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REVIEW ARTICLE

Time management in scientific projects: A review of the international literature (2006-2025)

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ABSTRACT

In the context of project development, effective time management is paramount, as it enables the fulfillment of objectives within the stipulated timeframe while ensuring the efficient utilization of resources. However, information gaps are frequently observed, often related to the absence of data or the lack of clear methodologies for planning activities. The objective of this study is to analyze strategies that improve time management in project execution through tools such as the Gantt chart, critical path method, and work breakdown structure. A scientometric analysis of international literature from 2006 to 2025 revealed a 5.57% increase in research productivity on time management, indicating a sustained and increasing interest in the subject. Leading countries, notably China, demonstrated a substantial contribution to this production, accounting for nearly 15% of global research output and 16% of citations. This underscores the country's significant global influence. The analysis identified high-impact journals such as the *International Journal of Project Management, Engineering, Construction and Architectural Management*, and *Journal of Management in Engineering* as major contributors to the field's advancement. The results indicate a persistent increase in research activity in this domain and demonstrate that the amalgamation of classical methodologies with contemporary approaches enhances the efficacy of planning. In practical terms, this tool contributes to decision-making and the achievement of projects.

KEYWORDS: time management; Gantt chart; critical path; work breakdown structure; scientometric analysis.

1. INTRODUCTION

Achieving accurate planning in project management is a task that often presents multiple challenges. As indicated by several articles, the employment of more versatile tools, including the work breakdown structure (WBS), has been identified as a significant contributor to enhancing time estimation in projects characterized by a high degree of complexity (Odedairo, 2024). Furthermore, Shen *et al.* (2023) caution that the planning of activities in virtual and educational spaces becomes increasingly complex due to the dispersion of

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groups and the constant technological transformation. In recent years, several bibliometric reviews have been conducted. However, a paucity of research has been conducted on the relationship between these factors and time management. A notable example is provided by Serrador and Pinto (2015), who assert that a correlation exists between effective time management and project success, even in contexts employing fast-track methodologies. However, a review incorporating a quantitative approach on a specific topic, such as time management within a project, is lacking. Furthermore, the utilization of structured data has emerged as a pivotal element in resource leveling, as evidenced by the research contributions of Kyriklidis and Dounias (2023) within the naval industry. This trend is complemented by advanced mathematical approaches. Ehsani *et al.* (2017) propose fuzzy programming models for solving multiobjective problems in terms of planning a project. These models allow for the anticipation of possible schedule conflicts and the improvement of resource issuance in real time. The extant literature also explores more recent multimodal scheduling methods. For instance, Aliahmad *et al.* (2025) initiated a sequential task space conversion model that enhances time efficiency in projects with multiple constraints.

This growth has occurred concomitantly with innovations such as the introduction of predictive models, artificial intelligence (AI), and other digital tools. In the contemporary business landscape, it is imperative to acknowledge that a project must not only be sustainable and efficient but also exhibit a high degree of flexibility with respect to resources, schedules, and costs. Indeed, the integration of contemporary technologies with long-standing, traditional methodologies has emerged as a prevailing trend. This development signifies a substantial enhancement in the methodologies employed for planning and execution. Consequently, effective time management in projects has evolved from a mere catalyst for economic growth to a pivotal driver of sustainability and innovation. This, in turn, facilitates the emergence of much more flexible and collaborative work models, something essential to be able to face current challenges in projects that are multidisciplinary and international (Aliahmad *et al.,* 2025). The impetus for this study stems from the following research question: How has international research on time management in scientific projects evolved between 2006 and 2025, and what strategies and tools are most evidenced to improve planning and execution? The overarching objective of this study is to analyze strategies that enhance time management during project execution, particularly through the utilization of the Gantt chart, the critical path method (CPM), and the WBS. To this end, a scientometric review of the international literature from 2006 to 2025 will be conducted. The specific objectives are as follows: (i) retrieve, merge, and preprocess records from Web of Science (WoS) and Scopus under a consistent search strategy; (ii) describe annual scientific production and citation dynamics over the study period; (iii) identify the most productive and influential countries, journals, and authors in this research stream; (iv) examine collaboration and citation/coupling patterns to characterize the field's structure; and (v) synthesize how classical scheduling methods are being integrated with emerging analytical approaches (e.g., data-driven and predictive tools) to support decision-making and improve project efficiency, outlining practical implications and future research directions.

These advances are part of a broader approach that seeks to integrate traditional techniques with predictive and optimization models to improve models. According to Zhu *et al.* (2023), the integration of classical tools such as Gantt chart, CPM, and WBS with emerging analytical methods has the potential to enhance not only planning but also the overall performance of the project. This study proposes an integrative methodological framework that articulates the joint use of the Gantt chart, the CPM, and the WBS, complemented by modern analytical tools. The objective is to formulate a proposal that delineates the sequence of activities with clarity, thereby facilitating the identification of potential bottlenecks and ensuring temporal congruence between execution and planning. Recent years have witnessed a steady growth in research on how the time is organized in projects, with a 5.57% increase from 2006 to 2025. Consequently, effective time management in projects is not only crucial

for economic growth but also serves as a pivotal catalyst for sustainability and innovation. This has resulted in the proliferation of highly adaptable and cooperative work models, which are imperative to confront the prevailing challenges associated with multidisciplinary and transnational endeavors (Ehsani *et al.,* 2017).

2. METHODOLOGY

This article will be prepared by conducting research to gain a more complete understanding of the discussed topic. The research will be concluded with a scientometric analysis to identify time management strategies. The methodological process will be similar to those applied in recent contemporary research on the analysis of scientific trends in time management in projects (Cui *et al.,* 2025; Díez *et al.,* 2022; Valencia *et al.,* 2025). The selection of high-impact indexed databases will be primarily based on WoS and Scopus. To this end, a search was conducted for published articles using specific search parameters, including keywords such as "project management" and "time management," and tools such as the Gantt chart, CPM, and WBS. The research encompassed a timeframe from 2006 to 2025. The results of the article publications in WoS and Scopus are displayed in Table 1.

Parameter	WoS	Scopus
Range	2006-2025	
Document type	Article, proceedings paper	
Words	("project management" OR "project planning" OR "project scheduling") AND ("time management" OR "schedule management" OR schedule* OR timeline OR deadline* OR duration OR "time control" OR "schedule control" OR "time estimation" OR "schedule/time performance" OR "progress tracking")	

Table 1. Search parameters used in Scopus and WoS.
Note: Data generated by the authors.

The search results will undergo a preprocessing step that utilizes text mining and web scraping techniques. This approach aims to eliminate as many irrelevant or duplicate publications as possible, thereby ensuring a more efficient utilization of the identified articles. This procedure provides key information such as the article title, author names, number of citations, and journals. This approach has demonstrated its efficacy in generating research synopses across diverse disciplines (Robledo *et al.,* 2024b). The data preprocessing procedure is illustrated in Figure 1.

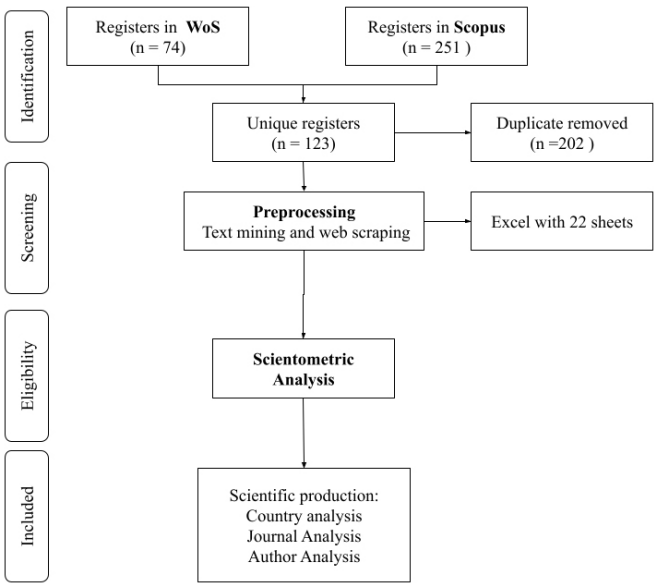

Figure 1. Database search criteria and results. **Note:** Prepared by the authors.

This methodology has contributed to the development of an integrative process that combines tools such as Gantt chart, CPM, and WBS, along with predictive models. These techniques have been shown to improve project time planning efficiency, reinforcing the idea of combining these techniques for improved project resolution (Hincapié-Naranjo *et al.,* 2024; Martínez-Pinzón & Duque-Hurtado, 2024). In addition, tools such as data analysis were employed to enhance the organization of information utilized by Gómez (2025), who delineates the manner in which these techniques augment efficiency in project monitoring. This approach enabled the formulation of a comprehensive vision regarding the evolution of research on time management strategies, a fundamental aspect for the establishment of a framework that fosters new academic debates on the topic (Robledo *et al.,* 2024a). The objective of this study was to examine the evolution of scientific output and citation impact over the 2006-2025 period. To this end, records were retrieved from Scopus and WoS, and only the core research articles were retained. The integration of both datasets into a unified corpus was accomplished through the utilization of Python programming, while the elimination of duplicates was facilitated by employing a method of matching digital object identifiers (DOIs), thereby ensuring the singular inclusion of each publication. Subsequent to the cleansing of the dataset, the annual indicators were computed, including: (i) the number of publications indexed in Scopus, (ii) the number indexed in WoS, (iii) the total number of unique publications after cross-database deduplication, and (iv) the total citations accumulated for the publications associated with each year.

These indicators were summarized in a combined visualization designed for rapid interpretation. The annual publications from Scopus and WoS were displayed as side-by-side bars, while a line series represented the yearly total of unique publications. An additional line plotted total citations on a secondary (right) axis. Distinct visual encodings and value labels were used to facilitate direct comparison between databases and across time, and the final figure was exported in SVG format to preserve resolution and readability. The temporal patterns were subsequently evaluated by plotting publication counts against publication year, a method that facilitated the identification of three distinct growth stages: an initial phase (2006-2010), a consolidation phase (2011-2016), and a recent expansion phase (2017-2025). In addition to the annual production, complementary analyses were conducted at the country, journal, and author levels to characterize the structure of the field. Country participation was derived from author affiliations using full counting (in which each collaborating country receives one participation per paper). Country-level citations were computed by summing the total citations of all papers in which the country appeared (also under full counting). The quality of the journal was described using Scimago's SJR quartiles (Q1-Q4) based on the most recent available classification. Summary tables reported production and citation shares together with quartile distributions (top 10 countries; top journals/authors for readability). To this end, collaboration and knowledge-structure patterns were examined using network analyses. The analysis of country co-authorship networks involved community detection, while the analysis of journal citation networks excluded trivial links such as direct self-citations. Finally, author co-authorship networks were analyzed using the Louvain method to identify communities (Botero *et al.,* 2025; Mejia-Rosado *et al.,* 2025). Additional author-level structural metrics were derived from ego networks (e.g., effective size, constraint, and a Scientific Diversity Index), and time-series comparisons of new nodes (countries/journals/authors) versus new links (collaborations/citations) were normalized by their respective maxima to enable visual comparison of system growth dynamics (Robledo *et al.,* 2025; Torres *et al.,* 2024).

3. RESULTS

3.1. Scientific annual production

A comprehension of the annual yield of scientific articles concentrating on project management facilitates an estimation of the scientific community's inclination towards augmenting knowledge in this domain. The study focused on a 20-year period, representing the production of these articles from 2006 to 2025. The

green bar signifies the annual publications that have been disseminated on the Scopus platform, while the orange bar denotes publications listed in the WoS database. The blue line indicates the total number of unique articles published in both databases. In 2017, 11 articles were published in Scopus, and 6 articles in WoS; however, the total number of unique publications was 13. This analysis underscores the necessity of maintaining both databases to ensure comprehensive coverage. The fuchsia line indicates the total number of citations received by articles in WoS and Scopus. The complete set of information is illustrated in Figure 2.

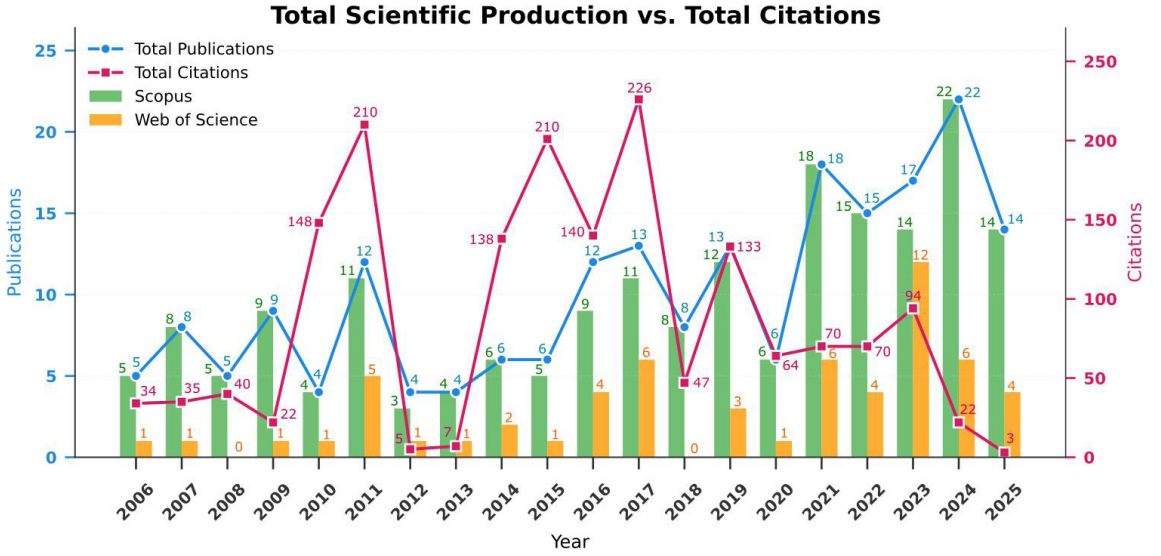

Figure 2. Annual trends in scientific production and source citations in Scopus and WoS (2006-2025): Focusing on time management in scientific projects. **Note:** Prepared by the authors.

As illustrated in Figure 2, the production has exhibited a moderate growth of 5.57%, indicative of a field characterized by fluctuations and significant variability in production. Notably, a higher rate of publications has been observed over the past five years. To facilitate a more thorough examination, the data presented in the graph have been segmented into three distinct periods.

3.1.1. Initiation (2006-2014)

During this initial period, the production of scientific articles exhibited a 2.31% increase. This phenomenon is indicative of a relatively sparse publication density and annual fluctuations that lack a discernible pattern. These fluctuations can be attributed to the nascent efforts to address the subject of project management. During the initial period, 2011 witnessed a production peak of 12 articles. Concurrently, 210 citations were documented, marking a significant high point within the broader field of study. The most frequently cited article proposes that teaching project management requires more practical knowledge and the use of virtual tools, as these factors together can influence student learning (Ojiako *et al.,* 2011). Furthermore, a decline in the rate of publications and citations can be observed for two consecutive years. However, in the final year of this period, there is a resurgence in the number of citations and publications. In summary, the initial period is marked by variability in productivity, exhibiting both elevated and diminished levels.

3.1.2. Early growth (2015-2019)

This period is characterized by an upward trend in production, with a 21.32% increase, which describes a phase of early growth or consolidation. During this period, research interest in the topic is evident, showing a steadily increasing production. The year 2017 demonstrated the highest citation rate, with a total of 226 citations recorded in Scopus and WoS. The most frequently cited article presents a comparison between the 14 areas of the PMBOK in order to

determine which of these rules generates the greatest impact on project development. Rules such as integration management, security, risk management, and human resources have a direct impact on development. Conversely, principles such as scope management and time management exemplify an indirect impact (Demirkesen & Ozorhon, 2017). It is noteworthy that in 2015, there was a peak of 210 citations, which matched the number of citations recorded in 2011. The article with the most citations suggests that the implementation of large projects should have a more in-depth approach, analyzing how the influence of people, politics, laws, and institutions involved in the projects directly affects a project (Hu *et al.,* 2015). In summary, this era signifies the solidification of project management as a subject that warrants consideration.

3.1.3. Consolidation (2020-2025)

In the most recent period, an average annual growth rate of 18.47% was revealed. This figure, while lower than the previous record, substantiates the ongoing expansion of production. The accelerated growth of this field has been so substantial that it has come to the attention of researchers worldwide, who are now recognizing it as a significant area of interest in both technological and computational research. In 2023, the number of citations reached its zenith within this time period. The article with the highest index explores how BIM models influence the design, work, and management of construction projects (Datta *et al.,* 2023). Despite the evident growth in production, Figure 2 reveals that the years 2024 and 2025 exhibit the lowest citation rates in the preceding 12-year period of production. It is important to acknowledge that this observation is attributed to the maturation period of articles such as Akram and Habib (2024) and Al-Hashimy and Yao (2025). It is not yet evident whether these have completed their cycle of incorporation into new research, which is an expected pattern in new articles.

3.2. Country analysis

Table 2 provides a comprehensive ranking of countries based on three key indicators: the production index, scientific citations, and article ratings. An analysis of the published literature reveals that China has the highest quantity and quality of articles, followed by India and Portugal in terms of production percentage. However, when the quality of published articles is considered, India and Canada share the second-highest number of articles rated Q1.

Country	Production	Percentage (%)	Citation	Percentage (%)	Q1	Q2	Q3	Q4
China	29	14.95	294	15.98	16	1	2	2
India	18	9.28	59	3.21	3	2	1	2
Portugal	9	4.64	150	8.15	0	0	1	0
Indonesia	9	4.64	65	3.53	2	0	0	0
Brazil	9	4.64	24	1.3	2	0	0	0
Canada	7	3.61	32	1.74	3	0	0	0
Australia	6	3.09	107	5.82	1	0	0	1
Turkey	5	2.58	76	4.13	1	0	0	1
Iraq	5	2.58	5	0.27	0	0	1	0

Table 2. Country production and citation.
Note: Data generated by the authors.

A recently proposed methodology by Chinese researchers involves the implementation of a decision support system for engineering project management. This system integrates data analysis, data mining, and machine learning models into a unified framework. The objective of this initiative is to curtail expenditures and accelerate project completion, while concurrently enhancing the quality of the project outcomes. The primary objective of this approach is to supplant conventional, empirically grounded decision-making processes

with meticulous, data-driven analysis (Zhang & Chen, 2025). The following article is from India, where the authors demonstrate the importance of integrating data analysis techniques into project management to practically improve decision-making, operational efficiency, and the viability of progress. The authors propose a transition from traditional methods that usually act after problems arise to a more anticipated model that can prevent events through historical data and metrics (Bajaria *et al.,* 2025).

As illustrated in Figure 3, a network of scientific collaboration exists among nations. The graph presents a representation of the aforementioned countries in the table, delineated into ten communities. Furthermore, a graph is presented on the left side, depicting the nodes and links between countries over time. Additionally, a graph is displayed below, representing the size of each community. The United States has historically assumed a leadership role within this community, undertaking research in collaboration with Australia and Switzerland. For instance, a study analyzes which areas of project management knowledge are taught within engineering institutions. Standard frameworks, such as the PMBOK, are utilized as a point of reference. The objective of this evaluation is to identify discrepancies or disparities in emphasis across the instructional domains. These domains encompass time management, scope, cost, quality, and risk, among other factors. This enables the enhancement of the training of future engineers and project managers, thereby ensuring a more comprehensive and balanced preparation in all components for successful project management (Nguyen *et al.,* 2017).

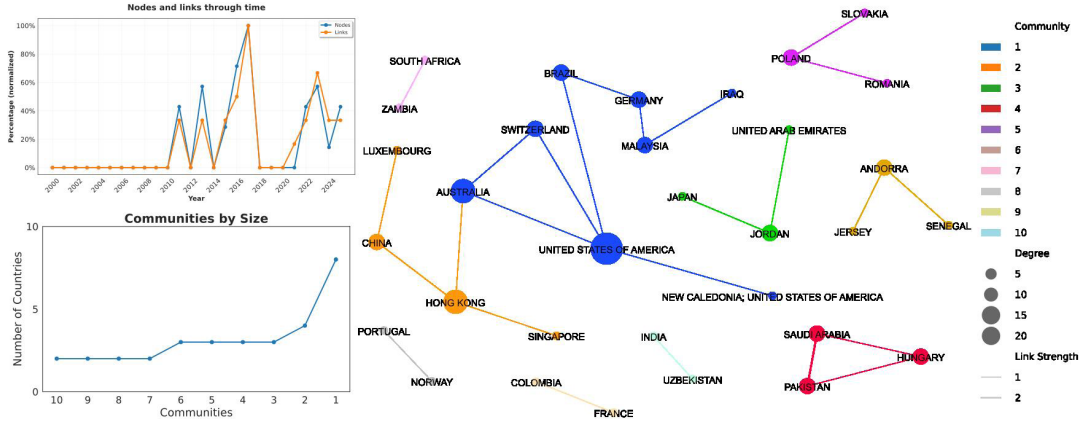

Figure 3. Global network of scientific research collaboration between countries.
Note: Prepared by the authors.

A thorough examination of Figure 3 unveils the intricate affiliations between nations, signifying a concerted endeavor to fortify scientific knowledge and production. These collaborations are often associated with publications in high-impact journals and the generation of articles with more robust results. In this context, Li *et al.* (2022) propose the utilization of blockchain technology to enhance project management across multiple corporations, ensuring information security and transparency.

3.3. Journal analysis

In this section, the analysis of publication sources is presented in Table 3, which allows for the identification of the concentration of scientific production in relation to the articles on the topic of study. A total of 35 publications were documented, which were disseminated in journals that are indexed in international databases. According to the most recent data, the journal *Lecture Notes in Networks and Systems* is among the sources with the highest production. The article in question contains a highly intriguing account of a methodology that employs AI and data analysis as technological instruments to assist companies in the more effective management of resources and the enhancement of project efficiency (Zhang & Chen, 2025). A relevant article was identified in the journal *Proceedings of*

the Annual Offshore Technology Conference, which demonstrates the transformation of project management from manual to digital systems using AI (de Barros *et al.,* 2025). This approach enables the consolidation of information, ensures its perpetual accessibility, and facilitates expeditious decision-making. The implementation of these measures has been demonstrated to contribute to the streamlining of processes.

Journal	No.	Percentage (%)	Country	SJR	Quartile	H-index
Lecture Notes in Networks and Systems	4	1.98	Switzerland	0.166	Q4	48
Journal of Physics: Conference Series	4	1.98	United Kingdom	0.187	-	110
Engineering, Construction and Architectural Management	3	1.49	United Kingdom	1	Q1	82
Proceedings of the Annual Offshore Technology Conference	3	1.49	United States	0.16	-	43
Procedia Computer Science	3	1.49	Netherlands	0.471	-	152
ACM International Conference Proceeding Series	3	1.49	United States	0.191	-	164
International Journal of Managing Projects in Business	3	1.49	United Kingdom	0.68	Q2	54
IEEE Engineering Management Review	3	1.49	United States	0.473	Q2	42
Journal of Modern Project Management	3	1.49	Canada	0.209	Q4	17
AIP Conference Proceedings	3	1.49	United States	0.153	-	90
IOP Conference Series: Materials Science and Engineering	3	1.49	United Kingdom	-	-	74

Table 3. Primary publication sources and network indicators of their ego networks.
Note: Data generated by the authors.

Figure 4 primarily shows the citation network among journals, allowing for the identification of five major themes. The network was constructed by selecting the five most influential journals according to each degree within each cluster. For instance, community 1 (denoted by the blue color in the figure) contains approximately 240 journals and is identified as the largest community (as indicated by the "Community by Size" figure). The three communities in question are comparable in size, with a substantial decrease observed in the remaining communities. The overarching theme of cluster 1 pertains to the utilization of work methodologies that employ technological devices, such as digital twins, within the construction industry. This approach enables enhanced oversight of project progression, quality assurance, and cost management, thereby ensuring the efficiency, safety, and profitability of the undertaking (Shulong *et al.,* 2025).

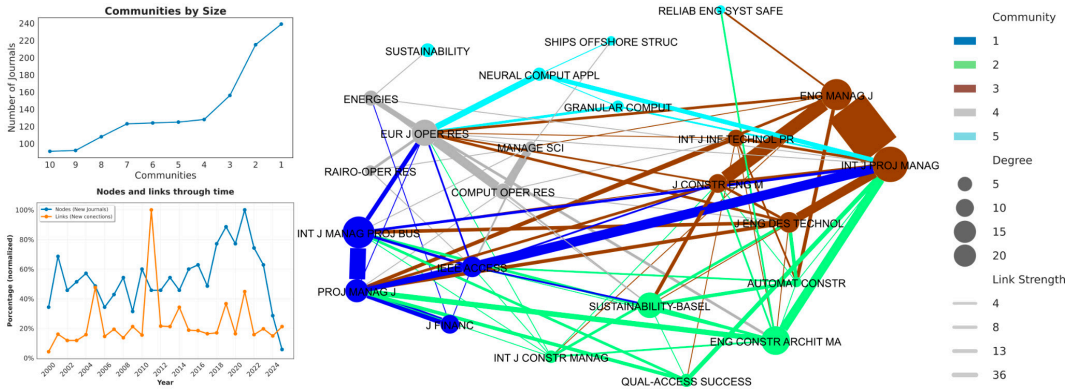

Figure 4. Journal citation and collaboration network.
Note: Prepared by the authors.

3.4. Author analysis

Table 4 presents the authors with the greatest academic output in the field analyzed. Anabela Tereso is positioned as a distinguished researcher due to the substantial volume of their publications and the robust nature of their collaborative network. The subject has four publications and 78 citations, which corresponds to an H-index of 2. The author's network has an effective size of 10.08 and a CDI of 0.25. The author's research is centered on the nexus of knowledge management and educational leadership, thereby underscoring the symbiotic relationship between pedagogical innovation and institutional sustainability (Tereso *et al.,* 2019).

Author	Papers total	Total citations	H-index	Effective size	Constraint	CDI
Anabela Pereira Tereso	4	78	2	10.08	0.23	0.25
(Ribeiro) Pedro Miguel Gonzalez Abreu	2	72	1	4.6	0.34	0.16
Annamalai Sivakumar	2	3	1	1	1	1
Suresh D.	2	3	1	1	1	1
Gabriela Fernandes	2	72	1	4.6	0.34	0.16
Iden Hassan Hussein	2	1	1	2	0.5	1
Yue Pengwei	2	2	1	2	0.5	1
Paulo Sousa Ferreira	2	2	1	3.57	0.46	0.23
Ofer Zwikael	2	18	2	1	0.93	0.33

Table 4. Most productive authors and network indicators of their ego networks.
Note: Data generated by the authors.

Pedro Ribeiro's research is characterized by a substantial output focused on educational research and learning processes, positioning the author in second place. The scholar has authored two articles and has been cited 72 times, achieving an H-Index of 1 and an effective size of 4.6. The author's approach is predicated on the integration of active methodologies with empirical studies that address teacher training and competency assessment (Fernandes *et al.,* 2024). According to the most recent bibliometric analysis, Gabriela Fernandes's publication record includes 2 articles and 72 citations, resulting in an H-index of 1 and an effective size of 4.6. This places the author in third position. The author's contributions to the study of innovation and project management in higher education are noteworthy. The author's research delves into the integration of technology and ongoing enhancement within academic institutions (Fernandes *et al.,* 2014). Annamalai Sivakumar, on the other hand, has distinguished himself through their research in sustainable development, environmental management, and climate change adaptation. The scholar has 2 publications and 3 citations, and an H-index of 1. The author's research provides interdisciplinary perspectives on education and sustainability (Suresh & Annamalai, 2024). D. Suresh has authored 2 articles and has been cited 3 times, with one of their articles being cited within the H-index. The author's effective size is 1 and CDI is also 1. Suresh is a prolific contributor to the fields of engineering and sustainability studies, sharing areas of work with the author Sivakumar, particularly in the optimization of natural resources and the application of sustainable models in educational and technological environments (Suresh & Annamalai, 2024). Iden Hussein is a prominent figure in the field of educational technology, particularly in the application of AI and mathematical modeling to educational processes. The author has made significant contributions to the understanding of the relationship between technology and learning, expanding the boundaries of knowledge in this area. Two articles, one citation, and an effective length of 2, with a CDI of 1, are documented (Ouda & Hussein, 2025).

Figure 5 reflects the co-authorship structure among these researchers, which reveals three distinct communities and links of international collaboration. The Effective Size and Constraint values indicate the coexistence of broad networks (e.g., those of Pereira and González

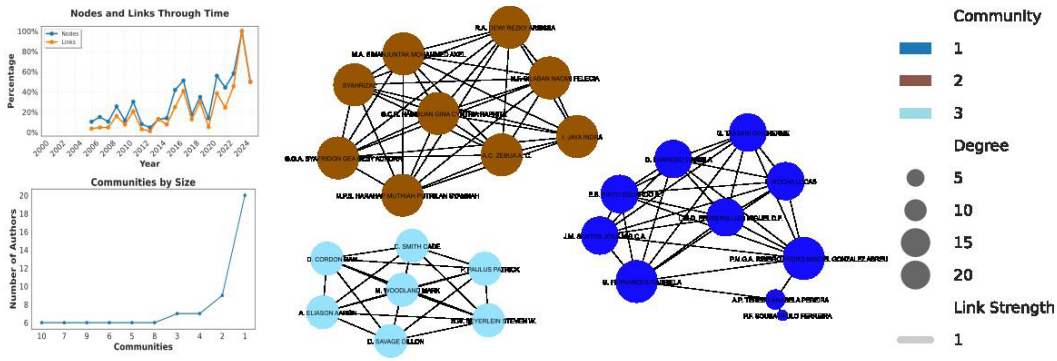

Figure 5. Collaborative network of prominent authors and their interconnections.
Note: Prepared by the authors.

Abreu) and denser, more focused ones (e.g., those of Sivakumar or Hussein), suggesting a mature field in terms of scientific connectivity.

4. DISCUSSION

The findings portray project time management as a steadily expanding research domain in which traditional scheduling instruments remain foundational, yet are increasingly being reinterpreted through data-driven and computational approaches. From 2006 to 2025, the field demonstrated moderate overall growth (5.57%), with an evident acceleration in the most recent years, suggesting a shift from exploratory adoption to broader consolidation and application-oriented work. The short-term decline in citations for 2024-2025 is consistent with the expected citation maturation lag for newly published articles. The country-level patterns indicate a highly unequal yet influential global landscape, with China leading both production and citation share. International collaboration networks reveal distinct communities where co-authorship appears to support higher visibility and more robust outputs. At the source level, the presence of high-impact outlets (e.g., leading project management and engineering management journals) alongside conference-driven dissemination reflects a field that is both methodologically active and practice-oriented, particularly around construction/engineering contexts and digital transformation themes (e.g., BIM, digital twins, AI-enabled decision support). The extant literature, when considered as a whole, lends support to the central argument of the article under consideration. The integration of Gantt chart, CPM, and WBS with predictive analytics and optimization does not constitute a replacement for classical planning. Rather, it serves to augment classical planning, thereby enabling the more effective management of uncertainty, resource constraints, and dynamic project environments. This finding suggests a number of research opportunities in the realm of explainable AI, including the development of scheduling decisions, the coordination of multiple projects, and the validation of advanced models in the context of distributed and interdisciplinary scientific teams.

5. CONCLUSIONS

This study examines publications related to project time management and the proper synchronization of project activities. The text emphasizes the utilization of CPM, WBS, and Gantt chart as tools for planning, organizing, and optimizing resources. A scientometric analysis was conducted to identify significant factors, including the countries with the highest scientific production, the journals with the highest number of citations, and the most influential research groups. The results obtained allowed for the identification of high-impact journals and research groups that exerted a significant influence on the development of knowledge in this field. The management of activities and the appropriate allocation of resources in projects have solidified their position as a pivotal domain of research. This is not only due to their efficacy in processes but also due to their impact on the quality of outcomes and the probability of successful implementation. The findings indicate that the methodologies employed, in conjunction with contemporary applications

founded on data analysis and predictive models, have fortified the processes of planning and execution in the realm of project development. Research conducted by Habibi *et al.* (2018) suggests that the incorporation of these models enhances the precision of temporal estimation and mitigates uncertainty in various contexts. In summary, these strategies not only facilitate the anticipation of problems in project organization but also enable the construction of processes that promote adaptability to any type of context. Additionally, the study underscores that effective time management should not merely emphasize time control, but rather, it should adopt a balanced perspective encompassing time, cost, and risk. This integration of risk preferences and project objectives is crucial for a comprehensive approach to time management in project management.

A review of the extant literature reveals that traditional tools, such as Gantt charts and the CPM, continue to be widely used. However, these tools present limitations when projects face uncertainty or dynamic changes (Ballesteros-Pérez *et al.,* 2018). A limitation of this research is its exclusive focus on publications indexed in WoS and Scopus. This may have resulted in the exclusion of articles from other databases that also contributed valuable information to this study. A notable limitation is the presentation of results at a general level, which precludes the exploration of more specific details. This restriction hinders the direct application of the conclusions in concrete project management scenarios. From a pragmatic standpoint, the utilization of these instruments has been shown to enhance decision-making processes and mitigate the element of uncertainty associated with potential failures. Furthermore, the integration of these tools with mathematical models facilitates the anticipation of bottlenecks and the optimization of resources. When implemented within research groups, these methodologies have been shown to enhance the probability of success and the attainment of objectives. For future research endeavors, a potential avenue for exploration could involve the application of AI and machine learning models for predicting timeframes and resources, in addition to analyzing their impact on time management in interdisciplinary projects and geographically distributed teams.

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Contribution statement

Isabella Gutierrez: Conceptualization, methodology, data curation, formal analysis, visualization, writing – original draft, writing – review & editing.

Luis Romero: Methodology, software, validation, writing – review & editing.

Daniel Moreno: Investigation, resources, writing – review & editing.

Statement of data consent

The datasets generated and/or analyzed during this study are available from the corresponding author upon reasonable request, subject to applicable data use restrictions.

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