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ANALYZING CRITICAL SUCCESS FACTORS IN PROJECT LIFECYCLE STAGES IN: CONTRIBUTION TO PROJECT MANAGEMENT SUCCESS IN CONSTRUCTION FIELD

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Abstract
Project management plays a crucial role in ensuring the successful completion of projects across various industries. The project lifecycle consists of multiple phases, each requiring effective management to achieve project objectives. This study aims to analyze the critical success factors (CSFs) that influence project performance throughout the project lifecycle. A quantitative research approach was adopted using a structured questionnaire distributed among individuals involved in project management activities. The collected data were analyzed to identify the most significant factors contributing to project success. The findings indicate that factors such as effective communication, leadership, stakeholder involvement, and proper planning significantly impact project performance across different lifecycle phases. The results of this study provide valuable insights for project managers and organizations in improving project execution and achieving successful project outcomes.

Keywords: Project Life Cycle, Critical Success Factors, Project Management Success, Quantitative Research

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1. INTRODUCTION

Project management has become an essential practice for organizations seeking to achieve strategic objectives and maintain competitiveness in an increasingly complex environment (Project Management Institute, 2021; Larson & Gray, 2021). Projects are typically executed through a series of phases known as the project lifecycle, which includes initiation, planning, execution, monitoring, and closure. Effective management of each phase is critical to ensuring that projects are completed on time, within budget, and according to specified quality standards.

Despite the widespread adoption of project management methodologies, many projects continue to experience challenges such as delays, cost overruns, and failure to meet stakeholder expectations. These challenges highlight the importance of identifying factors that contribute to project success. Critical success factors (CSFs) are elements that significantly influence project outcomes and require continuous attention throughout the project lifecycle.

Previous studies have examined CSFs in project management; however, limited attention has been given to analyzing how these factors affect different phases of the project lifecycle. Understanding the relationship between CSFs and project lifecycle phases can provide valuable insights for improving project performance. Therefore, this study aims to analyze the critical success factors that influence project success throughout the project lifecycle, thereby contributing to more effective project management practices.

1.1 Research Novelty

The novelty of this study lies in three main aspects. First, unlike prior research that generally treats critical success factors (CSFs) as static predictors of overall project success, this study examines how CSFs manifest and exert differential influence across the four distinct phases of the project lifecycle—Define, Planning, Executing, and Closing—through a stage-by-stage correlation and ranking analysis. Second, the study provides empirical evidence on the relative strength of each lifecycle stage's relationship with project success within the Malaysian construction industry, a context that remains comparatively underexplored in the CSF literature. Third, by ranking the lifecycle stages according to their correlation with project success, this study moves beyond the identification of isolated success factors toward a stage-sensitive framework for CSF management, offering project managers a prioritized basis for allocating leadership, communication, and resource-management efforts across the project timeline. These contributions extend the theoretical understanding of project lifecycle management while providing practical guidance for improving construction project performance.

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2. LITERATURE REVIEW

2. 1. Project Management

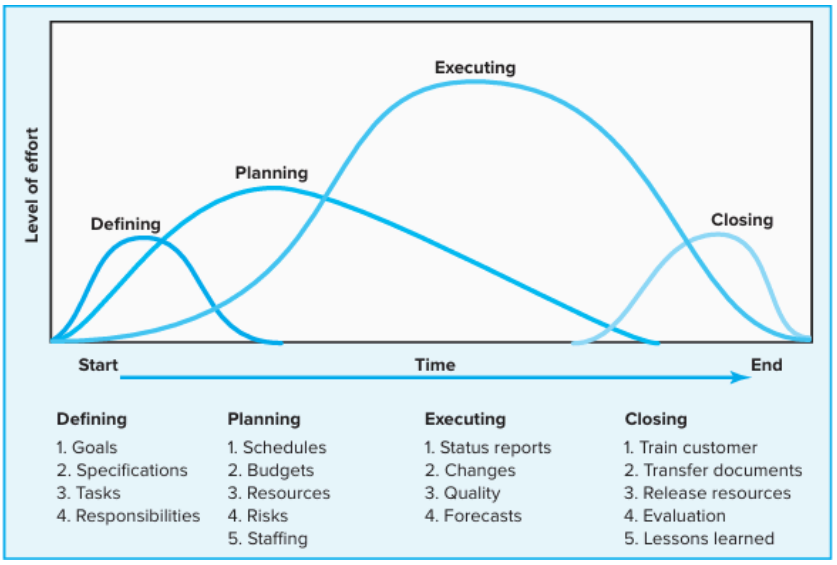
Project management refers to the application of knowledge, skills, tools, and techniques to project activities in order to achieve project objectives within specified constraints (Project Management Institute, 2021). It involves managing resources, time, cost, and quality to ensure project requirements are met. Effective project management provides a structured approach that supports decision-making, coordination, and control throughout the project lifecycle.

In recent years, project management has become increasingly important due to the growing complexity of projects and the need for organizations to remain competitive. Proper project management practices contribute to improved efficiency, reduced risks, and enhanced project outcomes.

2.2. Project Lifecycle

The project lifecycle represents the sequence of phases that a project undergoes from initiation to completion (Project Management Institute, 2021). It typically consists of initiation, planning, execution, monitoring and controlling, and closure phases. Each phase has specific objectives and deliverables that collectively contribute to project success.

Managing the project lifecycle effectively enables project teams to monitor progress, allocate resources efficiently, and address issues at an early stage. Failure to manage any phase properly may lead to delays, cost overruns, or unmet project objectives.



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Figure 1: Project Life Cycle

2.3. Critical Success Factors

Critical success factors (CSFs) are the essential elements that significantly influence the success of a project (Larson & Gray, 2021). These factors require continuous attention throughout the project lifecycle to ensure positive project outcomes. Commonly identified CSFs include leadership, communication, stakeholder involvement, team competency, and effective planning.

Leadership plays a vital role in guiding project teams and resolving conflicts, while communication ensures that information is shared clearly among stakeholders. Stakeholder involvement contributes to better requirement definition and increased acceptance of project outcomes. These factors collectively enhance coordination and project performance.

2.4. Systems and Communication Theory in Project Success

In addition to the CSF and project lifecycle perspectives discussed above, project success can further be explained through Systems Theory, which conceptualizes a project as a dynamic and interdependent system in which planning, execution, communication, and institutional arrangements co-evolve and mutually reinforce one another rather than operating as isolated components (Alhempi & Akkapin, 2025). Within this systemic perspective, communication has been identified as a key mechanism that links leadership practices and organizational support to team and project performance; empirical evidence from remote and virtual work settings shows that communication effectiveness significantly mediates the relationship between leadership practices, human resource support, and team effectiveness (Alhempi et al., 2026a). This finding reinforces the relevance of communication and coordination—identified in the present study as leading CSFs during the Executing stage—as critical determinants of project outcomes. Furthermore, structured capacity-building and stakeholder engagement initiatives, such as training, mentoring, and field-based knowledge transfer, have been shown to strengthen participants' technical competence, managerial understanding, and motivation to engage actively in a shared undertaking (Alhempi et al., 2026b). This underscores the importance of stakeholder involvement, one of the CSFs highlighted in the Define stage of this study, as a mechanism through which knowledge, trust, and shared commitment are cultivated among project participants.

2.5. Project Performance

Project performance refers to the extent to which a project achieves its predefined objectives,

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including scope, time, cost, and quality (Project Management Institute, 2021). It is often used as an indicator of project success and organizational effectiveness. High project performance reflects the ability of a project team to manage constraints and deliver expected outcomes.

Several studies suggest that project performance is strongly influenced by how well critical success factors are managed across the project lifecycle. Projects that effectively address these factors tend to demonstrate improved efficiency, stakeholder satisfaction, and overall success.

2.6. Summary of Literature Review

The literature highlights the importance of project management practices, project lifecycle management, and critical success factors in achieving successful project outcomes. However, limited studies have comprehensively examined how critical success factors influence project performance across different project lifecycle phases. This gap supports the need for the present study to analyze critical success factors within the context of the project lifecycle. The following figure shows the conceptual model of the relationship between stages in the project life cycle which is inclusive of the define, planning, executing and closing stage and the project success as a dependent variable.

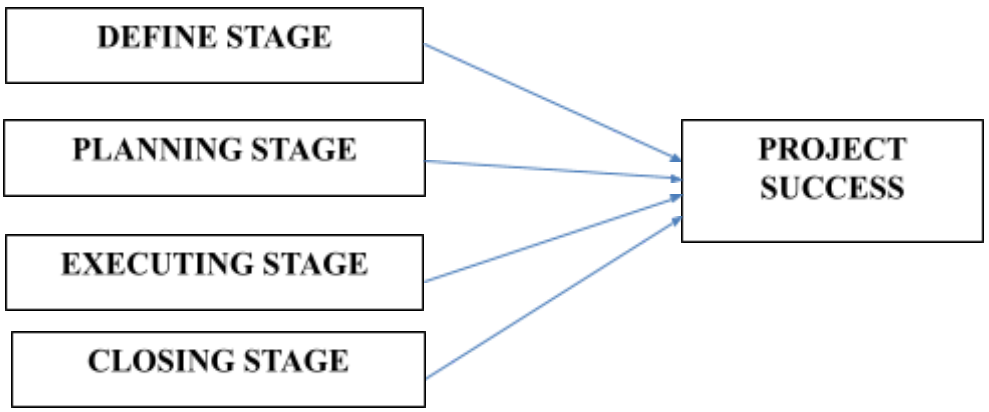


Figure 2: The conceptual model of relationship between PLC towards project Success

3. METHODS

This study adopted a quantitative research approach to analyze the critical success factors that influence project performance throughout the project lifecycle. A questionnaire survey was used as the primary data collection method, as it allows data to be gathered efficiently from

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respondents who are directly involved in project management activities.

3.1. Research Design

The research design of this study was descriptive in nature, focusing on identifying critical success factors across different phases of the project lifecycle. The questionnaire was developed based on previous studies related to project management and critical success factors to ensure that the research objectives were adequately addressed.

3.2. Data Collection Method

Data for this study were collected using a structured questionnaire administered to respondents with experience in project-related roles. The questionnaire consisted of two main sections: demographic information and items related to critical success factors (CSFs) in the project lifecycle. Survey questionnaires have been distrusted to the staff who are working in one construction based on Pengerang, Johor.

3.3. Population and Sample

The population for this study comprised individuals involved in project management activities, including project managers, engineers, and project team members. These participants were selected because of their direct involvement and practical experience in projects.

A purposive sampling technique was applied to ensure that respondents possessed relevant knowledge and experience related to the research topic. Only individuals who had participated in project activities and were familiar with project processes were included in the sample. Overall, there are 60 respondents involved in the data collection.

3.4. Data Analysis

The collected data were analyzed using statistical techniques appropriate for the research objectives. The analysis included three main procedures:

- Descriptive Analysis: Calculated the mean of each item to determine the central tendency of respondents' perceptions and identify factors with higher perceived importance.

- Ranking Analysis: Ranked the critical success factors based on mean scores to determine which factors were most dominant in influencing project success.

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- Correlation Analysis: Examined the relationship between critical success factors and overall project performance to assess the strength and direction of associations between variables.

These methods provided both summary insights and evidence of relationships among variables relevant to project performance.

3.5. Reliability Test

To assess the internal consistency of the questionnaire items, a reliability test was conducted using Cronbach's Alpha. This test measured how closely related the set of items were as a group, indicating the reliability of the scale used in the study.

A Cronbach's Alpha coefficient value of 0.70 or above was considered acceptable, consistent with established research standards. Higher values indicate greater reliability of the measurement instrument in capturing the constructs of interest. Based on reliability analysis, all measurement items which are defining, planning, executing, closing and project success is achieved more than 0.7. This result indicated that all items are reliable. The reliability test ensured that the items within each group of critical success factors were statistically consistent and suitable for further analysis.

4. RESULTS AND DISCUSSION

4.1. Descriptive Analysis of Critical Success Factors

Descriptive analysis using mean scores was conducted to evaluate respondents' perceptions of critical success factors (CSFs) across the four project lifecycle stages: Define, Planning, Executing, and Closing. In the Define stage, all factors recorded high mean values, indicating strong agreement on their importance. Mean value for top management support and stakeholder engagement were among the highest-rated factor which are 4.63 and 4.57 respectively, highlighting the importance of leadership involvement and stakeholder participation at the early stage of the project.

At the planning stage, factors such as risk planning, project scheduling, and resource planning received high mean scores. This suggests that careful and structured planning is considered essential for guiding project activities and minimizing uncertainties. Within the Executing stage, coordination and collaboration showed the highest mean score which is 4.57 and followed by performance monitoring with mean value 4.55. These findings emphasize the

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importance of teamwork, communication, and continuous tracking of project progress during implementation. Although change management had a slightly lower mean compared to other factors in this stage, it was still rated as important.

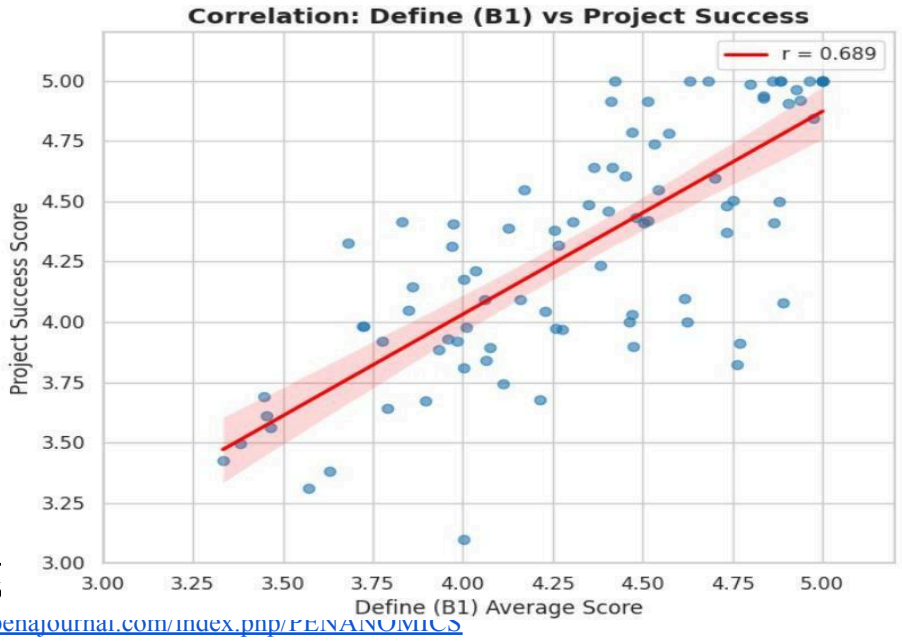
In the Closing stage, lessons learned obtained the highest mean score which is 4.69. This is followed by stakeholder satisfaction with the mean value of 4.62). This indicates that respondents recognize the value of proper project closure in supporting future improvements and ensuring that project outcomes meet stakeholder expectations. Overall, the descriptive results show that all identified CSFs across the project lifecycle stages are perceived as important contributors to project success.

4.2. Correlation Analysis Between Project Lifecycle Stages and Project Success

Correlation analysis was performed to examine the relationship between critical success factors at each project lifecycle stage and overall project success. Pearson correlation analysis was conducted to examine the strength and direction of the linear relationships between the study variables (Pallant, 2020). The results indicate positive relationships for all four stages, meaning that improvements in any stage are associated with better project performance.

The correlation coefficients are as follows:
Define stage: the correlation is 0.689 as per depicted in figure 1.
Planning stage; the correlation is 0.602 as per depicted in figure 4.
Executing stage; the correlation is 0.667 as per depicted in figure 2.
Closing stage; the correlation is 0.629 as per depicted in figure 3.

These values suggest that all stages have a moderate to strong positive relationship with project success.



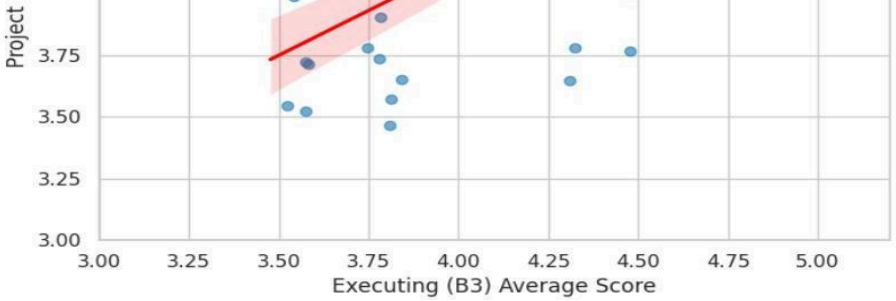


Figure 3: Correlation result for the define stage

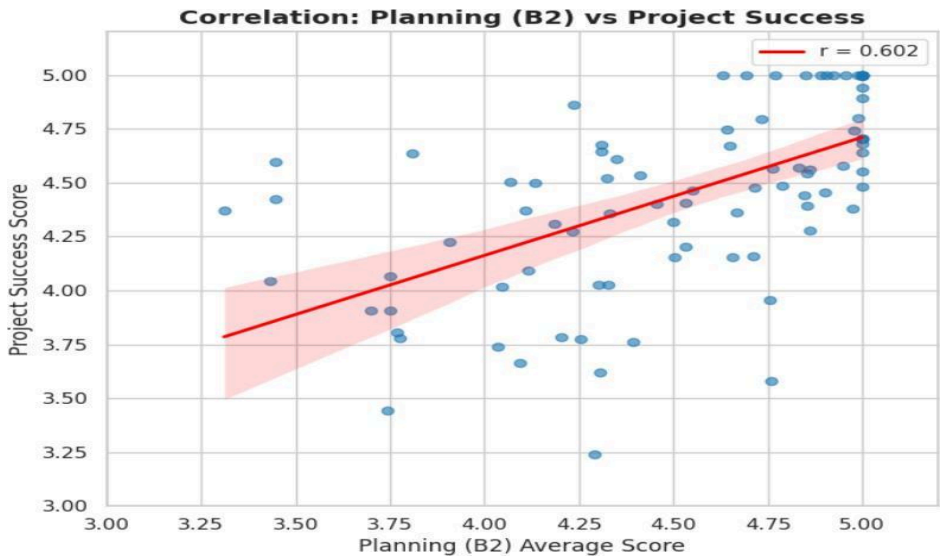


Figure 4: Correlation result for the planning stage

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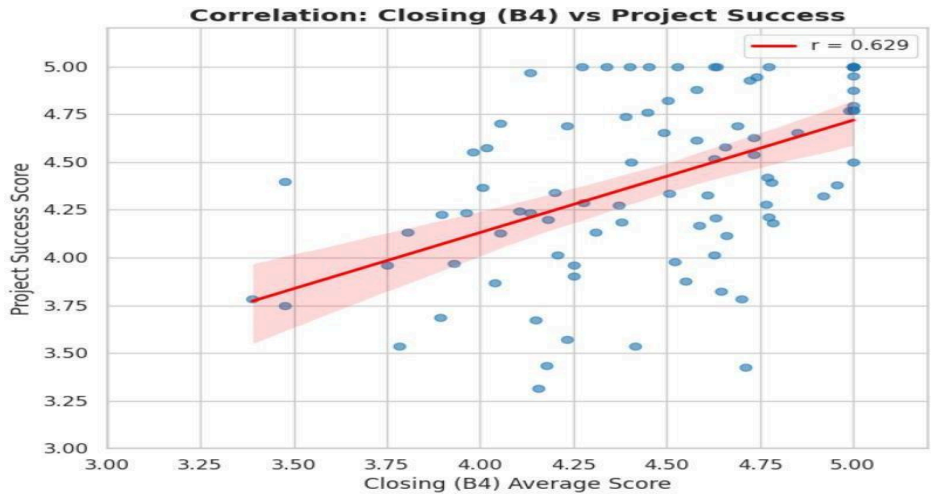


Figure 5 : Correlation result for the execution

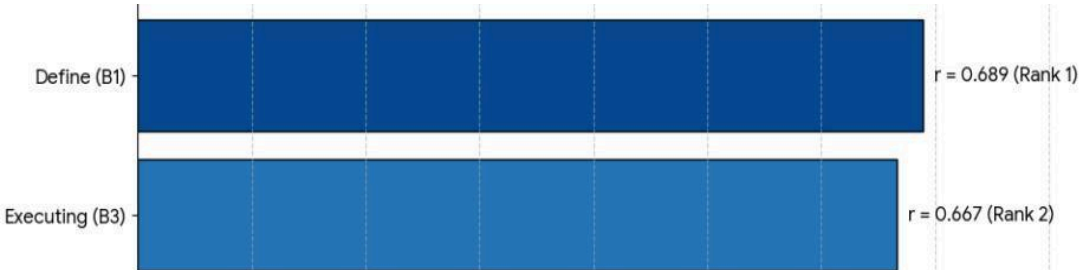
4.3. Ranking of Project Lifecycle Stages Based on Correlation Strength

Based on the correlation coefficients, the project lifecycle stages were ranked according to their strength of relationship with project success:

1. Define Stage (r = 0.689)
2. Executing Stage (r = 0.667)
3. Closing Stage (r = 0.629)
4. Planning Stage (r = 0.602)

The Define stage ranks first, indicating that early project activities such as setting clear objectives, ensuring stakeholder engagement, and obtaining top management support have the strongest influence on project success. This finding suggests that a well-established foundation at the beginning of the project significantly increases the likelihood of achieving desired outcomes. The Executing stage ranks second, showing that effective implementation, coordination, and performance monitoring are also key determinants of project success. This highlights the importance of managing day-to-day project operations efficiently.

The Closing stage, ranked third, still demonstrates a meaningful relationship with project success. Proper documentation, evaluation, and capturing lessons learned contribute to stakeholder satisfaction and long-term organizational improvement. Although the Planning stage ranks fourth, its correlation value still indicates a strong positive relationship with project success. This means that planning remains an essential stage, even if its direct influence appears slightly lower compared to the defining and executing stages.



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Figure 6: Ranking of the project life cycle.

4.4. Discussion

The findings indicate that while all project lifecycle stages are important, the Define and Executing stages have the strongest influence on project success. This emphasizes the need for project managers to focus on clear project definition at the start and effective management during implementation. The strong role of the Define stage highlights the importance of leadership support and stakeholder involvement in establishing a clear project direction. This is consistent with recent project management research, which identifies managerial support, clear direction, stakeholder management, and effective project management practices as important contributors to project success (Jitpaiboon et al., 2019; Herath & Chong, 2021).

Meanwhile, the Executing stage confirms that successful outcomes depend heavily on coordination, communication, and continuous performance monitoring. Recent studies have similarly highlighted effective communication, monitoring and control, leadership, and stakeholder involvement as critical factors during project implementation (Townsend & Gershon, 2020; Sicotte & Delerue, 2021). The results also show that the planning and closing stages remain significant contributors, supporting the view that project success is achieved through a balanced approach across all lifecycle stages, with particular emphasis on early definition and effective execution. This finding is further supported by Sicotte and Delerue (2021), who found that project planning, top management support, and communication are closely associated with project performance.

5. CONCLUSION

This study aimed to analyze the critical success factors that influence project performance throughout the project lifecycle. Based on the findings, factors such as leadership, communication, stakeholder involvement, and effective planning were identified as key elements contributing to project success (Project Management Institute, 2021; Larson & Gray, 2021; Kariuki & Musa, 2023).

The results of this study provide useful insights for project managers and organizations in understanding the importance of managing critical success factors across different phases of the project lifecycle. By focusing on these factors, project performance can be improved, and project objectives can be achieved more effectively.

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However, this study has several limitations, including the scope of respondents and the reliance on questionnaire-based data collection. Future research may consider involving a larger sample size and applying different research methods to further enhance the understanding of critical success factors in project management.

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