

The Intersection of Project Management and Automation: A Bibliometric Analysis

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Abstract. *The study is a bibliometric analysis that addresses the interdependence of two concepts: project management and automation. The paper presents a synthesis of relevant statistics that target articles that address the combination of the two concepts and includes important information, such as: most relevant sources, annual scientific production, most relevant authors, sources production over time and most relevant affiliations or countries production over time. The research method used for conducting the research is the bibliometric analysis, and the research question is the following: “What are the key research trends in the academic literature at the intersection of project management and automation?” The specialized literature is varied and is divided into two: one part targets project management, while the other part addresses automation. The research results reveal that interest in our research topic is continuously increasing, which is observable through the increasing use of artificial intelligence in project management and the automation of a large part of the processes carried out in companies. At the same time, the results show that there is a major increase in the use of artificial intelligence, especially in countries with rapid development rates, such as the USA or China. All this indicates that, over time, as technology advances, the use of artificial intelligence in project management will become increasingly common, easier and will contribute to increasing productivity and achieving much more efficient management.*

Keywords: project management, automation, organizational performance, project governance, bibliometric analysis.

Introduction

In this increasingly digitalized world that is evolving more and more rapidly, project management in all domains and all fields of activity must adapt to cope with increasingly frequent and sudden changes (Cole, 2017; Lawal et al., 2024).

Technology is evolving very rapidly, working methods are becoming more efficient, and project managers are being forced naturally to improve their skills of all types so that they can lead teams and collaborate effectively with stakeholders (Vătămănescu et al., 2018a, 2018b; Cegarra-Navarro et al., 2021), while they also have to improve their digital skills, making possible for them to learn to use new working methods and applications of artificial intelligence. Therefore, we conducted a bibliometric analysis through which we tried to discover whether the interest in combining project management with automation is growing or if there is a sufficiently large number of publications and authors to cover this field. Based on the information collected, we can have a confirmation or a refutation of the growing interest in the interdependence of the two concepts. The research question is the next one: “What are the key research trends in the academic literature at the intersection of project management and automation?”, trying to

discover the countries that published the biggest amount of research on our topic, the most influential authors and journals that contributed to the development of our research topic and if there are gaps or under-researched areas in the literature on automation and project management that warrant further investigation in the near future.

Because human needs are constantly developing, the projects through which these needs are satisfied are also becoming more complex. Therefore, the solutions for implementing these projects are also becoming more complex, in some cases the solutions being even unique. (Vătămănescu et al., 2014, 2023). As a result, artificial intelligence is gradually becoming indispensable in many fields of activity, and project management is forced to adapt, and within this continuous process. Therefore, in order to anticipate the evolution of project management in relation to the evolution of artificial intelligence that favors the automation of processes within a project, we have carried out this bibliometric analysis, through which we demonstrate the growing interest in the targeted topic.

Literature review

Project Management

The Project Management Institute (2017) defines project management as being “the application of knowledge, skills, tools, and techniques to project activities to meet project requirements”, which “enables organizations to execute projects effectively and efficiently”. The project manager is the one who is in charge with carrying out a project. There are many definitions for a project manager, one of them being the following: “the individual who has overall responsibility to plan, direct, and integrate the efforts of everyone involved in the project (stakeholders) to achieve the project goal. In the role of project manager, one person is held accountable for the project and is totally dedicated to achieving its goals” (Nicolas & Steyn, 2017). They are “responsible for time management, cost, quality, integration, project team members, communication, risk and assets” (Gasemagha & Kowang, 2021) and “act as independent decision makers, balancing critical financial, technical, and behavioral variables” all while seeking to maintain positive relationships with a variety of project stakeholders, both internal (e.g., top management) and external (e.g., contractors, regulatory bodies and others) (Pinto, et al, 2024).

In the projects they manage, the project manager assumes responsibility for a consistent series of factors, including: problems related to project work (delays, unforeseen costs), legal aspects (contractual disputes, damage claims) or the management of the relationship between team members (Chan, 2024). These projects can be classified according to several criteria: according to the area of coverage, according to the source of funding, according to the scale, according to the degree of novelty, or even according to the domain of the objective and activities (Prisăcaru, 2020).

Nowadays, project management has experienced a considerable development, as currently there is a variety of ways through which it can be implemented. A more classical type of methodology would be waterfall project management, where “projects are relatively simple, predictable and linear”, with clearly defined boundaries, “which makes it easy to plan in detail and follow that plan without much changes” (Špundak, 2014). However, according to Demsey et al., (2022), it also encounters a series of difficulties: “the challenge in conventional project management is typically to provide concise and understandable information about the project status, to document correlations, and to exchange information”. Another project management methodology is Agile, described as a method that “entails close interaction with the client throughout the project's development” and is designed to “avoid rework, unexpected delays,

overspend, and customer dissatisfaction” (Gemino, et al, 2020). A third type of project management is the hybrid one, which “is an approach that combines traditional and agile project management techniques”, where “the goal is to benefit from the strengths of each approach, and, at the same time avoid the weaknesses” (Reiff & Schlegel, 2022).

The most well-known Agile methodologies are Kanban and Scrum. Kanban is composed of 5 big stages: “visualizing the workflow, limiting work-inprogress, managing the workflow, making each and every step unambiguous and ultimately evolving as one single and precise mechanism” (Andrei, et al, 2019). The second Agile methodology is Scrum, defined as “a lightweight framework that helps people, teams and organizations generate value through adaptive solutions for complex problems” (Schwaber & Sutherland, 2011), being a methodology increasingly used in numerous fields of activity.

A study conducted on a sample of 37 IT industry employees, all employed in 22 different organizations, revealed that the most popular reasons for which they preferred to use the Agile methodology were: “external threats and fluctuating customer needs, a lack of transparency about the value that was being delivered and how it connected to other organisational units, the realisation that previously applied project management approaches did not work and the quest for increased employee satisfaction” (Oprins, et al, 2019). At the same time, a study conducted in 2023 showed that company employees usually prefer a hybrid working methodology, in which the two methodologies that are usually used in the vast majority of companies and are best known by project managers, Agile and Waterfall, can be combined: “while both Agile and Waterfall methodologies have their respective strengths, a hybrid approach can leverage the best of both worlds to deliver successful outcomes for complex projects”, as they realized that “by incorporating Agile's emphasis on collaboration and feedback into a Waterfall framework, teams can work more closely with stakeholders to ensure that project requirements are fully understood and that the final deliverables meet their needs” (Iwersen, et al, 2023). Therefore, we can say that project management is an activity that is found in all activities, in all fields, representing an important component of the success of the entire project. This field is constantly evolving, being adapted to the needs and possibilities of each individual company.

Automation in project management

When it comes to project management processes, emerging technologies are increasingly explored for their transformative potential (Auth et al., 2019). As the role of a project manager is critical to the success of the organization, it is essential that their tasks are carried out efficiently and effectively, and the recent technological advancements determined the development of particular innovations that can support project managers in achieving their goals (Prifti, 2022). For example, AI chatbots can be used to help project managers and their teams with time savings, by automating communication and administrative tasks, addressing inquiries, reducing the risk of project failure by ensuring timely updates, and also by improving the decision-making process (Cīrule & Bērziša, 2019). Another example is Robotic Process Automation (RPA), a type of Business Process Automation (BPA), as it is specifically designed to automate repetitive workflows, and it can make this process easier for non-technical staff by using a user interface automation layer and by avoiding deep interactions with application code, systems, or databases, therefore facilitating the transformation efforts (Chakraborti et al., 2020). However, in the past years RPA went through its own significant transformation, and the recent advancements in Machine Learning and Artificial Intelligence (AI) are reshaping how business processes can be automated and optimized (Chakraborti et al., 2020).

The main factor that supports AI adoption in project management is the perception that its effectiveness leads to higher profits and overall project success (Sarafanov et al., 2024). AI can improve project management through process automation, cognitive insight, and cognitive engagement (Sarafanov et al., 2024). Among its benefits compared to more traditional methods, this approach can offer stronger predictive capabilities, automated reviews, and forecasting based on trends, leading to efficiency and project performance improvements (Sarafanov et al., 2024).

Therefore, artificial intelligence can enhance project management by improving performance, optimizing processes, and increasing the likelihood of long-term success, as it can determine better stakeholder analysis, improved team communication, and optimized planning and resource allocation (Taboada et al., 2023). In conclusion, AI can prove valuable in processes that rely on historical data for estimation and planning, while areas that require human leadership and decision-making are less likely to be as impacted, and the project management field can adapt by integrating AI into workflows while continuing to develop essential human skills and competencies (Fridgeirsson et al., 2021).

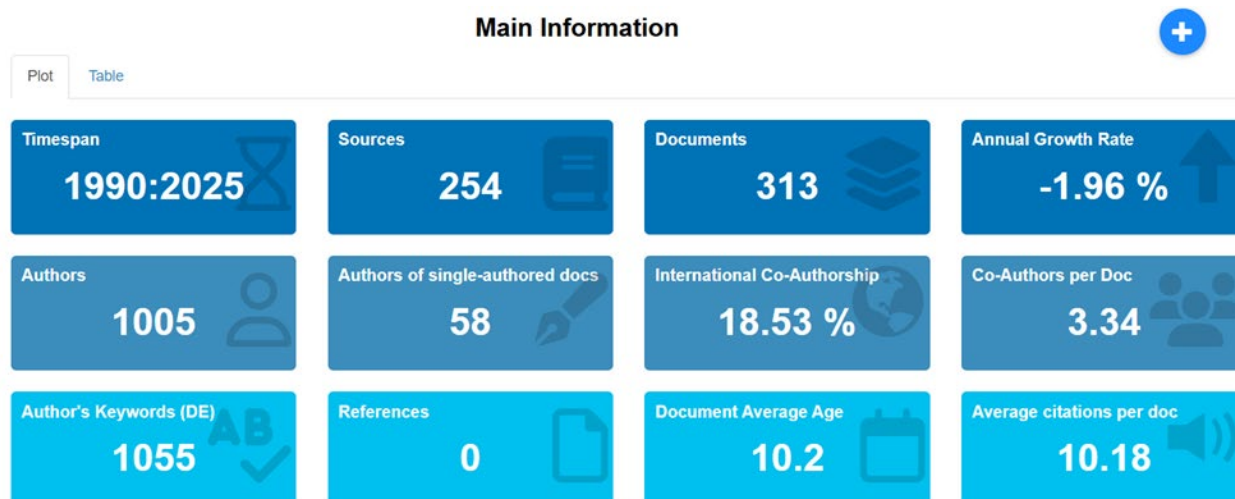
Methodology

This article is a bibliometric analysis performed using the R library and Bibliometrix (Aria & Cuccurullo, 2017). According to one definition, a bibliometric analysis is “a systematic study carried out on scientific literature for the identification of patterns, trends, and impact within a certain field” (Passas, 2024) that is responsible for “handling large volumes of scientific data and producing high research impact” (Donthu, et al, 2021). The main advantage that I had in deciding to perform a bibliometric analysis was that I was able to process a significant volume of data in a very short time.

These are the steps we carried during our bibliometric study: we searched the Web of Science (WoS/WoK) database for documents at the intersection of project management and automation, as it is „the most influential bibliographic data source traditionally used for journal selection, research evaluation, bibliometric analyses, and other tasks” (Pranckute, 2021). We chose this database because we considered it to be the most relevant for our type of research, as it is, together with Scopus, one of the most comprehensive databases used for research. The Web of Science query found all the documents that had both „project management” and „automation” in their topic (title, abstract, keywords, or Keywords Plus). This search retrieved a number of 313 documents, of which 296 (94,5%) were articles. As project management can be carried out in many fields and all its applications have different particularities, we have decided not to apply additional exclusion filters such as Web of Science categories, language, publication date, in order to see the intricate connections between our keywords in the entire interdisciplinary literature. Using Bibliometrix, we analyzed the retrieved documents, highlighting: annual scientific production, average citations per year, most relevant sources, sources production over time, most relevant authors, author production over time, most relevant affiliations, most global cited documents, most frequent words, co-occurrence networks, thematic map, collaboration network and maps with all countries collaborations.

Results and discussions

In this section we will analyze the bibliometric report we generated, indicating the main key information identified and trying to explain its significance.



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Figure 1. Main information

Source: authors' own processing using Bibliometrix.

The 313 retrieved documents were published in the between 1990 and 2025, which highlights a constant and stable interest in the combination of project management and automation. Over 1000 authors have written about this topic, most of them co-authored, of which 58 are sole authors, preferring to write alone. If we look at the image, we will notice that this is confirmed by the number of co-authors per paper, which is 3.34. At the same time, it can be observed that the average age of the documents is 10 years, and the average number of citations per document is 10.18.

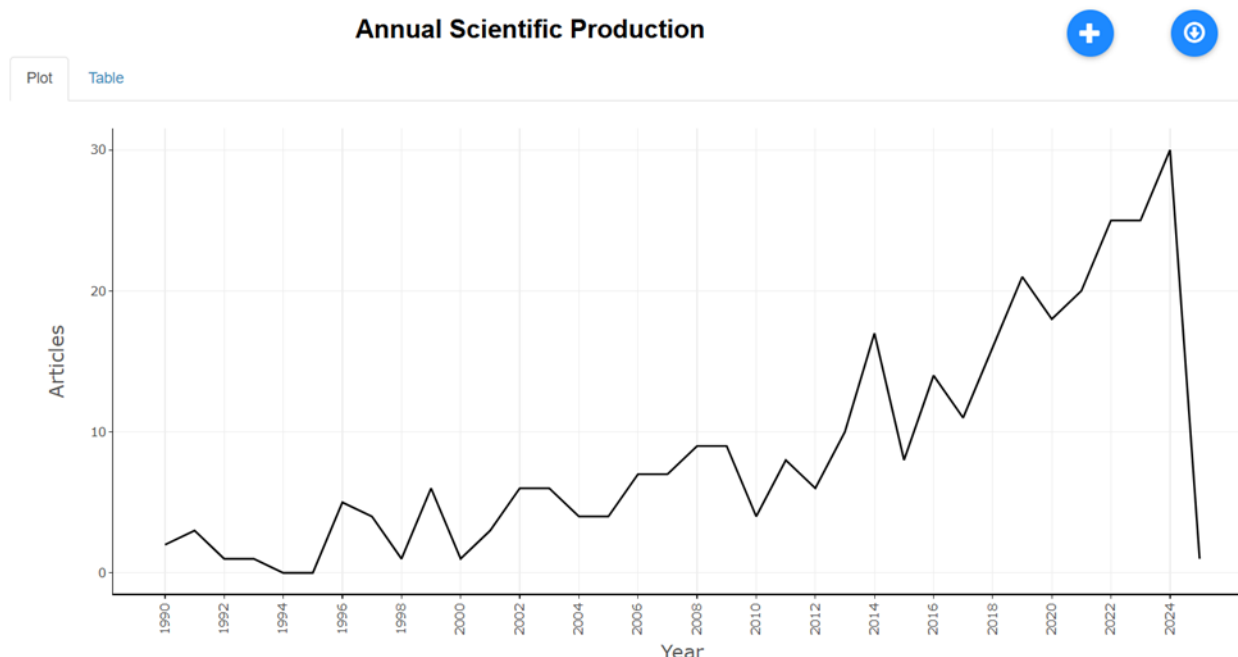


Figure 2. Annual Scientific Production

Source: authors' own processing using Bibliometrix.

The figure above presents the annual situation of the number of scientific articles written on our topic. The graph shows that over the past 10 years, the topic has become increasingly of interest to researchers. The peak was reached in 2024, when around 30 articles were written on the topic we are discussing. As for future trends, we expect the interest in our research topic to grow, as both automation and artificial intelligence become more and more present in the daily activities of companies and begin to take over the work of many employees, as their quality and characteristics advance.

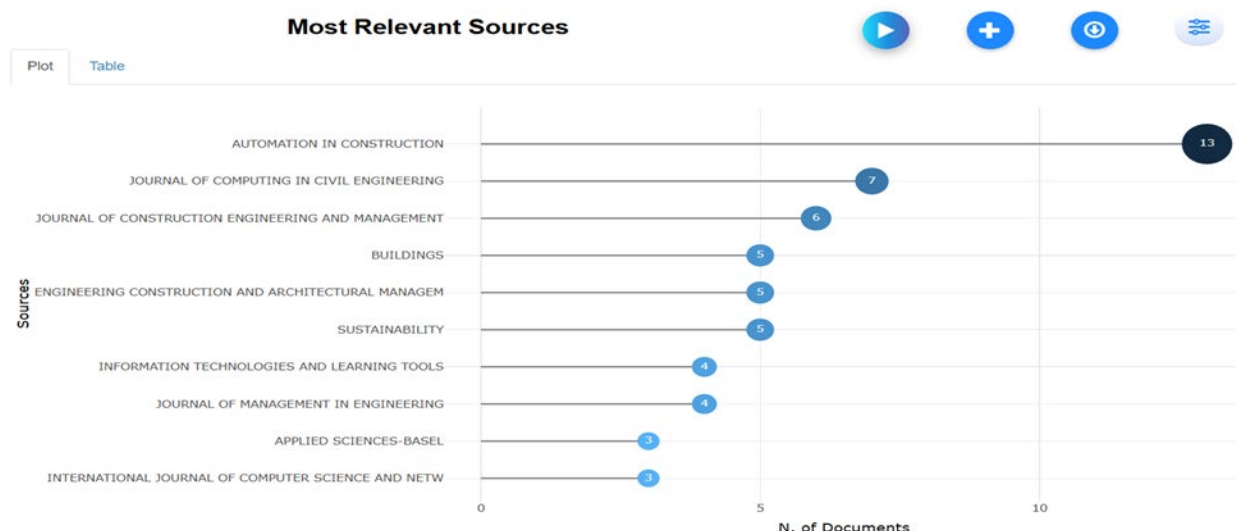


Figure 3. Most relevant sources

Source: authors' own processing using Bibliometrix.

In Figure 3 we have mentioned the publications in which most articles appeared that address the main theme of our article. As can be seen, the journal „Automation in construction” ranks first with 13 published documents, followed by the „Journal of computing in civil engineering” and the „Journal of construction engineering and management” with 7 and 6 published documents respectively. The following places are equally occupied, with 5 articles published by each, by the journal „Buildings”, „Engineering construction and architectural management” and the journal „Sustainability”.

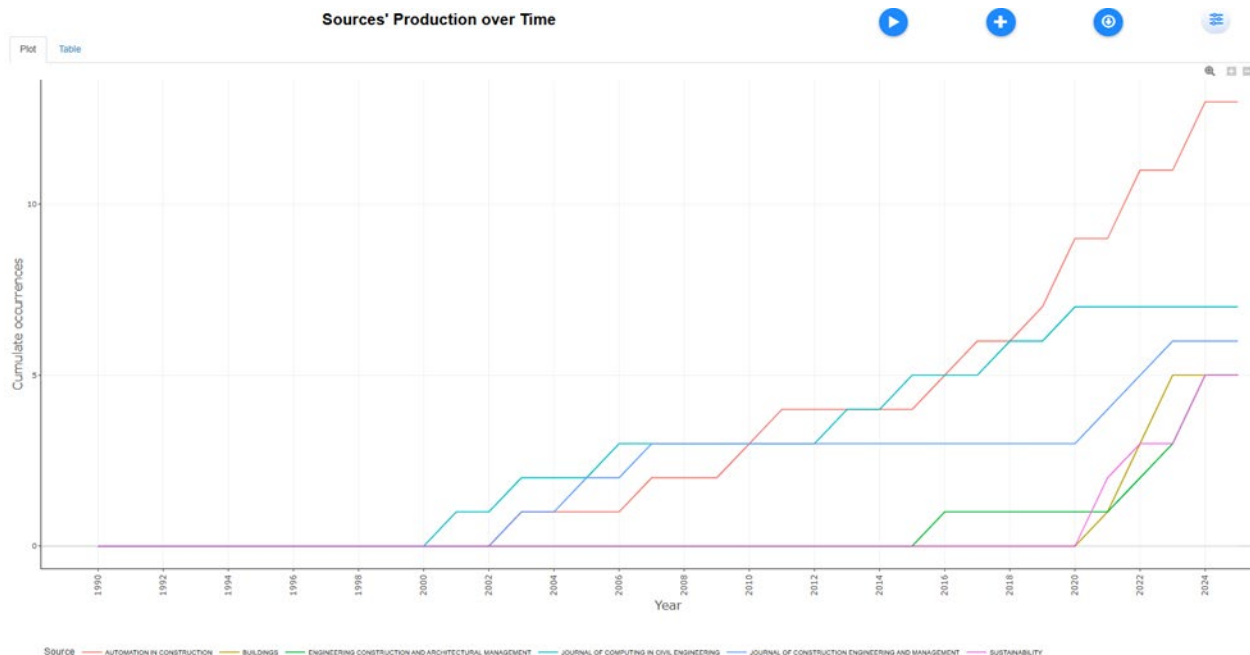


Figure 4. Sources Production over Time

Source: authors' own processing using Bibliometrix.

Figure 4 (above) shows the evolution of document publication by the top academic journals and magazines, starting from 1990 to 2024. What can be observed from the figure below is that between 1990 and 2000 no article addressing our research topic was published. After 2000, these began to appear and their number began to increase from one year to the next. One of the publications that stands out the most is “Automation in construction journal” (red line), that currently occupies the leading position in the field. Another 3 publications marked with purple, orange and green colors, have significantly increased their number of articles published on the subject addressed by us. The other publications have maintained a permanent rate of increase.

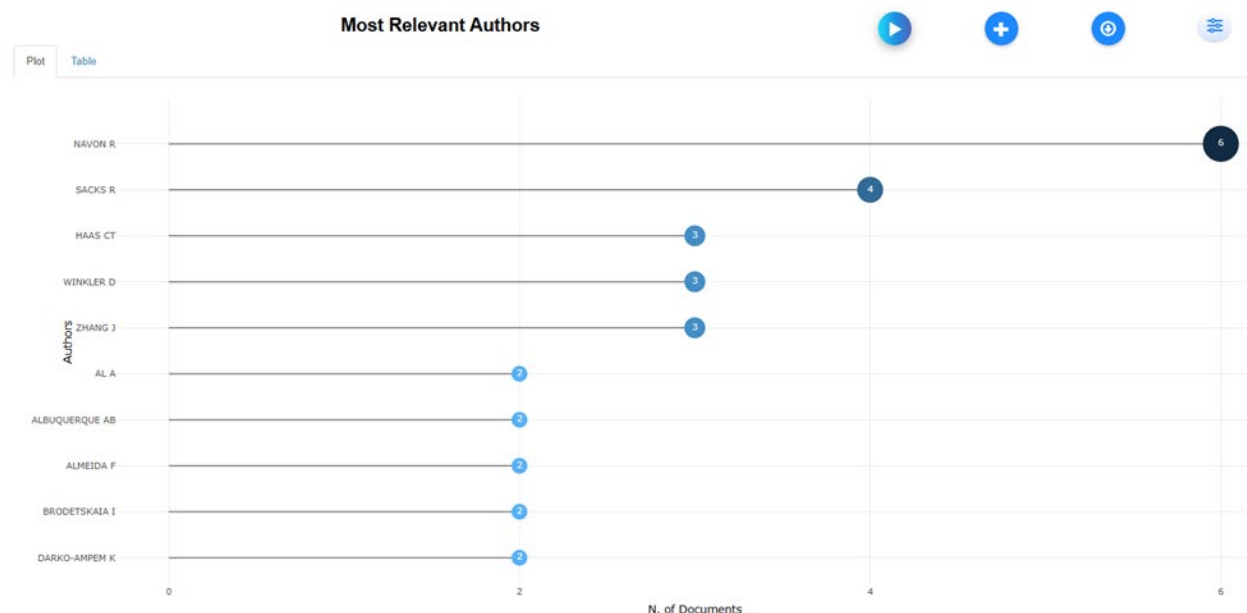


Figure 5. Most relevant authors

Source: authors' own processing using Bibliometrix

Figure 5 presents the most relevant authors who have published articles on the topic we are analyzing. The first position is occupied by Navon R., who up to the time of writing this article has published 6 papers in which he addressed the topic we are discussing. In second place, not far from the first place, is Sacks R., with a number of 4 papers that address the topic of project management and combined automation. The following places are occupied, in no particular order, by Haas C.T., Winkler D. and Zhang J, who have each published 3 papers in the field. The other authors who have written articles in the field have published up to 2 papers in the field each.

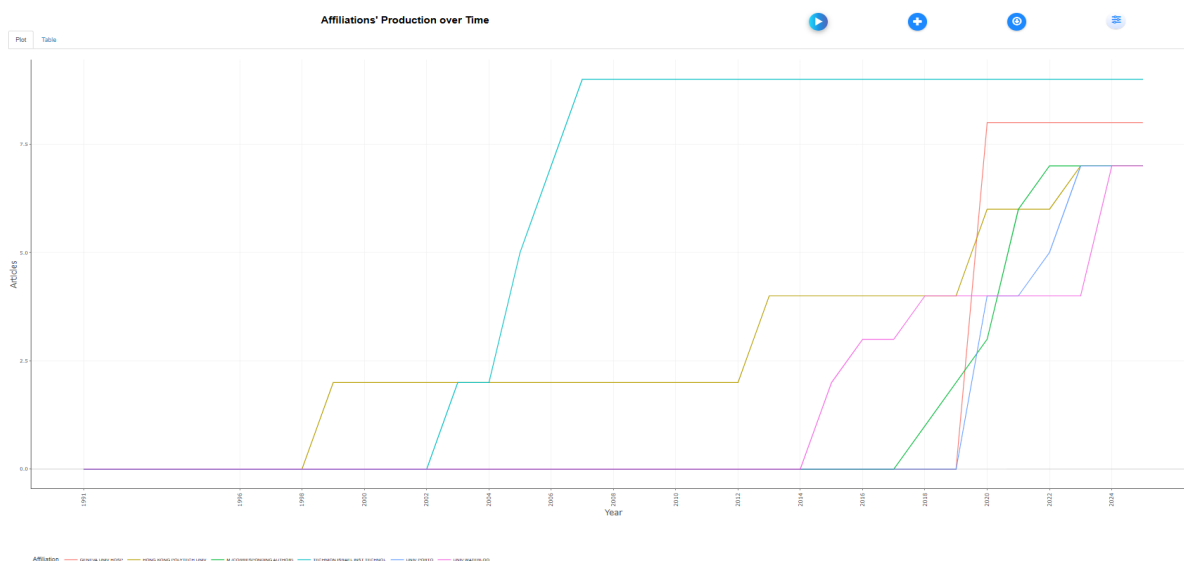


Figure 6. Affiliations Production over Time

Source: authors' own processing using Bibliometrix.

Figure no. 6 represents the evolution of the number of papers published by each publication from 1998 to 2024. As a general observation that demonstrates the growing interest in our research topic, it can be observed that the number of articles published in the field has increased permanently, from one year to the next, and, according to the graphs, the trend is of continuous growth, the peak not having been reached yet. In the graph above, Technion Israel Inst Technol stands out, with an average annual production of 9 articles, its production remaining constant for almost 2 decades. Another publication that stands out is Geneva Univ Hosp, which in the last 5 years has maintained an average publication of 5 articles annually. At the same time, Hong Kong Polytech Univ also stands out with an annual average of 7 articles published in the field, which demonstrates, once again, the increase in interest in the topic addressed by us in this article.

Corresponding Author's Countries

Plot Table

Show 10 rows

Excel

Search:

Country	Articles	Articles %	SCP	MCP	MCP %
CHINA	38	12.1	32	6	15.8
USA	37	11.8	33	4	10.8
GERMANY	22	7.0	17	5	22.7
UNITED KINGDOM	15	4.8	11	4	26.7
BRAZIL	14	4.5	10	4	28.6
AUSTRALIA	8	2.6	6	2	25.0
CANADA	8	2.6	7	1	12.5
INDIA	8	2.6	7	1	12.5
ITALY	8	2.6	7	1	12.5
KOREA	8	2.6	7	1	12.5

Previous 1 2 3 4 5 6 Next

Figure 7. Corresponding Author's Countries

Source: authors' own processing using Bibliometrix

Figure no. 7 shows us the countries from which the authors who wrote papers that addressed our topic come and the percentage of the total articles in the field covered by the country from which they come.

China, a country with an impressive academic history, occupies the first position, covering 12.1% of the total articles in the field, with 38 published papers. In second place, very close behind, is the USA, which covers 11.8% of the total articles published, with 37 papers. The next position is occupied by authors from Germany, with 7.0% of the total and 22 published papers. The United Kingdom and Brazil occupy positions 4 and 5, with 15 and 14 published articles in the field, respectively, representing 4.8% and 4.5% of the total.

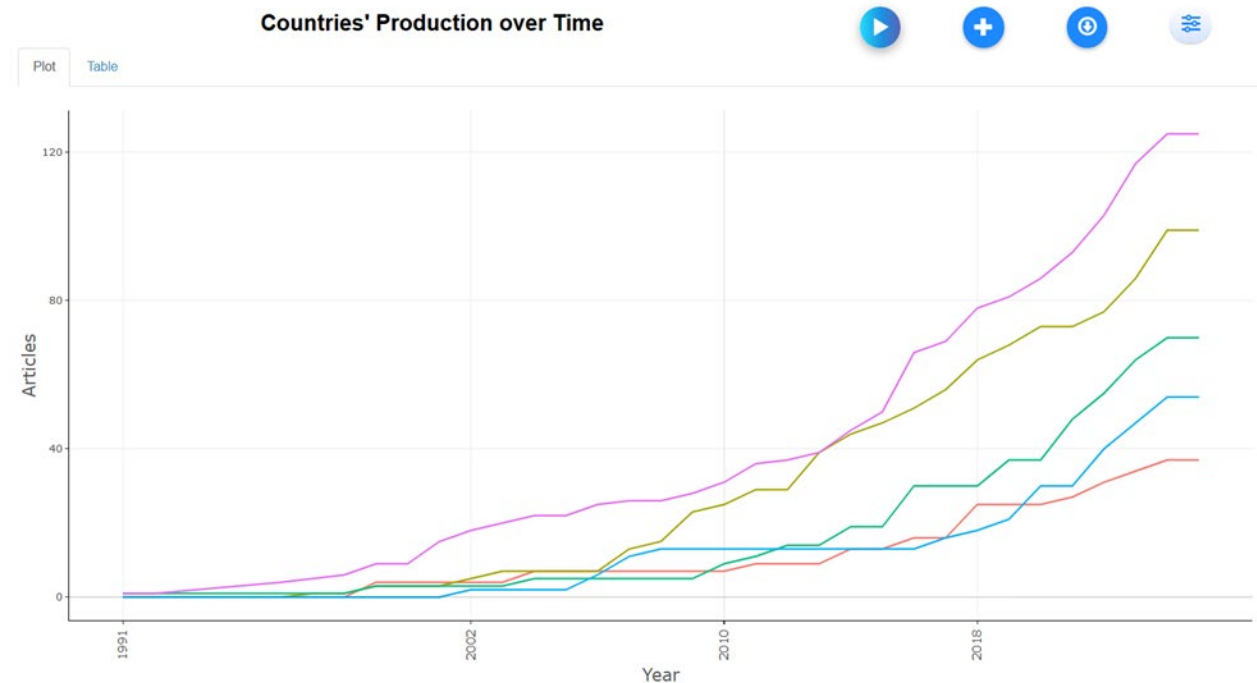


Figure 8. Countries production over time

Source: authors' own processing using Bibliometrix.

Figure 8 shows the production of articles combining project management and automation from 1991 to the present. The USA ranks first with a number of 125 articles published during the year 2024, being also one of the countries with an impressive and constant rate of growth of interest in the field. We can associate the growth rate of this interest with the fact that the USA is a country with a strong development rate, technological innovation being a constant in the country. From 2015 to 2024, so for 10 years, the number of articles increased from 50, in 2015, to 125, in 2024, a very impressive aspect. China ranks second, a country that in the last 10 years has doubled the number of works published in the field compared to the period 1991-2014, China being also a country with an intensive rate of development of all sectors of activity. Its total number of publications is, according to the graph above, 99.

The co-occurrence network attached as Figure 9 sets project management as the central concept, surrounded by several interconnected themes. The blue nodes represent technology-related terms, including digital transformation, information systems, scheduling, and robotics, indicating a strong link between project management and digital transformation. The green nodes represent automation-related terms, such as process automation and blockchain, emphasizing the role of emerging technologies when it comes to improving efficiency. Meanwhile, the orange nodes associate artificial intelligence and machine learning with risk and information management, highlighting their impact on data-driven decision-making in project management.

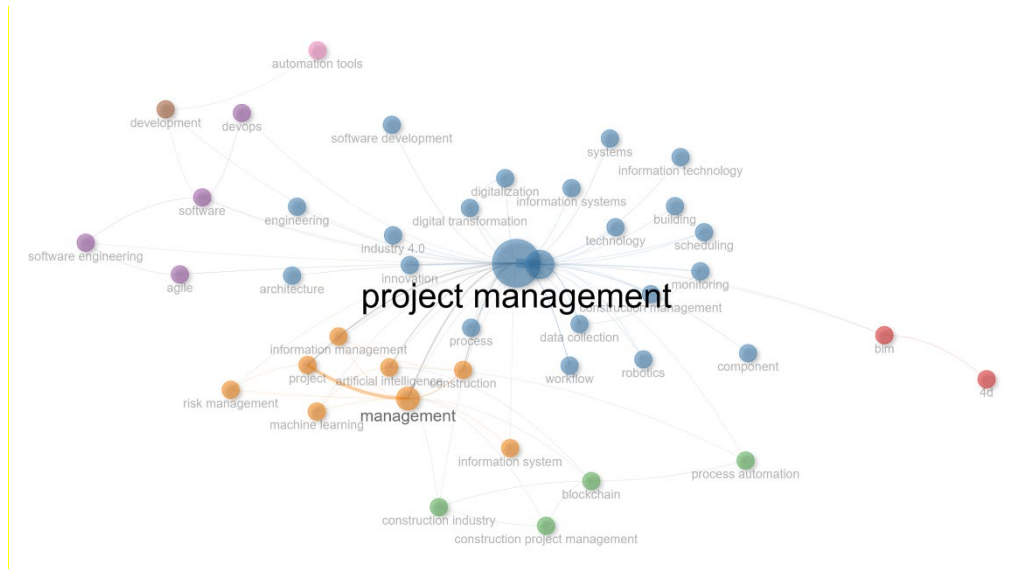


Figure 9. Co-occurrence network

Source: authors' own processing using Bibliometrix.

In the following paragraphs, we will examine the most relevant clusters for our bibliometric study from the ones identified in the thematic map attached as Figure 10, analyzing them through the lenses of their contributions and research potential.

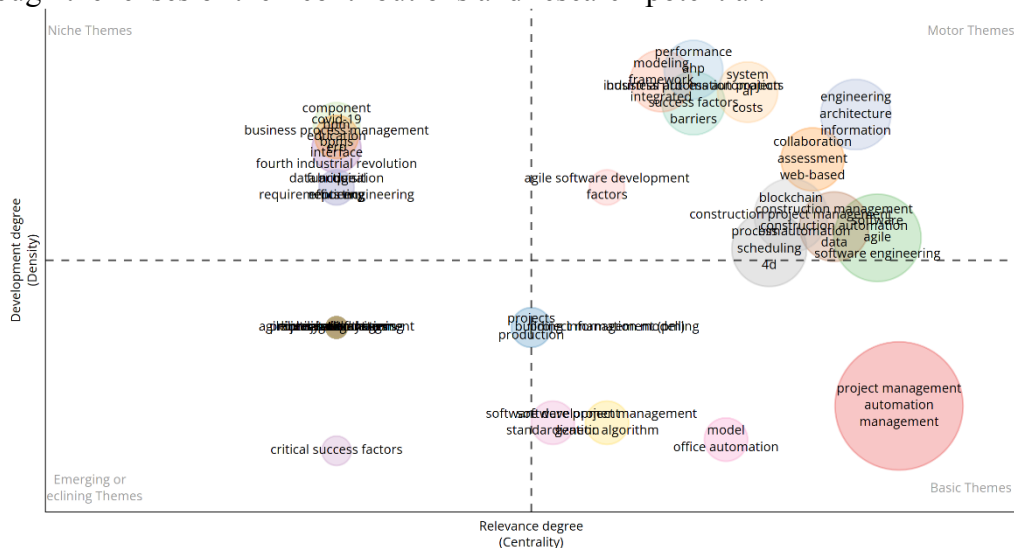


Figure 10. Thematic map

Source: authors' own processing using Bibliometrix.

The first cluster, which is the largest and the most relevant for our study, is Project Management, and it includes 58 keywords, such as: project management, automation, management, artificial intelligence, industry 4.0, and machine learning. It is positioned in the Basic Themes quadrant, which means it represents areas that are well-established and extensively researched, serving as a foundational literature for emerging, more advanced, or niche studies. The fact that project management automation has become a fundamental theme can reflect the technological advancements of recent years, and it highlights the importance of considering

established research to explore new opportunities for efficiency through emerging technologies. The most cited references are Darko et al. (2020), Navon and Sacks (2007), Heigermoser et al. (2019), and Guo and Zhang (2022).

We can also notice a few interesting clusters that are positioned in the Motor Themes quadrant, which can be interpreted as representing related, more niche, emerging research topics. As such, they are highly relevant and with strong research potential, as they require further exploration. The third cluster by size is Software, and it includes 16 keywords, such as: software, agile, automation tools, scrum, and project efficiency. The ninth cluster by size is Business Process Automation, and it includes 7 keywords, such as business process automation and robotic process automation. The 15th cluster by size is Blockchain, and it includes 7 keywords, such as blockchain, construction project management, and process automation.

Conclusion

After analyzing the statistical data, the results confirm that there is a categorical upward trend in interest in combining these two concepts: project management and automation. As artificial intelligence makes its presence felt more and more in common project management, in more and more fields of activity, the interest in combining the two concepts is also experiencing a significant evolution. The results of the analysis highlight that, from 2015 to the present, that is, in the last 10 years, there have been more articles written that combine project management and automation than in the last 30 years prior to 2015. The results also confirm the rising interest in the subject in the countries with the fastest development level (USA and China), these being also the states whose authors have had the most publications in the field and which cover the largest percentage of the total research on this subject. At the same time, they confirm that the number of publications in the field is continuously increasing, concomitant with the development of technology and working methods.

Even though our thematic analysis positioned the intersection of project management and automation under Basic Themes, as a foundational and well-established research area, our analysis identified several related, more niche, emerging topics in the Motor Themes quadrant that show high research potential. Automation in software projects, the use of RPA in project management, and blockchain in construction projects are a few of the areas that require further exploration, reflecting the evolving role of automation in improving project efficiency across various domains.

In conclusion, we consider the subject of our research to be essential for writing research that targets new, emerging research trends, which could be based on the present bibliometric analysis or a similar one. At the same time, we must mention that automation has also become an important topic that highlights technological advances in multiple sectors of activity, as well as possibilities for streamlining existing technologies.

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