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A COGNITIVE MODEL FOR ANALYSING AND MONITORING TEAM PERFORMANCE IN PROJECT MANAGEMENT: PART 1

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ABSTRACT: Performance assessment in project management has traditionally relied on indicators such as time, cost and quality; however, these provide only a limited perspective on the factors that influence the work of project teams. The purpose of this study is to develop a conceptual model based on the Cognitive Load Index for assessing the cognitive load experienced by team members. The research is based on a review of the literature on project management and cognitive load theory, which identified five relevant cognitive variables: perceived stress, mental fatigue, multitasking, ability to concentrate and task clarity. These variables are integrated into a single index designed to complement traditional indicators used to assess project performance. The proposed model provides a conceptual framework for incorporating cognitive dimensions into team performance assessment and highlights the importance of monitoring cognitive load in complex projects. The results provide a basis for the model's subsequent validation and development in organisational contexts.

KEYWORDS: project management; team performance; Cognitive Load Index; cognitive load; performance assessment; project teams.

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1. INTRODUCTION

In recent years, project management has become one of the principal means by which organisations implement their strategic objectives and adapt their operations to the requirements of a continuously changing environment. Regardless of the field, projects are characterised by increasing complexity, shorter delivery times and growing volumes of information that must be processed within limited periods. Under these conditions, project team performance can no longer be analysed solely in terms of outcomes; it must also be considered in relation to team members' ability to respond to the cognitive demands generated by project activities. In contemporary project management, success has historically been measured using a rigid triad: time, budget and scope. However, the complexity of present-day projects has shown that, although necessary, these traditional indicators are no longer sufficient and provide too little real-time insight into team performance.

Project work requires fast decision-making, the simultaneous management of several tasks, continuous collaboration among team members and ongoing adaptation to changes that arise during implementation. These requirements may increase stress, cause mental fatigue and reduce the ability to concentrate, with direct effects on decision-making and the quality of the outcomes achieved. In many cases, cognitive overload is not identified in time, and its effects are reflected in errors, lower productivity, communication difficulties and delays in completing planned activities.

Although organisations continuously monitor indicators such as delivery time, costs and the degree to which activities have been completed, few tools are available for systematically assessing the cognitive factors that influence project team performance. In practice, the cognitive state of team members is usually assessed subjectively, without a tool that coherently integrates the main dimensions affecting individual and collective performance. In this context, developing assessment methods which complement traditional indicators is relevant to both research and project management practice.

In response to this need, this article proposes the development of a conceptual model for assessing project team performance by integrating the cognitive factors that influence project activities. The model is based on the construction of a Cognitive Load Index, conceived as a composite indicator capable of reflecting the cognitive demands experienced by team members. It incorporates perceived stress, mental fatigue, ability to concentrate, multitasking and task clarity, all of which are considered relevant to the performance of project activities.

The research is conceptual and is grounded in a critical analysis of the literature on project management, performance assessment and cognitive load theory. Based on the evidence identified in the literature, a framework is proposed for integrating these dimensions into a single index that may support the analysis of team performance in complex projects.

The article's contribution consists in proposing an assessment model that complements traditional approaches based on operational indicators by introducing a perspective focused on the cognitive factors that influence the work of project teams.

2. LITERATURE REVIEW

Project management is defined as the process of planning, organising, directing and controlling the phases and resources of a project in order to achieve a well-defined objective, typically subject to time, resource and cost constraints. Its role is to steer the project so as to maintain, at all times, a balance between the usually conflicting requirements relating to project performance, costs and completion time. Ensuring project success entails efficiently delivering a product or service that complies with performance requirements and making it available to the client as quickly as possible [1].

Team performance in project management is a central area of contemporary research at the intersection of organisational theory, organisational behaviour and project management. The literature emphasises that project success is strongly influenced by team dynamics, internal cognitive and social processes, and the way in which resources are coordinated to achieve the established objectives. Project team performance is treated as a multidimensional construct comprising both objective outcomes, such as adherence to deadlines, budgets and technical specifications, and internal team processes, including coordination, communication, cohesion and collective learning. Pavez et al. conducted a systematic review that theorises project team performance via integrating technical and behavioural dimensions, emphasising that performance cannot be reduced solely to traditional time-cost-quality indicators but must also be understood in terms of the emergent processes within the team [2].

In project management, performance has long been assessed using three fundamental indicators: time, cost and quality. This approach exhibits the operational dimensions of project efficiency. Although the concept of performance is now much broader, these indicators stay essential for controlling and monitoring project execution. Team dynamics and the increasing complexity of project outcomes and indicators have demonstrated that performance cannot be assessed solely against the essential criteria of compliance with deadlines, budgets and quality standards.

Recent research shows that project success is also influenced by a range of complementary factors, including stakeholder satisfaction, the added value perceived within the organisation, effective collaboration among team members, the ability to adjust to unforeseen changes in the internal and external environment, and the long-term sustainability of outcomes. In this context, project performance assessment requires a multidimensional approach that builds on traditional criteria by incorporating strategic, organisational, relational and human dimensions. Such an approach can contribute significantly to maximising performance and, consequently, to project success.

Recent studies [3] show that digitalisation, virtual collaboration tools and AI-based employee engagement platforms are necessary for geographically dispersed research teams to remain productive. Emotion-recognition software and AI-based resource-planning systems can help managers understand how their teams function and take early action to improve personnel well-being [4].

Table 1. Main cognitive factors identified in the literature [1], [2], [3].

Variable	Role in the CLI	Rationale for inclusion
Stress	Measures pressure	Influences decision-making
Mental fatigue	Cognitive capacity	Reduces performance
Multitasking	Attentional fragmentation	Increases load
Concentration	Cognitive efficiency	Reduces errors
Task clarity	Understanding of activities	Reduces demands

The data summarised in Table 1 highlight the gradual shift in how project performance is defined and assessed. Whereas traditional models focused primarily on compliance with operational constraints, recent research suggests a wider approach in which project success is also associated with value creation, stakeholder satisfaction, team development and the capacity to adapt to change. This development demonstrates that performance can no longer be analysed solely through outcome indicators; dimensions reflecting how teams manage the complex demands of projects must also be included.

Schedule performance can be assessed by examining adherence to the planned overall duration, deviations from the Gantt chart, Schedule Variance and the Schedule Performance Index within Earned Value Management [7]. Cost reflects the project's ability to use financial resources within the approved budget. Financial performance serves as a direct indicator of resource-use efficiency and managerial discipline. Budget overruns may affect profitability, reduce shareholder confidence and compromise organisational sustainability.

Cost performance is measured using Cost Variance, the Cost Performance Index, earned value analysis and comparisons between actual and planned costs. Quality may be assessed using defect rates, the number of revisions, the degree of compliance, user feedback and quality audits. A project completed on time and within budget but producing poor-quality deliverables cannot be considered successful. Quality therefore reflects project effectiveness, not merely efficiency. The three indicators are closely interconnected: a change in one inevitably affects the others. These indicators primarily capture execution effectiveness rather than the project's strategic value or long-term impact. Contemporary literature shows that a project may satisfy the three constraints yet fail from other perspectives. Time, cost and quality therefore provide the basis for performance assessment, but they must be integrated into a broader perspective [5].

Performance assessment in project management has advanced considerably in recent decades. As projects have become more complex and more strategically integrated within organisations, performance assessment has also begun to include strategic, organisational and behavioural dimensions. The focus has therefore expanded from sole compliance with operational constraints to an analysis of the value generated, stakeholder satisfaction and contributions to organisational objectives.

Although traditional performance indicators remain important tools for monitoring projects, the literature indicates that they mainly capture execution outcomes and provide limited information about the mechanisms that produce those outcomes. In practice, two projects may meet the same time, cost and quality objectives yet differ significantly in terms of team collaboration, decision-making or adjustability to change. Recent research has therefore proposed models that broaden the perspective on performance by including the organisational and behavioural processes that influence project team activities.

One of the most robust and widely used conceptual models for explaining team performance is the Input–Mediator–Outcome model (Figure 1), which was developed in the organisational behaviour literature and subsequently adapted to project management. The model provides a systems perspective on how teams function and explains why some teams achieve superior results while others perform less well despite having similar resources [8]. It is based on the premise that performance is not an accidental outcome, but the consequence of a logical and dynamic relationship among three categories of variables: inputs, mediators and outcomes.

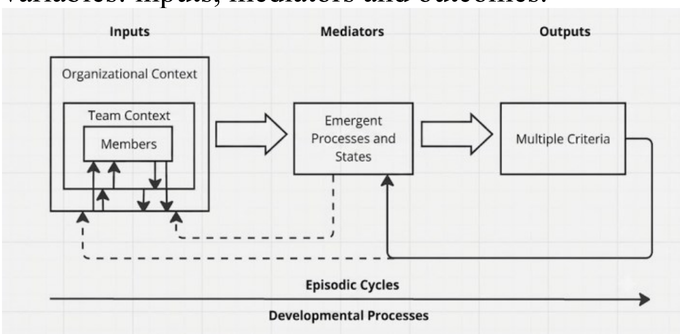

Figure 1. Input-Mediator-Output Model

Figure 1 shows that team performance is determined not only by the available resources or the individual competencies of team members, but also by the processes that occur as activities are carried out.

Inputs, represented by team characteristics, members' experience, available resources and the organisational context, influence how the team interacts and manages project tasks. However, these elements do not generate performance directly; they operate through internal processes and mechanisms known as mediators, which include collaboration, communication, activity coordination, decision-making and conflict management. The quality of these processes ultimately determines the team's outcomes and the level of project performance.

An important feature of the model is its changing nature. The relationships among inputs, mediators and outcomes are neither linear nor static; they evolve throughout the project life cycle. Changes in team structure, the emergence of new requirements, shifting priorities or increasing deadline pressure may influence internal processes and, consequently, team performance. Performance assessment therefore cannot be limited to final outcomes; it must also consider the factors that influence how the team performs its work. Effective management of cognitive factors can have a significant contribution to decreasing errors, achieving objectives and creating the conditions required for improved performance.

In modern projects, which are characterised by high complexity, task interdependence and constant pressure on delivery time, cognitive demands become a critical determinant of performance. Team members are often required to manage several activities simultaneously, process large volumes of information and make decisions within short periods. These conditions may lead to mental overload, affecting attention, reaction time and coordination. According to cognitive load theory, individual performance depends on the relationship between task demands and the cognitive system's limited capacity to process information [9].

Cognitive load theory holds that working memory has limited capacity and that performance efficiency declines when this capacity is exceeded. In complex work environments, such as project teams, cognitive overload may result in errors, communication difficulties and poorer decision quality. Studies in cognitive ergonomics and human performance show that high levels of mental workload are associated with lower operational performance and a greater probability of errors [10]

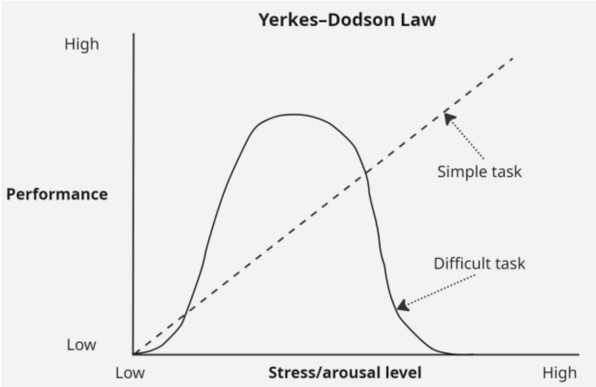

Figure 2. Yerkes–Dodson Law

The relationship between psychological arousal and performance was described in the classic research conducted by Yerkes and Dodson, who showed that performance improves up to a certain level of demand and then begins to decline. This relationship, represented by an inverted U-shaped curve (Figure 2), indicates an optimal level of mental demand at which performance is highest, whereas both overload and underload may result in poorer performance [11]. In project settings, this relationship explains why teams under excessive pressure may produce weaker results even when sufficient resources are available.

The Yerkes–Dodson model provides an important theoretical rationale for including cognitive dimensions in project team performance assessment. It shows that performance is influenced not only by technical competencies and available resources, but also by the level of psychological demand experienced by team members. In complex projects, the early identification of high cognitive load may help prevent performance deterioration before it manifests as delays, budget overruns or reduced deliverable quality. From this perspective, monitoring cognitive factors can complement traditional project management indicators and support project managers' decision-making.

Stress is an important factor influencing team performance. Moderate stress may have a positive effect by increasing mobilisation and concentration, whereas high stress impairs decision-making and reduces collaborative efficiency. Research on team management indicates that high stress adversely affects communication and increases the frequency of conflict within project teams [12]. Multitasking is another relevant feature of project team activity. In many situations, team members must work on several tasks simultaneously, attend meetings, communicate with other members and resolve unforeseen problems. Studies of performance under multitasking conditions show that frequent switching of attention between tasks reduces efficiency and increases the time required to complete activities. In complex projects, this may lead to delays and poorer outcomes even when the initial plan is sound. Research in cognitive psychology indicates that multitasking may increase error rates by approximately 20-30% [13]. Task clarity is another cognitive factor with a direct impact on team performance. A lack of clarity in task definition creates major structural friction that is often mistakenly attributed to personality problems. Incomplete role definitions create overlapping responsibilities, decision-making bottlenecks caused by insufficient autonomy, and a risk that critical projects will be abandoned. Conversely, clear success metrics and an explicit definition of each person's area of responsibility reduce stress and role ambiguity, help prevent burnout and increase team member engagement [14]. Studies of team effectiveness show that insufficient clarity may reduce performance by approximately 20-25%, increase perceived stress and extend completion times [15]. The precise definition and allocation of responsibilities is another factor influencing team performance, affecting both the efficiency of organisational processes and team members' involvement and satisfaction [14].

Other cognitive factors, such as mental fatigue and difficulty concentrating, may also affect these processes and reduce performance even in well-prepared teams. The ability to concentrate is essential when teams face complex tasks, interruptions, mental fatigue, the need to make time-critical decisions and deadline pressure, all of which also affect team performance [16]. Studies show that after four to six hours of intensive cognitive activity, performance may decline by 15-25% and decision accuracy may decrease [17].

The literature review shows that project performance is approached from multiple perspectives, but most existing models focus on project outcomes or organisational processes. Although numerous studies examine stress, mental fatigue, multitasking, task clarity and ability to concentrate separately, these variables have not been integrated into a composite indicator capable of assessing team members' overall cognitive load. This limitation supports the development of a Cognitive Load Index that can complement existing models by incorporating cognitive dimensions relevant to project management.

3. RESEARCH METHODOLOGY

This research adopts a qualitative approach grounded in an analysis of the literature on project management, cognitive ergonomics and organisational performance. The methodology seeks to identify the relationship between cognitive factors and project team performance and to develop a conceptual model capable of integrating these variables into an applied tool for monitoring and decision support.

The research was conducted in several stages. The first stage comprised a theoretical review based on a critical analysis of the literature on project management performance, cognitive load theory, occupational stress, multitasking and the relationship between cognitive demands and the effectiveness of team activities. The literature review enabled the identification of the principal cognitive factors influencing performance and provided the conceptual foundation for the proposed model.

The second stage involved conceptualising an integrated cognitive model for analysing team performance. Based on the evidence drawn from the literature, the cognitive variables relevant to assessing mental workload were selected: stress, mental fatigue, multitasking, ability to concentrate and task clarity. These variables were integrated into a composite indicator termed the Cognitive Load Index, which is used to quantify the cognitive demands experienced by team members.

4. DEVELOPMENT OF THE COGNITIVE LOAD INDEX

Performance assessment in project management can be improved by incorporating indicators that reflect the cognitive state of team members. Traditional indicators provide information about outcomes but do not always explain the causes of problems that arise during a project.

Moving from reactive management to a predictive and empathetic approach requires the development of tools capable of monitoring performance beyond conventional indicators. This study proposes a cognitive model for analysing and monitoring team performance and explores how goal clarity and a learning climate can support flexibility and adaptive performance at both individual and collective levels.

To enable an objective analysis of the team's mental state, a composite indicator termed the Cognitive Load Index is defined. Its purpose is to quantify overall mental workload by combining several cognitive variables relevant to project team activities. The variables used are stress, mental fatigue, multitasking, ability to concentrate and task clarity. They were selected on the basis of studies in cognitive ergonomics and human performance showing that these variables directly influence the efficiency of activities performed under demanding conditions [4].

Only cognitive variables are used to calculate the Cognitive Load Index because they describe the mental state of team members. Performance variables, such as meeting deadlines, deliverable quality and the level of collaboration, are not included in the index formula because they represent the final outcomes of the activity. In accordance with the IMO model, the team's cognitive state acts as a mediator between project demands and the performance achieved, and the Cognitive Load Index is used to describe this intermediate state.

To determine the index value, each cognitive variable is assessed on a numerical scale and the resulting values are combined using an aggregation formula. In the proposed model, variables that increase mental workload, such as stress, fatigue and multitasking, contribute positively to the index, whereas variables that reduce it, such as ability to concentrate and task clarity, contribute negatively.

The Cognitive Load Index is defined as follows:

$$\mathrm{CLI} = \mathrm{w}_1 \times \mathrm{S} + \mathrm{w}_2 \times \mathrm{O} + \mathrm{w}_3 \times \mathrm{M} - \mathrm{w}_4 \times \mathrm{C} - \mathrm{w}_5 \times \mathrm{Cl} \qquad (1)$$

where:
CLI – Cognitive Load Index
S – stress level
O – mental fatigue
M – multitasking
C – ability to concentrate
Cl – task clarity
$w_1 \ldots w_5$ – variable weighting coefficients

To ensure model consistency and the correct interpretation of how the variables influence the Cognitive Load Index, their direction must be aligned. Stress, mental fatigue and multitasking are defined so that higher values directly increase the index. By contrast, ability to concentrate and task clarity have an inverse effect and reduce mental workload. To integrate these variables consistently into the calculation, their values are transformed so that lower levels of concentration and task clarity increase the index. All variables are thus expressed in a form in which higher values indicate greater cognitive load, allowing their consistent aggregation within the CLI.

$$\mathrm{CLI} = \mathrm{w}_1 \times \mathrm{S} + \mathrm{w}_2 \times \mathrm{O} + \mathrm{w}_3 \times \mathrm{M} + \mathrm{w}_4 \times \mathrm{C}' + \mathrm{w}_5 \times \mathrm{Cl}' \qquad (2)$$

where:

$$C' = 6 - C \qquad (3)$$

$$Cl' = 6 - Cl \qquad (4)$$

Because all cognitive variables are assessed on a five-point Likert scale (1-5), the ability to concentrate and task clarity variables are transformed using the relationship $x' = 6 - x$. The constant 6 is one unit greater than the maximum value on the scale and reverses the direction of the variables, so that a high concentration or clarity score is converted into a low cognitive-load value. Following this transformation, all variables included in the Cognitive Load Index have the same direction: higher values indicate greater cognitive demand, facilitating consistent aggregation and interpretation of the index.

The model identifies situations in which the level of demand is optimal, as well as those involving a risk of overload or underload, both of which may adversely affect decision quality, adherence to deadlines and the effectiveness of team collaboration.

Table 2. Operational interpretation of the cognitive load index

Project situation	CLI value	Interpretation	Managerial action
Relaxed team	[1 - 2)	Underload	Increase engagement
Balanced level	[2 - 3.5]	Optimal	Maintain working conditions
Overload	(3.5 - 5]	Risk	Reduce workload

To facilitate the model's practical use, index values are interpreted using intervals that represent different levels of cognitive demand (Table 2). The interval [1, 2) corresponds to a low level of demand characterised by limited pressure and engagement. Although the risk of overload is minimal in this situation, team performance may be affected by insufficient mobilisation and engagement in project activities.

The interval [2, 3.5] is considered optimal because it reflects a balance between project demands and team members' cognitive capacity. Within this interval, demand is sufficient to stimulate concentration and engagement without generating excessive fatigue or high stress. Team performance therefore reaches its highest level.

The interval (3.5, 5] indicates a high level of cognitive demand associated with mental overload. Under these conditions, team members may find it difficult to maintain concentration, and errors and poorer decision quality may occur, resulting in lower overall performance.

To improve the interpretation and practical use of the results, the index value is linked to a visual signalling system based on colour codes. An optimal level of cognitive demand, corresponding to a balanced state and high performance, is shown in green. A moderate index level, indicating a possible increase in demand and the need for monitoring, is shown in yellow. When the index reflects high cognitive load associated with a risk of poorer performance, errors or coordination difficulties, the result is shown in red.

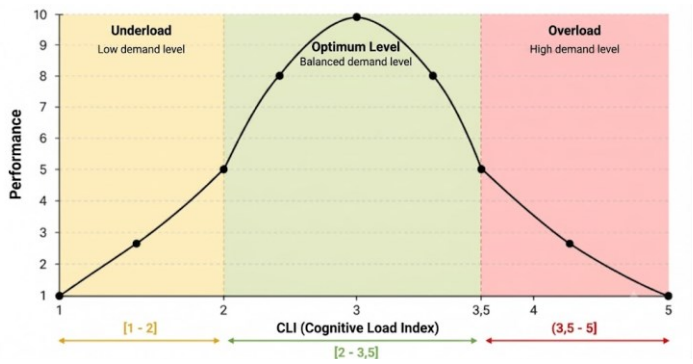

Figure 3. The relationship between the cognitive load index and team performance

Figure 3 illustrates the non-linear relationship between the Cognitive Load Index and team performance, following the inverted U-shaped curve described by the Yerkes–Dodson law. Performance increases with cognitive demand until it reaches an optimum around CLI ≈ 3, after which it begins to decline as demand becomes excessive.

The central area, shown in green, corresponds to the optimal level of demand, where the balance between project requirements and the team's cognitive capacity results in high performance. The yellow intervals indicate transition zones in which the level of demand must be monitored because of the risk of progression towards either overload or underload.

The red areas correspond to extreme index values associated with either low engagement or cognitive overload, both of which reduce team performance. The graph therefore confirms the existence of an optimal cognitive-load interval and supports the use of the CLI as a performance-monitoring tool in project management.

Table 3 provides an example of a CLI calculation in which the weighting coefficient is held constant at 0.2 for each variable.

Table 3. Calculation example for the CLI

No.	W	S	O	M	C	Cl	CLI
1	0.2	1	2	2	4	5	1.6
2		3	2	4	3	2	3.2
3		4	5	4	2	1	4.4

The value 1.6 falls within the interval [1, 2), corresponding to cognitive underload. This result indicates a low level of mental workload, suggesting that the user is not exposed to a high volume of tasks or substantial cognitive pressure. Although this situation reduces the risk of overload and burnout, an excessively low level of demand may lead to reduced engagement, poorer attention and lower long-term performance. Increasing involvement in activities or allocating additional tasks is recommended to reach an optimal operating range.

The value 3.2 falls within the interval [2, 3.5], corresponding to an optimal level of cognitive demand. This result indicates that the user is in a balanced range where mental workload is sufficiently high to sustain attention and engagement without producing significant adverse effects on performance. Within this range, the user can effectively manage project tasks and deadlines while maintaining an appropriate level of concentration and productivity. According to the principle described by the Yerkes–Dodson law, this interval is associated with maximum performance and effective team functioning.

The value 4.4 falls within the interval (3.5, 5], corresponding to cognitive overload. This result indicates a high level of mental workload associated with increased stress, mental fatigue and difficulty concentrating. The user's performance may be substantially affected, with an increased risk of errors, reduced efficiency and cognitive exhaustion. The value suggests a need for managerial interventions, such as reallocating tasks, reducing workload or prioritising activities, to reduce the level of cognitive demand.

The weighting coefficients provide flexibility by allowing the influence of each cognitive variable to be adjusted according to its relative importance within a specific project or working environment. In the simplified version of the proposed model, all coefficients are assigned equal values, assuming that each variable contributes equally to the overall cognitive load. However, the model has been designed to support the modification of these coefficients whenever a particular activity requires greater emphasis on specific cognitive factors. For example, in projects characterised by strict deadlines, the stress level may receive a higher weight, whereas in projects involving prolonged analytical work, mental fatigue or concentration may become more significant.

This adaptable weighting mechanism increases the applicability of the model across different organisational contexts and professional domains. As a result, the Cognitive Load Index can be calibrated to better reflect the real cognitive demands experienced by employees performing different types of tasks. Such flexibility enables project managers to obtain a more representative assessment of workload and to make decisions based on the characteristics of their teams rather than relying on a fixed evaluation model.

The use of a synthetic cognitive-load index also facilitates the comparison of different work situations, employees, and assessment periods through a single quantitative measure. By monitoring changes in the CLI over time, managers can identify trends in cognitive workload and detect periods during which employees may be approaching excessive mental strain. These observations can then support preventive interventions, such as task redistribution or workload adjustment, before performance begins to decline.

Furthermore, the calculated CLI can be correlated with project performance indicators, including productivity, task completion time, quality of deliverables, or error rates. This relationship enables organisations to analyse how cognitive factors such as stress, mental fatigue, multitasking, concentration, and task clarity affect both individual and team performance. Consequently, the proposed index serves not only as a measurement tool but also as a decision-support instrument for improving workload management and promoting sustainable team performance.

5. CONCLUSIONS

Performance assessment in project management is a complex process that can no longer be based exclusively on the traditional indicators of time, cost and quality. The literature review conducted in this study shows that team performance is also influenced by cognitive factors affecting decision-making, collaboration and team members' ability to respond to project demands. In this context, incorporating cognitive dimensions into performance assessment can provide a more comprehensive perspective on how teams carry out their work. In response to this need identified in the literature, the study proposes the development of a conceptual model based on the Cognitive Load Index. The indicator integrates five variables considered relevant to describing the cognitive demands experienced by team members: perceived stress, mental fatigue, multitasking, ability to concentrate and task clarity. By aggregating these variables into a single index, the model offers a means of estimating cognitive load and complements the information provided by traditional project management indicators.

The principal contribution of this research is the theoretical foundation of a conceptual tool for monitoring the cognitive load of project teams. Unlike existing models, which analyse cognitive factors separately or focus on project outcomes, the proposed model integrates these factors into a composite indicator capable of supporting team performance assessment from a complementary perspective.

Moving from reactive management to a predictive and empathetic approach requires tools that can support performance monitoring beyond conventional indicators. Accordingly, the central aim of this research is to develop a conceptual model based on the Cognitive Load Index, an innovative tool for assessing the cognitive load experienced by team members. Unlike traditional performance metrics, which primarily evaluate outcomes after tasks have been completed, the proposed model focuses on identifying cognitive conditions that may influence performance before productivity declines. By integrating multiple cognitive dimensions into a single measurable indicator, the model provides managers with a more comprehensive understanding of employees' mental workload. This approach enables the early detection of excessive cognitive demands, allowing timely interventions such as workload redistribution or task prioritisation. Furthermore, the proposed framework promotes a more human-centred project management strategy by considering employees' cognitive well-being alongside organisational objectives. Ultimately, the Cognitive Load Index is intended to support more informed decision-making, improve resource allocation, and contribute to both sustainable team performance and employee well-being.

The fundamental value of this approach lies in its applied nature: the results indicate that the conceptual model need not remain an abstract theory but can be implemented as a software solution. This lays the foundations for a functional application designed to support project managers directly in monitoring cognitive load and making informed decisions about team management, while also providing a sound basis for the model's subsequent validation and development in different organisational contexts.

The study also has several limitations that must be considered when interpreting the results. The proposed model integrates five cognitive variables selected on the basis of the literature review, but these do not fully capture the complexity of the factors that may influence project team performance. The model should therefore be regarded as a conceptual approach that can be extended and refined by including additional dimensions and validating the relationships among variables in different organisational contexts. The weights assigned to each variable also require verification and adjustment through empirical studies.

Future research will implement the proposed conceptual model in a software prototype that enables the Cognitive Load Index to be calculated and visualised in a digital environment. This stage will form the subject of subsequent research and will be presented in a separate article on developing and designing the prototype in Figma. Implementing the model in a functional interface will allow its practical applicability to be assessed and enable analysis of how the index can support project managers in monitoring the cognitive load of teams.

By developing a conceptual model based on the Cognitive Load Index, this study offers an innovative methodology for the real-time diagnosis of teams' mental and operational health. Integrating the five critical variables—perceived stress, mental fatigue, multitasking, ability to concentrate and task clarity—into a single index enables managers to move beyond superficial or subjective assessments. Friction within projects is no longer viewed simply as a matter of personality but is interpreted as a direct symptom of cognitive overload or structural ambiguity.

From a managerial perspective, integrating the Cognitive Load Index into project monitoring may contribute to the proactive management of team performance. Unlike traditional indicators, which reveal the effects of problems that have already occurred, cognitive-load monitoring makes it possible to identify situations involving a high risk of overload at an early stage. Project managers may therefore intervene before these effects result in delays, budget overruns or reduced deliverable quality by reallocating tasks, rescheduling activities or adjusting available resources.

The use of such a tool may also support the development of organisations committed to sustainable performance and employee well-being. Recent research indicates that organisations which systematically monitor psychological and cognitive factors within teams achieve higher levels of engagement, resilience and adaptability to changes in the organisational environment. From this perspective, the Cognitive Load Index may become not only an indicator of individual and collective performance but also a tool for supporting strategic decisions on human resource management and the optimisation of work processes in complex projects.

This article represents the first stage of the research and aims to establish the theoretical foundation for and develop the Cognitive Load Index model. The research highlights a fundamental paradigm shift in project management: efficiency and success can no longer be assessed exclusively through impersonal, retrospective metrics such as time, cost and quality. The true sustainability of a project lies in the careful balance of the cognitive environment of the team implementing it. The second part of this research will address the model's practical implementation through the development of a software prototype in Figma. This stage will enable the model's applicability to be assessed in a digital environment and will provide a basis for its validation in real organisational contexts.

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