
<a href="#">Mahmoudi, Abbasi, and Deng (2022)</a>	A novel project portfolio selection framework towards organizational resilience: Robust ordinal priority approach.	33
<a href="#">Carr (2019)</a>	Properties and projects: Reconciling resilience and transformation for adaptation and development.	83
<a href="#">Rahman et al. (2021)</a>	Resilient research in the field: Insights and lessons from adapting qualitative research projects during the COVID-19 pandemic.	79
<a href="#">Fuchs et al. (2020)</a>	Distress and resilience of healthcare professionals during the COVID-19 pandemic (DARVID): study protocol for a mixed-methods research project.	34
<a href="#">Lyng et al. (2022)</a>	Capacities for resilience in healthcare; a qualitative study across different healthcare contexts.	22
<a href="#">Borie et al. (2019)</a>	Mapping narratives of urban resilience in the global south.	142
<a href="#">Campos (2020)</a>	Resilience, education, and architecture: The proactive and "educational" dimensions of the spaces of formation.	23
<a href="#">Verdolini et al. (2021)</a>	Resilience and mental health during the COVID-19 pandemic.	105
<a href="#">Pettit, Croxton, and Fiksel (2019)</a> .	The evolution of resilience in supply chain management: a retrospective on ensuring supply chain resilience.	450
<a href="#">Jovanović et al. (2020)</a>	Assessing resilience of healthcare infrastructure exposed to COVID-19: emerging risks, resilience indicators, interdependencies, and international standards.	71
<a href="#">Mancheri et al. (2019)</a>	Effect of Chinese policies on rare earth supply chain resilience.	254
<a href="#">Mikulewicz (2019)</a> .	Thwarting adaptation's potential? A critique of resilience and climate-resilient development.	89

Citation	Title	Cited by
Dohaney et al. (2020)	Benefits, barriers, and incentives for improved resilience to disruption in university teaching.	76
Ivanov (2021).	Digital supply chain management and technology to enhance resilience by building and using end-to-end visibility during the COVID-19 pandemic.	96
Meuwissen et al. (2019)	A framework to assess the resilience of farming systems.	398
Roostaie, Nawari, and Kibert (2019)	Sustainability and resilience: A review of definitions, relationships, and their integration into a combined building assessment framework.	131
Saja et al. (2019)	A critical review of social resilience assessment frameworks in disaster management.	162
Argyroudis et al. (2022)	Digital technologies can enhance the climate resilience of critical infrastructure.	56
Scholten, Stevenson, and van Donk (2020).	Dealing with the unpredictable: supply chain resilience.	114
Rehak et al. (2019)	Complex approach to assessing the resilience of critical infrastructure elements.	178
Duchek, Raetze, and Scheuch (2020).	The role of diversity in organizational resilience: a theoretical framework.	164
Elmqvist et al. (2019)	Sustainability and resilience for transformation in the urban century.	662
Mottahedi et al. (2021)	The resilience of critical infrastructure systems.	30
Leigh and Lee (2019).	Sustainable and resilient urban water systems: The role of decentralization and planning.	117
Humphrecht, Esser, and Van Aelst (2020).	Resilience to online disinformation: A framework for cross-national comparative research.	248

### **Future Prospects for Project Resilience Implementation**

Based on the results of this research, this study formulates several future research topics comprehensively, including aspects of project resilience variables, technology adoption, leadership agility, organizational adaptability, and turbulent environment, based on the framing of network analysis contexts and supported by numerous project resilience literatures. These aspects should be examined in real-world contexts using network analysis frameworks and relevant literature on project resilience. Researchers and practitioners can obtain valuable insights into how these factors can be effectively integrated into projects, organizations, and industries by conducting actual implementation studies. These implementation studies will contribute to developing strategies, tools, and methods that enhance project resilience, improve technology adoption, nurture adaptive leadership, and promote organizational agility in dynamic and challenging environments. In addition to being exceedingly limited, stakeholders urgently need this research from a practical standpoint. As current knowledge in these areas is limited, stakeholders anxiously await more comprehensive and practical research.

Moreover, based on recent developments, future research should investigate the development of project resilience models that can be used in situations such as the Covid-19 pandemic or other large-scale construction projects (mega projects), such as the IKN development project that Indonesia is currently undertaking.

## CONCLUSION

Based on the findings and discussion of this study, it can be concluded that the greatest growth in project resilience topics occurred over the subsequent ten years, or from 1996 to 2005, with an increase of 900 percent, or thirty articles. According to the article network, most of these issues are published by journals with a background or scope in policy, economics, psychology, or even public policy. This analysis demonstrates that project resilience is rarely discussed in the context of infrastructure management. In addition, the development map is divided into 12 clusters based on keyword co-occurrence, with only one cluster about the infrastructure sector. According to the findings of the inter-cluster analysis, Africa and the United States are frequently associated with the issue of project resilience in the infrastructure sector. In addition, contexts associated with microgrid projects, resilience projects, and training programs are frequently investigated.

The review's findings are categorized into three categories based on the location of the case study, the studied sector or industry, and the issue's context. According to the findings of the review, the United States, Africa, Salt Lake City, Oregon, and southern California are frequently utilized as case studies in studies of project resilience. Infrastructure, construction, wellness, forest, coastal, infant, and youth are the industrial sectors that have been studied the most recently. In the meantime, this review identifies several contexts that are frequently discussed in resilience project research, such as family partnership projects, toughness, optimism, evaluation, multi-hazards demonstration project, strength, resilience stewardship projects, effect, capacity, community, indigenous resilience projects, climate change, strategy, global maternity care covid, dependability, task force project, vulnerability, partnership, and independent inv.

This study suggests several topics for future research, including project resilience, technology adoption, leadership agility, organizational adaptability, and a turbulent environment. In addition, based on recent advancements, future research should be able to investigate the development of project resilience models that can be utilized in situations such as the Covid-19 pandemic, particularly in megaprojects. In addition to being exceedingly limited, stakeholders urgently need this research from a practical standpoint.

The research is limited by the purview of the articles used, which were obtained from the Google Scholar database. In the future, exhaustive and in-depth follow-up research can be conducted using the recommendations from this study as hypotheses, in addition to conducting research using broader literature sources. It is anticipated that the results

of this study will serve as a resource for academics researching resilience initiatives in the management scope and infrastructure.

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