Evaluating the State of Earned Value Management Research and Finding Paths Forward [1]

By Andrew J. Grandage, PhD

Abstract

The Earned Value Management (EVM) literature consists of an extensive and diverse collection of practitioner writings, governmental reports, and peer-reviewed journal articles. However, relatively few attempts have been made to take stock of this vast literature and provide direction for future research. This paper provides a comprehensive review of peer-reviewed articles on EVM published from 2015 to 2025. The analysis of 227 articles summarizes the industries that have been studied, research methods and data sources used, the contributions of the articles, and gaps in the literature. The paper concludes by inviting practitioners to help shape the future of EVM research through a ranked choice voting process designed to establish research priorities.

Introduction

Over the last several decades, the field of project management has experienced a proliferation of standards, guidelines, and certifications intended to establish best practices and qualifications for project professionals. The contents of these standards and guidelines are consequential because organizations often develop their procedures in accordance with them, while certifications can serve as a gatekeeping function by establishing qualifications for entry into and advancement within the profession. Therefore, project management research is needed to ensure that the field's increasingly extensive body of standards and guidelines is grounded in evidence. Furthermore, such research should aim to do more than justify existing practices by striving to improve their use and meeting the evolving needs of practice.

The purpose of this paper is to evaluate the state of Earned Value Management (EVM) research and begin a conversation of how future research can better support professional practice. Given the central role of EVM in project management and its increasingly vast body of research, there is an ongoing need to take stock of the literature, bring greater organization to what is known, and

[1] How to cite this paper: Grandage, A.J. (2026). Evaluating the State of Earned Value Management Research and Finding Paths Forward; *PM World Journal*, Vol. XV, Issue XI, November.

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identify the areas in which future research can provide the greatest value. This study analyzes 227 peer-reviewed papers that were published from 2015 to 2025.

Results demonstrate that EVM research has explored a variety of industries, but construction projects are by far the most commonly studied. The primary contributions of the papers focus on forecasting, project monitoring, and analyzing factors contributing to successful implementation. Yet, relatively few examine whether EVM improves project performance by demonstrating that use of it leads to better cost and/or schedule results. The studies utilize a variety of research methods and data sources, with some of the approaches being quite rigorous. However, many papers do not have adequate sample sizes that are necessary for proper statistical analysis, often utilizing a limited number of case studies.

At the outset, it is important to clarify the perspective this paper is written from. It is certainly not written from the point of view that practitioners need direction from academics. It is essentially the opposite. As an academic researcher, the author feels that the academic community needs direction from practitioners to conduct more impactful and engaged research. However, for this joint effort to be most productive, it is necessary to provide an up-to-date literature review as a reference point for where we are now.

The paper begins by briefly highlighting other key literature reviews on EVM. The following section explains the approach used to analyze the 227 peer-reviewed articles. Next, the results section summarizes the findings. The discussion section which follows focuses on current gaps in the literature. The paper concludes by issuing a call to practitioners to guide EVM research by participating in a ranked choice voting process to establish priorities.

EVM Literature

The EVM literature includes a mix of book length treatments (Fleming & Koppelman, 2016; Solomon & Young, 2007; Song, 2010; Vanhoucke, 2023), governmental reports (U.S. Government Accountability Office, 1997, 2020), reflective practitioner works (Abba, 2023; Giammalvo, 2022; Rodrigues, 2026; Smith, 2022; Weaver, 2022), and peer-reviewed articles published in academic journals (Aramali et al., 2022; Grandage, 2022; Kim et al., 2003; Willems & Vanhoucke, 2015). Governmental reports provide insights into the origin and evolution of EVM, reform efforts, and the dissemination of knowledge on best practices. Reflective practitioner works often cover these same areas but preserve the original voice of thought leaders and their unique lived experiences. Overall, academic articles tend to emphasize quantitative analysis of project monitoring and forecasting, with less coverage of history and reform.

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Each of these sources of EVM literature are valuable and complementary in forming a holistic understanding. However, they are voluminous and require systematic efforts to take stock of knowledge and advance the field. For example, a comprehensive overview of The United States Government Accountability Office (GAO) reports on EVM alone could easily fill out an entire paper, and the same could be said about practitioner works and academic articles. Ultimately, grouping these works together in any comprehensive fashion would likely require a book length treatment to present these different sources of literature, make comparisons, and draw meaningful conclusions. Therefore, to focus the scope of this paper, I analyze recent peer-reviewed EVM publications and invite practitioners to provide direction for future research.

Willems and Vanhoucke (2015) provide a review of 187 journal articles on project control and EVM. In any systematic literature review, authors must strike a balance between taking stock of existing literature and providing direction for future research, and their review emphasizes providing direction for future research. The authors identified the primary research questions explored, contributions of individual studies, and the type of research designs employed. The authors encouraged future research to create datasets with a greater number of real world projects and utilize more simulation experiments with artificial projects to support more robust statistical analysis. They also called for greater attention to other dimensions of project performance, such as quality, and for future research to more directly address corrective action procedures.

Aramali et al. (2022) reviewed 160 academic and industry publications from the period 2011-2021, with a goal of better understanding EVM System (EVMS) maturity and environmental factors impacting implementation. A unique aspect of this study was that it was funded by the Department of Energy (DoE) and guided by a steering committee made up of government and industry professionals. The study found that industry publications tended to focus more on the history of EVM, compliance, the contextual environment, and implementation when compared to academic publications which placed greater emphasis on extensions of EVM (ex, earned schedule and earned duration). The authors identify specific research gaps within compliance, forecasting, and risk management while also encouraging more concentration on contextual factors and less explored industries.

Research Methods

This research builds on Willems and Vanhoucke by examining peer-reviewed articles published from 2015 to 2025, extending their work on the literature published before 2015. It also builds on Aramali et al. (2022) by engaging the practitioner community in identifying future research directions. To identify potential articles for inclusion, Google Scholar was used as the primary search engine and a University library system was used to access articles. Google Scholar was

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chosen because of its broad coverage of peer reviewed publications. Specifically, it was searched with keywords, such as "Earned Value Management", "EVM", "EVMS", etc. Filters were applied to the search engine so that single years were searched one at a time, helping narrow down results.

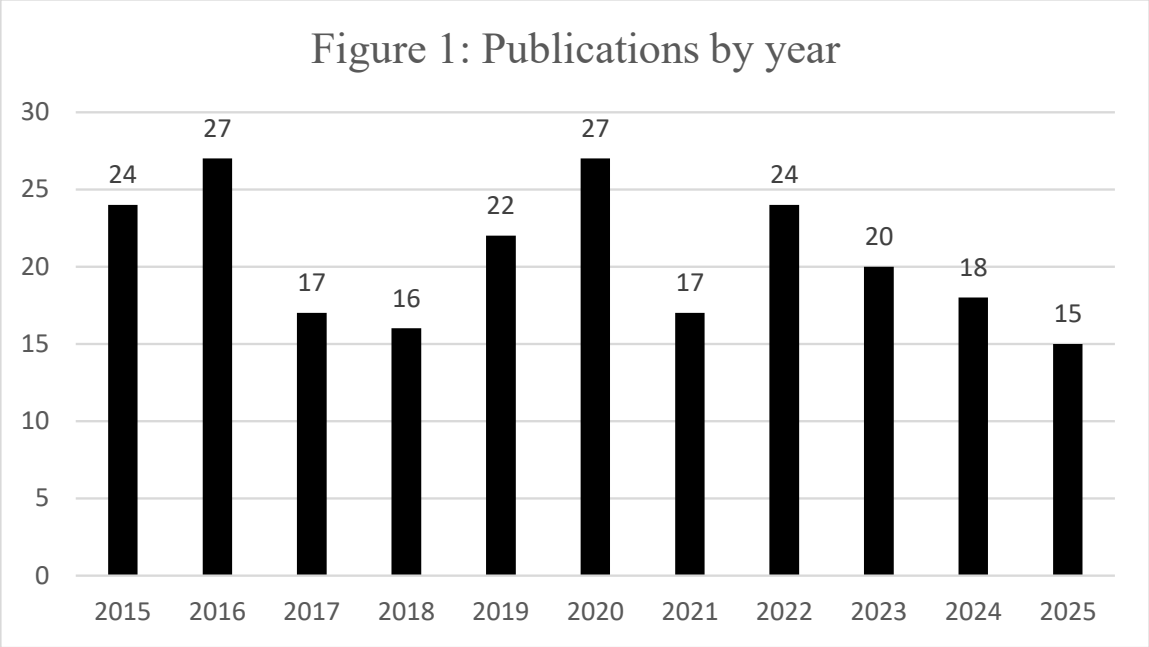
Because this paper aims to take a comprehensive overview of the literature, an inclusive approach was taken for identifying and including articles in the analysis. To be identified as a potential study, a paper had to be peer reviewed, indexed by Google Scholar, and meet a minimal quality check. The quality check was taken to identify and exclude articles published in predatory journals. In short, predatory journals operate what can be described as "pay for publication", typically charging high "article processing fees" and guaranteeing rapid review cycles. To determine whether a journal was predatory, watchdog sites that blacklist journals were referenced, article processing fees and review cycles were reviewed, and searches were conducted to find concerns posted on discussion boards. In total, 265 peer-reviewed publications were identified in the initial search. The quality screening subsequently excluded 38 articles, resulting in the 227 articles for analysis.

Each article was manually read, and a database was created to capture key information for each article. Specifically, articles were classified to identify industries, data types used for analysis, the number of projects each study analyzed, and their topical focus and unique contributions. The author was the primary coder and was supported by a secondary coder to ensure the classifications of the articles were correct. Overall, the primary and secondary coder had relatively few discrepances (less than 10 percent of data points coded), and the primary coder made the final decision on how to deal with the discrepancies.

Results

Figure 1 shows the number of publications per year from 2015 to 2025. In total, 227 papers were included in the analysis. As the figure indicates, the number of publications varied by year between 15 and 27. However, the average annual number of publications was slightly higher from 2015–2019 (21) than from 2021–2025 (19). Overall, this indicates that EVM continues to be a focus of research, but the total volume of future papers could trend downward.

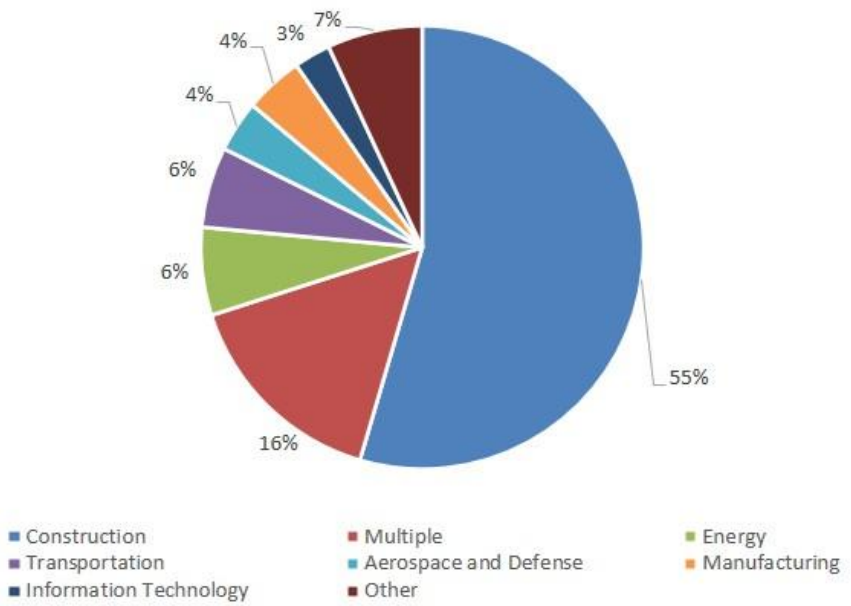
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Regarding the industries analyzed in these studies, Figure 2 illustrates that construction is by far the most commonly studied industry, accounting for over half of the papers. The second largest category, "multiple", indicates that a paper's analysis of EVM considered more than one industry. Figure 2 shows that energy, transportation, and aerospace/defense are covered within the literature, and that some studies have explored the use of EVM in manufacturing. However, information technology (IT) projects occupy a very small percentage of the literature, which is unfortunate considering the growing role of IT in society. The "other" category is dispersed across several areas, including water/sewer, product development, telecommunication, healthcare, and research and development.

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Figure 2: Industry breakdown



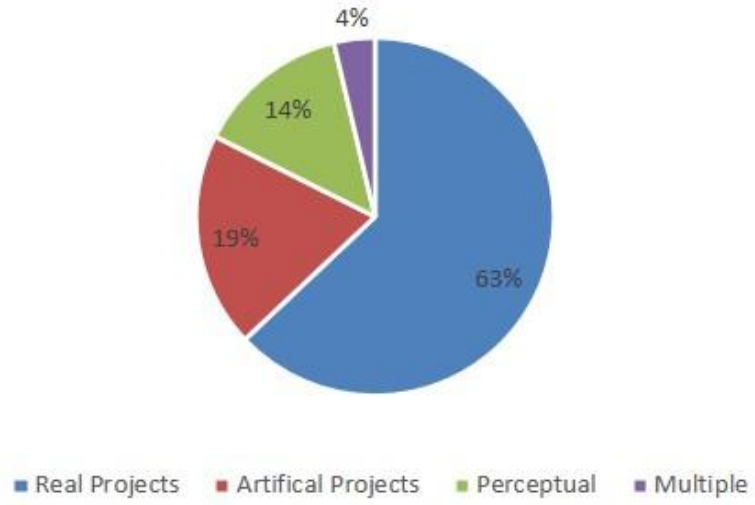
The industry composition matters for understanding the strength of the evidence in two important ways. First, industries with more studies provide a stronger foundation for evaluating the consistency of findings within those contexts. For example, consider construction and IT. The construction industry has been analyzed in over 100 studies, covers a vast range of key topics within EVM, and has been studied in numerous countries. In contrast, IT offers less than a dozen studies, does not provide the same topical range, and has been studied in fewer countries. The second way industry composition matters is in assessing the extent to which EVM can be considered a universally effective management tool. This argument is strongest when numerous industries have been thoroughly studied and the findings converge on similar core conclusions. Conversely, when research is concentrated in a limited number of industries, it becomes more difficult to determine whether findings generalize across different project environments.

Figure 3 presents the different types of data used in the papers. The majority of research was conducted using data from "real" projects, meaning that the papers used project data that was archived and made available to the researchers for their analysis. However, a fair amount of the studies relied on "artificial" projects. The artificial studies can be categorized into two different groups, one of which is considerably more robust than the other. For example, the robust studies generate a large number of artificial projects with certain properties (ex, network structure) and run simulations to determine what type of forecasting methods and project monitoring strategies

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are most suitable under different conditions (Vanhoucke, 2023). In contrast, the less robust approaches tend to present a limited number of simplified notional projects and introduce a new forecasting or project monitoring approach. Put differently, robust artificial studies provide insights into what can work better under different circumstances, and the others often introduce new methods by way of illustration. Finally, perceptual studies use survey research and interviews to capture the lived experiences of EVM users, often providing insights to their perceived benefits of EVM and factors which support effective implementation. As Figure 3 shows, a relatively limited number of studies used more than one of these data types.

Figure 3: Sources of data used



Before discussing the contributions of the papers, it is important to elaborate on data sources that EVM research has relied upon. Specifically, many of the studies rely upon too few data points to allow for proper statistical analysis. For example, roughly 25 percent of the papers contain 30 or more observations. That is, whether using project or perceptual data, most studies contain less than 30 projects or people, respectively. Furthermore, almost half of the studies utilize single project case studies. Thus, it can be argued that EVM research has yet to adequately meet one of the challenges outlined by Willems and Vanhoucke (2015), specifically their call for the creation and use of larger datasets to ground findings in more solid evidence.

The primary contributions of the studies are illustrated in Figure 4. As it shows, the bulk of research has focused on project monitoring and forecasting. The studies classified as project monitoring emphasized tracking cost and schedule during implementation. In contrast, studies categorized as

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forecasting focused on predicting final cost and duration.[2] Roughly five percent of the studies provided a state of the art analysis, which mostly consisted of literature reviews on specific topics within EVM. The remaining articles focused on enablers of effective EVM implementation and project performance. The studies categorized as "enablers" often use survey methods to gather perceptual data from EVM users on factors that contribute to effective use of EVM, both in general and within specific industries. Finally, relatively few studies attempted to establish links between EVM usage and improved project performance, such as reduced cost overruns or schedule delays.

Figure 4: Primary contributions

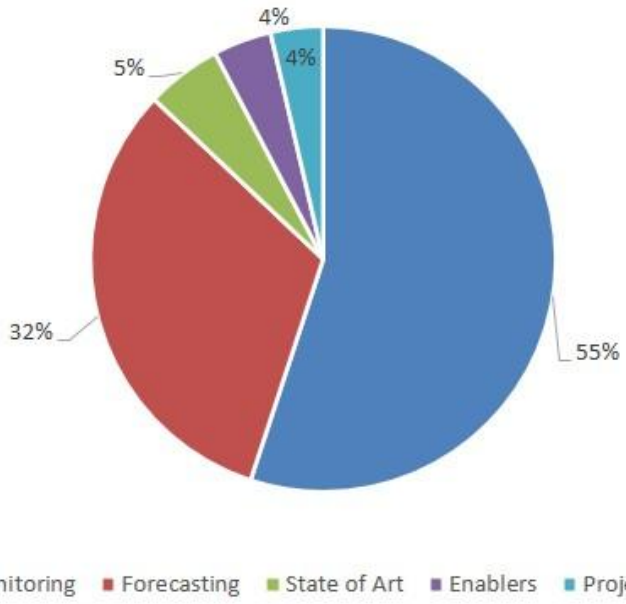


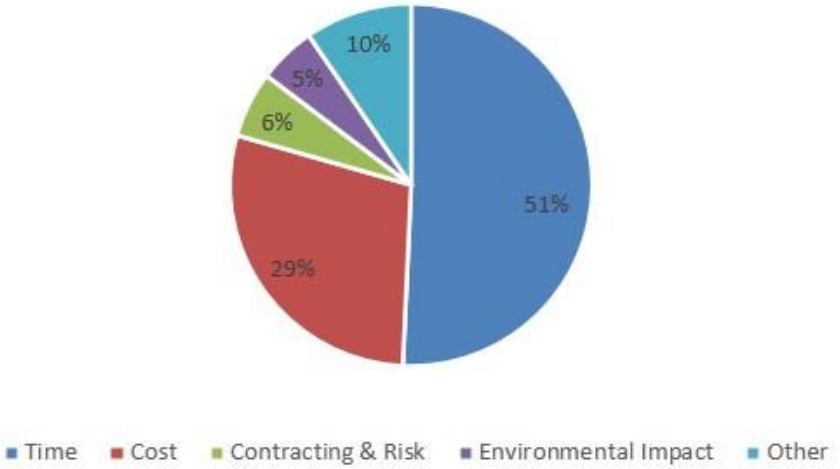
Figure 5 provides further detail on project monitoring studies. As it shows, most studies focused on cost and time monitoring, but a few other interesting areas emerge. The studies dealing with cost and time tend to consider tolerance thresholds, top-down vs. bottoms-up approaches to project control, and how different variations of EVM (ex, earned schedule and earned duration) perform under different circumstances. Some of the papers show how EVM can support contracting and risk management, for example, by informing progress payments and incorporating risks into

[2] Note that when reviewing these figures, some studies offered multiple contributions and others focused on a single area. For example, a study with formal results for project monitoring and forecasting is classified as having two primary contributions whereas a study focusing on just monitoring would have one.

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planning, respectively. The decision was made to group contracting and risk management into one category because the papers themselves often touched on both areas. Figure 5 also shows that some of the papers focused on monitoring the environmental impact of major projects, for example, by tracking greenhouse gas emissions. Noticeably, only a few studies emphasized the incorporation of quality into EVM and how that could be used to evaluate technical performance and inform monitoring. The "other" category is spread out across scope management, communication, and corrective action.

Figure 5: Contributions within project monitoring



Regarding the papers on forecasting, 60 percent focused on duration and the remaining 40 percent considered cost. The papers on forecasting provide an expansive menu of formulas and methodological approaches which are relatively sophisticated. However, given the concerns about sample sizes previously discussed, it could be argued that we have *too many formulas and too few projects*. Another concern is that the complexity of this literature may limit its applicability for the broader project management community. For example, the author recognizes the potential value of Bayesian methods, fuzzy logic, exponential smoothing, and many other innovations for mature organizations. However, it is not clear the extent to which these approaches could be used in many settings because the authors of these papers rarely introduce contextual factors into their work. Furthermore, in many papers, authors do not show statistically significant forecasting improvements with use of more complicated methods.

Research on enablers provides insights into how EVM can be implemented effectively by examining the influence of various factors. For example, studies have examined the effects of

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EVMS maturity, EVM training programs, tailoring, independent reviews of performance baselines, corrective action procedures, information systems, and the relative importance of different subprocesses, among other things (Aramali et al., 2021; Grandage, 2022). Most often, these studies capitalize on the lived experiences of EVM users via survey research and interviews, building upon prior work that has taken the same approach. Ultimately, these studies are valuable because they offer the potential to build large samples encompassing multiple industries or focus on specific settings, which offers the potential to better understand prospects for generalizability and context-specific issues while incorporating practitioner perspectives.

Although these studies offer rich explanations of how EVM can potentially be used effectively, there are a limited number of studies which examine the extent to which EVM improves project performance. Perceptual studies have used Likert scale questions to understand how EVM helps achieve cost and schedule objectives (Grandage, 2022). However, only a few studies have used real project data to analyze the relationship between EVM and project performance (Aramali, Gibson, Asmar, et al., 2024; Aramali, Gibson, Sanboskani, et al., 2024; Aramali et al., 2023; Kose et al., 2024). Aramali and colleagues argue that EVMS maturity contributes to meeting cost objectives, fewer change orders, higher levels of customer satisfaction, and meeting business objectives more often. Kose et al. (2024) found that projects regularly tracked were less likely to be late. These studies represent very useful starting points, but more work is needed in this area to improve our understanding of how EVM contributes to project performance. Of course, it is recognized that the purpose of EVM is not simply to reduce time and cost overruns, but also to facilitate effective communication, inform progress payments, promote accountability, and many other things. However, the empirical case for EVM would be strengthened significantly if future research more clearly illustrates that it contributes to better project performance.

Having given an overview of the current state of EVM research, the discussion section builds on these findings by identifying gaps in the literature and highlighting potential directions for future research.

Discussion

More Attention to Contextual Factors

Overall, EVM research has provided important context on organizational factors and how these support effective implementation. However, given the numerous countries that EVM is practiced within, there is a need to better understand how these cultural and political factors shape practice in these settings. Research on EVM in the U.S. federal government has given serious attention to reform and bureaucracy, but we lack an adequate number of comparative studies. Furthermore, many papers are written without paying attention to how EVM operates from the vantage point of

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different users, specifically, governments, contractors, and consultants. For example, because governments primarily engage in major projects to acquire assets for service delivery, their performance information use can be distinct from contractors who place more emphasis on disciplined cost management. These gaps limit the ability for existing research to provide actionable insights without adequate attention to political realities and the needs of different stakeholders.

More and Better Data

Given that relatively few papers had adequate sample sizes, there is clearly a need for studies that use a greater number of projects. Furthermore, because the majority of studies focused on construction, there is a need for datasets to be created with projects from less explored industries, especially IT. Although perceptual data offers insights into the potential benefits of EVM through surveying and interviewing EVM users, it would help to corroborate these findings with data from real projects. At the most basic level, such datasets would need information on cost and schedule performance, but most importantly, they would need to indicate on a project by project basis whether EVM was used. By using regression analysis, this would allow us to infer whether projects using EVM were less likely to experience cost overruns and schedule delays. A simple binary measure would be a good start, but more robust inference requires that researchers operationalize multiple variables for EVM implementation, similar to Aramali and colleagues.

Agile

More research is needed on agile and EVM. As previously noted, there were less than a dozen studies on IT, and most discuss agile in passing rather than a primary focus. Furthermore, when looking across the other papers, there was very little mention of how EVM could be used for agile styles of project management. Given the popularity of agile approaches to project management, there is a need for researchers to survey practitioners to better understand their experiences using EVM for agile projects, especially within IT where this style of project management is more prominent. This would help shed light on its perceived effectiveness, factors which support effective implementation, and perhaps equally important, why some decide not to use EVM on agile projects and what alternative tools are used.

Artificial Intelligence

Last and certainly not least, there is a relative absence of research on how artificial intelligence (AI) will impact the use of EVM. Therefore, research would benefit from taking stock of the current use of AI for EVM and tracking new developments over time to better understand its potential value. Can it simplify EVM implementation? What types of tasks will AI perform equally or better than humans? Are there any unique risks that should be considered when using this

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technology for EVM? These are just a few of many important questions one could pose about AI. However, the recent growth in the use of AI illustrates the need for EVM research to keep pace with a constantly evolving world.

Conclusion

The EVM body of knowledge has grown to encompass a voluminous collection of practitioner writings, government reports, peer-reviewed journal articles, and several book-length treatments. Each of these sources of knowledge are valuable and should be viewed as complimentary to those seeking a deep understanding of EVM. This paper has provided an up-to-date and comprehensive overview of peer-reviewed publications on EVM.

In taking stock of this work, the conclusions one reaches depends heavily on what type of data sources they value the most and the findings that are considered to be most important. For example, a positive assessment of the literature may point to a plethora of studies that provide guidance for choosing monitoring and forecasting approaches based on unique project characteristics, surveys of practitioners that indicate the potential benefits of EVM and factors contributing to effective implementation, and a handful of studies using real project data which indicate EVM can improve project performance. In contrast, a less positive assessment may argue that the sample sizes are often too small, forecasting studies do not consistently report statistically significant improvements when new methods are introduced, and that too few studies demonstrate that EVM reduces cost or time overruns using real project data.

Like any literature review, this paper has identified a few potential areas of future research. However, it has been written from the perspective that future research needs greater direction from the practitioner community on which areas should be prioritized. Therefore, the concluding portion of the paper is not written to summarize findings and reinforce the analysis. Instead, the author invites the EVM community to offer their perspectives on where things should head next.

The plan is to identify members of the EVM community interested in contributing to this effort and send a formal research invitation to participate in a series of surveys. The first round will ask participants to identify topics they feel are worth pursuing. This will provide information to create a set of categories which will then be ranked by participants in subsequent analysis.

The recruitment of participants is planned to begin in early 2027. If you have any questions about this research, please contact the corresponding author.

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About the Author



Andrew J. Grandage, PhD

North Carolina, USA

Andrew J. Grandage, PhD, is an Associate Professor at Western Carolina University in Cullowhee, North Carolina. His research interests focus on public administration, specifically the nexus of performance management, budgeting, and project management. Recent publications include work on project management in U.S. state governments and capital planning at the local level. Andrew teaches courses on public administration, budgeting, and American government. He earned his PhD from The University of Georgia in Public Administration and Policy with a specialization in Public Budgeting and Financial Management. Prior to his academic career, Andrew worked as a financial analyst at Harris Corporation (now L3Harris Technologies) for several years. Prof Grandage can be contacted at agrandage@email.wcu.edu.

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