Linking Performance Management Systems to Team Performance: Evidence from Knowledge-Intensive Organizations

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ABSTRACT

The effectiveness of performance management systems in knowledge-intensive organizations has become increasingly critical as teams operate under conditions of high complexity and time pressure. This study examines the relationship between performance management systems and team performance by focusing on the role of time efficiency as a key operational mechanism. Using data from 200 projects in knowledge-intensive organizational settings, this study employs logistic regression analysis to assess the impact of agile effectiveness, management satisfaction, and time efficiency on project success. The results indicate that time efficiency has a positive and statistically meaningful effect on the likelihood of project success, whereas agile effectiveness and management satisfaction do not exhibit direct significant effects. Further analyses using predicted probabilities, marginal effects, and distributional evidence provide consistent support for the central role of time efficiency in explaining performance outcomes. These findings contribute to the performance management literature by highlighting that performance improvements are driven less by perceptual aspects of management systems and more by their ability to enhance operational efficiency. The study offers practical implications for managers seeking to design performance management systems that support effective team performance in knowledge-intensive environments.

Keywords Performance Management Systems, Team Performance, Time Efficiency, Knowledge-Intensive Organizations, Project Success

INTRODUCTION

The increasing prevalence of knowledge-intensive organizations has fundamentally transformed how work is organized, coordinated, and evaluated. In such environments, organizational performance depends heavily on teams engaged in complex problem-solving, knowledge creation, and collaborative decision-making. As a result, performance management systems have become a critical managerial tool for aligning individual and team efforts with organizational objectives while maintaining flexibility and innovation [1].

Performance management systems are broadly defined as formal and informal mechanisms used by organizations to set goals, monitor progress, provide feedback, and evaluate performance outcomes [2]. Prior research has consistently emphasized their importance in improving employee motivation, accountability, and overall organizational effectiveness [3]. However, much of the existing literature has focused on perceptual outcomes such as satisfaction with management practices or the adoption of contemporary management approaches, while paying comparatively less attention to the operational mechanisms through which these systems influence performance results [4].

In knowledge-intensive organizational contexts, traditional performance management approaches often face limitations. The dynamic nature of tasks,

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high levels of interdependence among team members, and reliance on specialized expertise reduce the effectiveness of rigid control and evaluation mechanisms [5]. Consequently, scholars have increasingly argued for performance management systems that function as enabling controls, supporting coordination and efficiency rather than constraining professional autonomy [6]. Despite this theoretical shift, empirical evidence identifying the specific pathways through which performance management systems enhance team performance remains limited [7].

One operational mechanism that warrants closer examination is time efficiency. Efficient use of time is particularly critical in knowledge-intensive work, where delays, coordination failures, and inefficient workflows can significantly undermine project outcomes [8]. While prior studies have acknowledged the importance of timely execution and efficient processes, time efficiency has rarely been examined as a central explanatory mechanism linking performance management systems to team performance [9]. This gap limits our understanding of how managerial practices translate into tangible performance outcomes in complex organizational settings [10].

Against this backdrop, the present study seeks to address this gap by examining the relationship between performance management systems and team performance, with a specific focus on time efficiency as an operational mechanism. Using empirical data from projects conducted in knowledge-intensive organizations, this study investigates whether dimensions of performance management systems—namely agile effectiveness, management satisfaction, and time efficiency—are associated with project success. By integrating regression analysis with predicted probabilities, marginal effects, and distributional evidence, this study provides a comprehensive assessment of how performance management systems influence team performance [11].

This study contributes to the literature in several ways. First, it advances performance management research by shifting attention from perceptual evaluations of management systems to concrete operational outcomes. Second, it offers empirical support for the enabling control perspective by demonstrating the central role of time efficiency in driving team performance. Finally, the findings provide practical insights for managers seeking to design performance management systems that enhance performance in knowledge-intensive organizational environments [12].

Literature Review

Performance Management Systems

Performance Management Systems (PMS) are widely recognized as a central component of organizational control and coordination mechanisms. PMS encompasses a set of formal and informal practices designed to define performance expectations, monitor progress, provide feedback, and evaluate outcomes at individual, team, and organizational levels [13]. Through these mechanisms, organizations seek to align employee behaviour with strategic objectives while maintaining accountability and performance consistency [14].

Prior studies have demonstrated that well-designed performance management systems can enhance motivation, clarify roles, and improve overall organizational effectiveness [15]. The effectiveness of PMS, however, is highly contingent on its design and implementation. Research indicates that systems emphasizing goal alignment, continuous feedback, and developmental

evaluation tend to produce more positive behavioural and performance outcomes than those relying primarily on evaluative or control-oriented mechanisms [16].

Performance Management in Knowledge-Intensive Organizations

Knowledge-intensive organizations are characterized by high levels of task complexity, professional autonomy, and reliance on specialized expertise [17]. In such environments, traditional performance management approaches based on standardized metrics and rigid monitoring often prove insufficient to capture the dynamic and collaborative nature of work [18]. As a result, performance management systems must be adapted to support flexibility, learning, and coordination among highly skilled professionals [19].

Scholars increasingly emphasize the importance of performance management systems that function as enabling controls in knowledge-intensive contexts [20]. Enabling control systems are designed to support employees by providing relevant information, facilitating problem-solving, and reducing uncertainty in task execution [21]. Empirical evidence suggests that such systems are more effective in promoting innovation, teamwork, and sustainable performance compared to coercive or compliance-oriented control mechanisms [22].

Team Performance and Project Success

Team performance is a multidimensional construct reflecting a team's ability to achieve task objectives, coordinate effectively, and deliver high-quality outcomes [23]. In project-based and knowledge-intensive organizations, team performance is frequently operationalized through project success, which captures both the attainment of project goals and adherence to time and resource constraints [24].

Previous research identifies a range of factors influencing team performance, including leadership quality, communication effectiveness, task interdependence, and organizational support [25]. Performance management systems are often highlighted as an important contextual factor shaping team behaviour and outcomes [26]. However, empirical findings vary regarding the strength and nature of the relationship between different performance management dimensions and project success, suggesting the need for more nuanced examination of how these systems operate in practice [27].

Time Efficiency as an Operational Dimension

Time efficiency refers to the extent to which tasks and projects are completed within planned schedules while minimizing delays and coordination failures [28]. In knowledge-intensive work settings, time efficiency is particularly critical due to the interdependent nature of tasks and the cumulative impact of delays on overall project performance [29].

Existing studies acknowledge that performance management systems can influence time efficiency by clarifying priorities, improving coordination, and enabling timely feedback [30]. Efficient time management has been associated with improved project outcomes, higher productivity, and better resource utilization [31]. Accordingly, time efficiency represents an important operational dimension through which performance management practices may shape team performance in complex organizational environments [32].

Research Methodology

This study employs a quantitative explanatory research design to examine the relationship between performance management systems and team performance in knowledge-intensive organizations. As illustrated in figure 1, the research follows a structured sequence of steps, beginning with the development of the conceptual framework, followed by data collection, variable measurement, and empirical analysis. A quantitative approach is appropriate because the objective of the study is to empirically test theoretically grounded relationships among variables using statistical modelling.

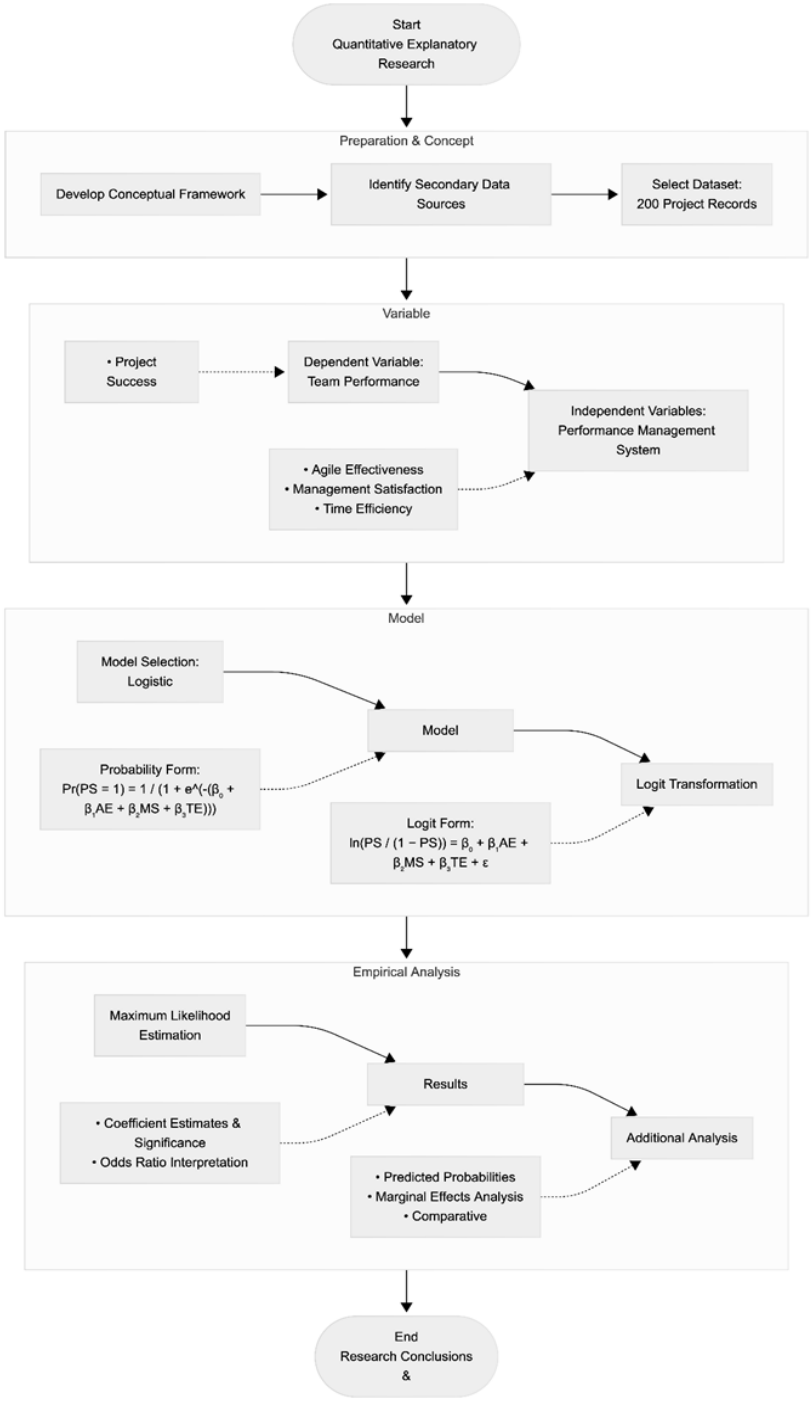

Figure 1 Research Step

Research Design and Data Source

The study utilizes secondary data derived from project-level observations within knowledge-intensive organizational contexts. The dataset consists of 200 project records that capture performance management practices and project outcomes. Knowledge-intensive organizations are defined as organizational settings in which performance is largely driven by specialized expertise, collaborative processes, and non-routine tasks.

Measurement of Variables

The dependent variable in this study is team performance, operationalized as project success. Project success is measured as a binary variable, where a value of one indicates a successful project and zero indicates an unsuccessful project. The independent variables represent key dimensions of performance management systems, namely agile effectiveness, management satisfaction, and time efficiency. Agile effectiveness reflects the extent to which agile-oriented management practices are effectively implemented, management satisfaction captures managerial perceptions of management practices, and time efficiency measures the extent to which project activities are completed within planned schedules with minimal delays.

Model Specification

Given the dichotomous nature of the dependent variable, a logistic regression model is employed to estimate the probability of project success. The logistic regression model is specified as follows:

$$Pr(PS_i = 1) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 AE_i + \beta_2 MS_i + \beta_3 TE_i)}} \quad (1)$$

PS_i denotes the probability of project success for project i, AE_i represents agile effectiveness, MS_idenotes management satisfaction, and TE_i refers to time efficiency. The parameters β_0 to β_3 are coefficients to be estimated.

For estimation purposes, the logistic regression model can also be expressed in its logit (log-odds) form as follows:

$$ln\ ln\left(\frac{PS_i}{1 - PS_i}\right) = \beta_0 + \beta_1 AE_i + \beta_2 MS_i + \beta_3 TE_i + \varepsilon_i \quad (2)$$

Result

This section reports the empirical findings of the study. It begins with descriptive statistics, followed by the results of the logistic regression analysis and graphical illustrations that further explain the relationship between performance management systems and team performance in knowledge-intensive organizations.

Descriptive Statistics

Table 1 presents the descriptive statistics of all variables included in the analysis. The dataset comprises 200 observations. The independent variables—Agile Effectiveness, Management Satisfaction, and Time Efficiency—exhibit mean values above the scale midpoint, indicating that

performance management practices are generally perceived as moderately to highly implemented within the sampled organizations. The dependent variable, Project Success, shows a mean value of 0.49, suggesting a relatively balanced proportion between successful and unsuccessful projects.

Table 1 Descriptive Statistics of Study Variables

Variable	Mean	Std. Dev.	Min	Max
Agile Effectiveness	3.58	1.12	2.00	5.00
Management Satisfaction	3.56	1.14	2.00	5.00
Time Efficiency	3.46	1.17	2.00	5.00
Project Success	0.49	0.50	0.00	1.00

The observed standard deviations indicate that the variables exhibit adequate dispersion across observations. This level of variability suggests that the data capture meaningful differences in respondents' perceptions and project outcomes. Such variation is essential to ensure that the relationships among variables can be statistically identified. Therefore, the dataset is considered suitable for multivariate regression analysis.

Logistic Regression Analysis

Given the binary nature of the dependent variable (Project Success), logistic regression analysis was employed to examine the relationship between performance management system dimensions and team performance. The regression results are reported in table 2.

Table 2 Logistic Regression Results

Variable	Coefficient	Std. Error	z-value	p-value
Constant	-0.425	0.707	-0.601	0.548
Agile Effectiveness	-0.053	0.129	-0.412	0.680
Management Satisfaction	-0.067	0.127	-0.530	0.596
Time Efficiency	0.235	0.125	1.887	0.059

The results indicate that Time Efficiency has a positive and marginally significant effect on project success ($p < 0.10$). This finding suggests that teams operating under more time-efficient performance management systems are more likely to achieve successful project outcomes. In contrast, Agile Effectiveness and Management Satisfaction do not demonstrate statistically significant relationships with project success.

Predicted Probability of Project Success

To facilitate interpretation of the regression results, predicted probabilities of project success were calculated across different levels of Time Efficiency, while holding other independent variables at their mean values. The results are illustrated in figure 2.

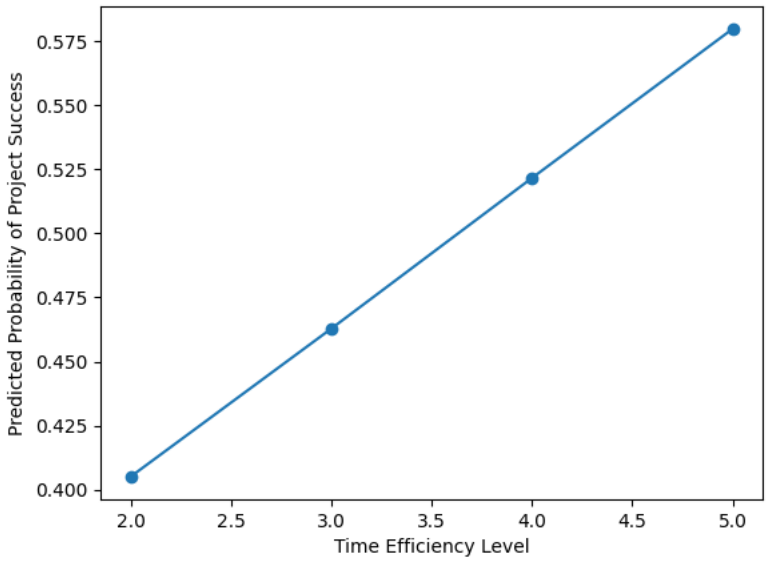

Figure 2 Predicted Probability of Project Success across Time Efficiency Levels

Figure 2 shows a monotonic increase in the probability of project success as time efficiency improves. This pattern indicates that even incremental gains in time efficiency can meaningfully enhance the likelihood of successful project completion, reinforcing the substantive importance of this variable.

Marginal Effects of Performance Management Dimensions

To assess the relative influence of each performance management dimension, marginal effects were estimated for all independent variables. This approach allows for a more intuitive interpretation of the magnitude of each variable's impact on project success. The estimated marginal effects were then visualized to facilitate comparison across dimensions. The results are presented in figure 3.

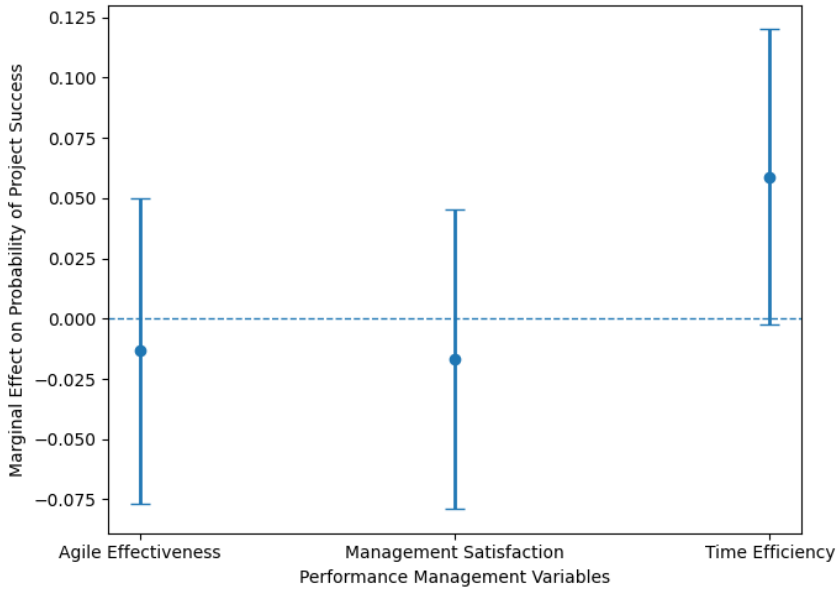

Figure 3 Marginal Effects of Performance Management Variables on Project Success

Figure 3 demonstrates that Time Efficiency exhibits the strongest positive marginal effect on project success, whereas the marginal effects of Agile Effectiveness and Management Satisfaction remain close to zero. This suggests that operationally oriented aspects of performance management systems exert a more direct influence on team performance than perceptual or evaluative components.

Distribution of Project Success by Time Efficiency

To further substantiate the regression findings, the distribution of project success outcomes across varying levels of time efficiency was examined. This analysis provides descriptive evidence that complements the model-based results. By illustrating how success and failure are distributed at each efficiency level, the analysis offers additional insight into the underlying pattern of the data. The results of this distributional analysis are presented in figure 4.

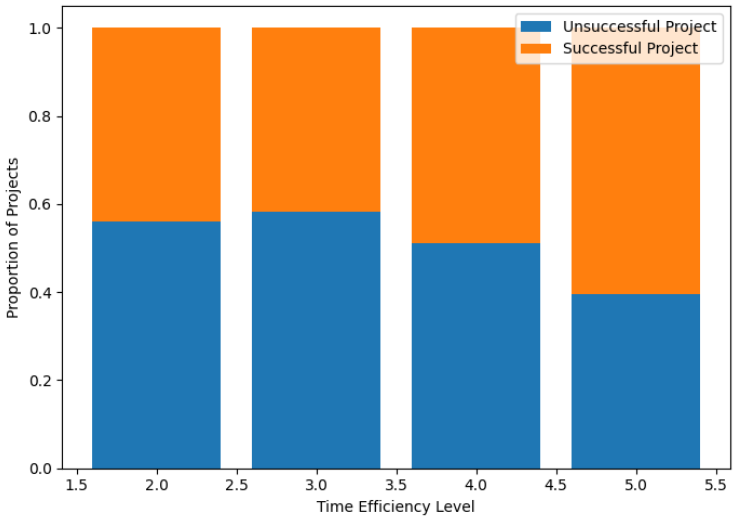

Figure 4 Distribution of Project Success across Time Efficiency Levels

Figure 4 reveals a clear shift in outcome distribution as time efficiency increases. Lower levels of time efficiency are associated with a higher proportion of unsuccessful projects, whereas higher levels correspond to a greater share of successful projects. This distributional evidence complements the regression analysis by illustrating that the observed relationship is not only statistically detectable but also practically meaningful.

Summary of Results

Overall, the results indicate that performance management systems contribute to team performance primarily through improvements in time efficiency. While perceptions of agile effectiveness and management satisfaction are relevant organizational attributes, they do not directly translate into project success unless they are accompanied by tangible efficiency gains in work processes.

Discussion

This study examines the relationship between performance management systems and team performance in knowledge-intensive organizations, with particular attention to the role of time efficiency as an operational mechanism.

The results provide several important insights that extend the existing literature on performance management and organizational performance.

First, the findings demonstrate that time efficiency plays a central role in explaining project success, as evidenced by the logistic regression results, predicted probability analysis, and distributional patterns. The positive and marginally significant effect of time efficiency suggests that performance management systems contribute to team performance primarily when they translate managerial practices into tangible improvements in workflow execution. This supports the perspective that performance management systems function most effectively as enabling controls, facilitating coordination and reducing inefficiencies rather than merely monitoring outcomes.

Second, the lack of statistically significant effects for agile effectiveness and management satisfaction indicates that perceptual or symbolic aspects of performance management alone are insufficient to drive successful project outcomes. While these dimensions may shape employees' attitudes and perceptions, the results suggest that such factors do not directly enhance team performance unless they are accompanied by concrete efficiency gains. This finding aligns with prior research emphasizing that knowledge-intensive work requires flexible yet execution-oriented management systems that support timely decision-making and task completion.

Third, the marginal effects analysis reinforces the relative importance of time efficiency compared to other performance management dimensions. As illustrated in figure 3, time efficiency exhibits the largest substantive impact on the probability of project success, whereas the effects of agile effectiveness and management satisfaction remain close to zero. This highlights an important mechanism-based explanation: performance management systems influence outcomes not through abstract managerial qualities, but through their capacity to improve operational efficiency.

Finally, the distributional evidence presented in figure 4 provides robust, model-independent support for the regression findings. The clear shift toward a higher proportion of successful projects at higher levels of time efficiency indicates that the observed relationship is not driven solely by statistical modelling assumptions. Instead, it reflects a consistent empirical pattern observable at both inferential and descriptive levels. Collectively, these findings suggest that time efficiency constitutes a key pathway linking performance management systems to team performance in knowledge-intensive organizational contexts.

Conclusion

This study investigates how performance management systems are linked to team performance in knowledge-intensive organizations, with a particular focus on operational efficiency. Using logistic regression, marginal effects analysis, and distributional evidence, the study provides empirical support for the argument that time efficiency is the primary mechanism through which performance management systems enhance project success.

The findings contribute to the performance management literature by moving beyond broad evaluations of managerial effectiveness and satisfaction, and by identifying a concrete operational pathway that explains performance outcomes. By highlighting the central role of time efficiency, this study reinforces the view

that effective performance management systems should prioritize enabling structures that streamline workflows, reduce delays, and support timely execution of tasks in complex and knowledge-driven environments.

From a managerial perspective, the results suggest that organizations should focus less on formal or symbolic performance management practices and more on how these systems are implemented in daily operations. Managers are encouraged to design performance management systems that emphasize clear timelines, efficient coordination, and rapid feedback loops, as these elements are more likely to translate into successful team outcomes.

Despite its contributions, this study has limitations. The analysis relies on cross-sectional data, which limits causal inference, and the measurement of team performance is based on project success as a binary outcome. Future research could employ longitudinal designs, incorporate alternative performance indicators, or examine moderating factors such as task complexity or organizational culture to further refine the understanding of how performance management systems operate in knowledge-intensive organizations.

Declarations

Author Contributions

Conceptualization: K.A.Z. and K.N.P.; Methodology: K.N.P.; Software: K.A.Z.; Validation: K.A.Z. and K.N.P.; Formal Analysis: K.A.Z. and K.N.P.; Investigation: K.A.Z.; Resources: K.N.P.; Data Curation: K.N.P.; Writing Original Draft Preparation: K.A.Z. and K.N.P.; Writing Review and Editing: K.N.P. and K.A.Z.; Visualization: K.A.Z.; All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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Informed Consent Statement

Not applicable.

Declaration of Competing Interest

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

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