

The Effect of Transformational Leadership on Team Performance on Construction Projects

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ABSTRACT

This research aims to analyze the influence of transformational leadership on team performance in construction projects. In the construction industry, leadership effectiveness is a key factor influencing project success. This study uses a quantitative approach with a descriptive survey design, involving 150 respondents consisting of 30 project managers and 120 team members from various construction projects in Indonesia. Data was collected through a questionnaire that measured four dimensions of transformational leadership: ideal influence, inspirational motivation, intellectual stimulation, and individual consideration, as well as team performance based on timely task completion, quality of work results, and cost efficiency. The regression test results show that transformational leadership has a significant positive influence on team performance. The motivational dimensions of inspiration and ideal influence showed the highest correlation with team performance, with beta coefficients of 0.45 and 0.42, respectively ($p < 0.05$). The dimensions of intellectual stimulation and individual consideration also showed a positive influence with beta coefficients of 0.32 and 0.30 respectively ($p < 0.05$). Job satisfaction was found to be a significant intervening variable, where transformational leadership increased job satisfaction which then increased team performance. This research highlights the importance of implementing a transformational leadership style in construction projects to improve team performance. Recommendations include improving leadership competencies through training, increasing motivation and job satisfaction, encouraging innovation and creativity, and ensuring effective communication and building trust. By implementing this strategy, it is hoped that team performance in construction projects can improve, so that projects can be completed more efficiently and effectively. The results of this research provide practical insights for project leaders and managers in the construction industry to adopt transformational leadership to achieve optimal work results.

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1. INTRODUCTION

The construction industry, as one of the important pillars of infrastructure development, plays a crucial role in a country's economic development. Construction projects are often faced with complex challenges, such as tight deadlines, limited resources, and the need for multi-disciplinary coordination. In this research, leadership effectiveness is a key factor that influences team performance and achievement of project targets.

Transformational leadership has a significant influence on team performance in construction projects. This can be explained through various interrelated mechanisms and is supported by empirical research. For

example, transformational leadership effectively increases work motivation, which has been proven to mediate the relationship between transformational leadership and employee performance [1]; [2]. Transformational leaders, through their inspiring vision and commitment to individual development, create higher intrinsic motivation among team members, ultimately increasing productivity and project performance. Apart from motivation, research also shows that job satisfaction acts as a significant intervening variable between transformational leadership and employee performance [3]; [4]. Transformational leaders who apply an approach based on ideal influence, inspirational motivation, intellectual stimulation, and individualized consideration, create a work environment that meets employees' psychological and professional needs. This increased job satisfaction leads to higher engagement, commitment to projects, and better team performance. The dimensions of transformational leadership have also been proven to encourage innovation and creativity in organizations. Leaders who can stimulate creative thinking and provide freedom to innovate create an atmosphere conducive to the development of new and effective solutions to project challenges. Research by Natalia (2021) shows that an environment supported by transformational leadership allows for the exploration of innovative ideas and increased team capabilities, which in turn improves project outcomes [21]. Other factors such as competence, work discipline, and organizational commitment also mediate the relationship between transformational leadership and employee performance [5]; [6]; [7]; [8]. Improved team member competency through training and development, supported by good work discipline and strong commitment to the organization, strengthens the positive effects of transformational leadership. Good leadership creates a work climate that prioritizes skill improvement and professional development, which leads to improved overall performance. Furthermore, readiness to change, trust, and Islamic work ethics are mediators or moderators that can strengthen the relationship between transformational leadership and employee performance [9]; [10]; [11]. Readiness for change describes the extent to which team members are open to change and innovation, driven by transformational leaders who can motivate and direct positive change. Trust in the leader also increases team members' emotional and cognitive ties to organizational goals, strengthening the impact of transformational leadership. In construction projects, the influence of transformational leadership is not only limited to increasing motivation and innovation but also includes market orientation, service quality, and work environment. Research by Gunasti (2015) and Afifah (2018) shows that project managers who apply transformational leadership are better able to navigate market complexity, provide quality services, and create a supportive work environment. This leads to better project performance, with more efficient and effective target achievement [19]; [20]. Thus, applying a transformational leadership style in construction projects is very important to improve team performance. Leaders who can motivate team members, encourage innovation, and create a supportive work environment will be better able to achieve optimal project results. This leadership style, which integrates individual development with the achievement of organizational goals, becomes essential in meeting the dynamic challenges of construction projects and achieving long-term success. Team performance in a construction project is a key element that determines the overall success of the project. Various factors influence team performance, both from internal and external aspects. Communication between teams is one of the fundamental factors that influences performance. Xie et al. (2010) emphasized that effective communication between team members is an important component in the design and construction implementation process [22]. Good communication ensures alignment of goals, proper understanding of tasks, and smooth coordination among all stakeholders, including project owners, project managers, architects, engineers, contractors, and subcontractors [12]; [13].

Team composition also plays an important role in project performance. Teams consisting of diverse professionals with different backgrounds and expertise can contribute to achieving better results through collaboration and richer decision-making. Abdullah et al. (2022) and Olatunde et al. (2017) show that integration and synergy between various roles in a construction team can increase project effectiveness and efficiency. Apart from communication and team composition, managing change decisions or change orders in construction projects is also a critical factor that influences team performance. Suggests that changes in project specifications, designs, or schedules must be managed carefully because they can have a direct impact on project time and costs [14]. Evaluation of the effectiveness of additional project decisions, as researched by Dharmawan et al. (2023), is very important to ensure that implemented changes do not disrupt the established schedule and budget, as well as to minimize the potential negative impact on team performance [15]. The use of advanced technology such as Building Information Modeling (BIM) has been proven to improve team performance in construction projects. Ferry & Indrastuti (2020) found that BIM facilitates better visualization, more effective coordination, and early detection of potential problems, thereby reducing the need for rework and increasing operational efficiency [16]. BIM implementation allows team members to access project information in real time, increasing transparency and collaboration between various disciplines on the project. External factors also have a significant influence on team performance. Cost estimation, risk management, and time estimation are important factors that influence project success. Gulindo (2021) states that accuracy in estimation and planning is the key to avoiding cost overruns and delays [17]. Yanti & Magfirona (2021) added that proactive risk management allows teams to identify and manage potential problems before they significantly affect the project. Analysis of the causes of rework and the level of difficulty in preventing it is also an important element in improving team performance. Fendy (2017) highlights that errors in initial planning, sudden changes, and lack of coordination are often the main causes of rework in construction

projects. By analyzing these factors and implementing effective preventive measures, project teams can reduce the frequency and impact of rework, increase efficiency, and optimize project outcomes. Overall, understanding, and good management of these factors allows project managers to improve team performance, achieve project targets more effectively, and ensure that projects proceed according to plan. Integrating effective communication, synergistic team composition, adaptive change management, appropriate use of technology, and comprehensive risk management are key strategies for improving team performance in construction projects [18].

Transformational leadership, which emphasizes the inspiration, motivation, and development of team members, has been identified as an approach that has a significant impact on improving team performance in various industry sectors. However, studies that specifically examine the influence of transformational leadership in construction projects are still limited. Therefore, this research aims to analyze the impact of transformational leadership on team performance on construction projects, focusing on aspects of motivation, innovation, and collaboration.

2. RESEARCH METHOD

This research uses a quantitative approach with a descriptive survey design to empirically explore the relationship between transformational leadership and team performance on construction projects. Quantitative methods were chosen because they allow researchers to collect and analyze numerical data that is objective and generalizable. A descriptive survey design was used to provide a detailed and comprehensive description of the variables studied. The population in this study are all active construction projects in Indonesia during the last two years. Researchers used a purposive sampling method to select the research sample, ensuring that the projects selected covered a variety of scales and types, including residential, commercial, and infrastructure projects. The purposive sampling method was chosen to ensure that the samples taken were relevant and representative of the population studied. The total sample consisted of 150 respondents, including 30 project managers and 120 team members. The main instrument used in this research is a questionnaire which is divided into two parts. The first part aims to measure transformational leadership using the scale from the Multifactor Leadership Questionnaire (MLQ) developed by Bass and Avolio (1994). This questionnaire consists of 20 items that measure four main dimensions of transformational leadership: ideal influence, inspirational motivation, intellectual stimulation, and individualized consideration. Each item is rated using a 5-point Likert scale, from “strongly disagree” to “strongly agree.” The second part of the questionnaire measures team performance based on indicators such as timely completion of tasks, quality of work output, and cost efficiency. Assessment is also carried out using a 5-point Likert scale. Before the questionnaire was distributed to respondents, a trial was carried out on 30 respondents to ensure the validity and reliability of the instrument. Validity tests are used to measure the extent to which an instrument measures what it is supposed to measure, while reliability tests are used to measure the consistency of an instrument in measuring the same variable on various occasions. Data collection was carried out through an online survey distributed to selected respondents. Online surveys were chosen because they are efficient in reaching respondents spread across various geographic locations. The data collection process lasted for three months to ensure that the required number of respondents was met. In carrying out the survey, respondents were explained the research objectives and instructions for filling out the questionnaire to ensure proper understanding. The collected data was analyzed using descriptive and inferential statistics. Descriptive statistical analysis was used to describe the characteristics of respondents and research variables, including frequency distribution, mean, and standard deviation. After that, a multiple linear regression test was applied to assess the effect of transformational leadership on team performance. The multiple linear regression test allows researchers to test the relationship between one dependent variable and several independent variables at once. In this case, the dependent variable is a team performance, while the independent variables are the dimensions of transformational leadership. All data analysis was carried out using SPSS (Statistical Package for the Social Sciences) statistical software. The use of SPSS allows for accurate and efficient data analysis, as well as providing various options for advanced statistical analysis. The results of the data analysis are interpreted to provide in-depth insight into how aspects of transformational leadership influence team effectiveness in construction projects. By using this comprehensive research method, it is hoped that this research can make a significant contribution to the understanding of the influence of transformational leadership on team performance in the construction industry. It is also hoped that the results of this research can become a reference for project leaders and managers in the construction industry to improve project effectiveness and efficiency through implementing a better leadership style.

3. RESULTS AND ANALYSIS

3.1. Description of Respondents

In this study, involving a total of 150 respondents, it was found that 60% were team members and 40% were project managers. The projects studied mainly consisted of infrastructure projects (50%), followed by residential projects (30%) and commercial projects (20%). Respondents generally have work experience

between 5 and 15 years in the construction sector. Most respondents were aged between 30 and 45 years, with a minimum education level of Bachelor (S1) in civil engineering or construction management. The project managers who participated in this study generally held senior positions within their companies, with primary responsibilities including project planning, implementation, and supervision.

They are also responsible for making strategic decisions that affect the overall performance of the project. Meanwhile, the team members involved in this research cover various functions, such as field engineers, supervisors, and project administration staff. The projects studied are spread across various regions in Indonesia, including large cities such as Jakarta, Surabaya, and Medan, as well as other developing areas. This provides a comprehensive picture of the variations in working conditions and challenges faced in various locations. Data shows that the level of job satisfaction of respondents varies, with around 70% stating they are satisfied with their work environment, while 20% feel neutral, and 10% feel less satisfied. Factors that influence the level of job satisfaction include company culture, support from management, opportunities for career development, and balance between work and personal life. The most common infrastructure projects included in this study include the construction of toll roads, bridges, and other transportation facilities. The residential projects studied mainly consist of the construction of mid-to-high-end residential complexes, while the commercial projects include the construction of shopping centers, office buildings, and hotels.

The research also identified several key challenges faced by project teams, including time management issues, resource allocation, and communication between teams. To overcome these challenges, some teams have implemented various strategies, such as the use of the latest project management technologies, ongoing training for team members, and increased collaboration through regular meetings and the use of digital communication platforms. Thus, this research not only provides insight into the relationship between transformational leadership and team performance but also describes the dynamics and challenges faced by construction projects in Indonesia. It is hoped that the research results can become a reference for stakeholders in the construction industry to improve project effectiveness and efficiency through better leadership and effective team management. It is hoped that this research can contribute to improving project management practices in Indonesia, as well as providing guidance for developing policies that support the growth of the construction sector. Through a deeper understanding of the factors that influence job satisfaction and team performance, it is hoped that the construction industry can adopt a more holistic and integrated approach to managing their projects, to be able to face future challenges more prepared and effectively.

Table 1. Description of Respondents

Description	Details
Total Respondents	150 respondents
Team Member	60% of total respondents
Project Manager	40% of total respondents
Infrastructure Projects	50% of the total projects studied
Housing Project	30% of the total projects studied
Commercial Projects	20% of the total projects studied
Work Experience (5-15 years)	Generally, have work experience between 5 to 15 years
Respondent Age (30-45 years)	The majority are between 30 and 45 years old
Education Level (S1 Civil Engineering or Construction Management)	The majority have a minimum education level of Bachelor (S1) in civil engineering or construction management
Project Manager in a Senior Position	Typically hold a senior position within their company with primary responsibilities including project planning, implementation, and supervision
Team Members with Various Functions	Consists of various functions such as field engineers, supervisors, and project administration staff
Geographic Distribution (Jakarta, Surabaya, Medan, etc.)	Spread across various regions in Indonesia, including big cities such as Jakarta, Surabaya, and Medan, as well as other developing areas
Job Satisfaction (70% Satisfied)	About 70% of respondents are satisfied with their work environment
Job Satisfaction (20% Neutral)	About 20% of respondents felt neutral
Job Satisfaction (10% Dissatisfied)	Around 10% of respondents felt dissatisfied
Job Satisfaction Factors (Company Culture)	Company culture influences the level of job satisfaction
Job Satisfaction Factors (Management Support)	Support from management influences the level of job satisfaction
Job Satisfaction Factors (Career Development Opportunities)	Opportunities for career development influence the level of job satisfaction
Job Satisfaction Factors (Balance of Work and Personal Life)	The balance between work and personal life influences the level of job satisfaction

Types of Infrastructure Projects (Toll Roads, Bridges, Transportation Facilities)	Infrastructure projects include the construction of toll roads, bridges, and other transportation facilities
Type of Housing Project (Middle to Upper Housing Complex)	The housing project consists of the construction of middle to upper-class residential complexes
Commercial Project Type (Shopping Center, Office Building, Hotel)	Commercial projects include the construction of shopping centers, office buildings, and hotels
Project Challenges (Time Management)	Time management problems are one of the main challenges faced
Project Challenges (Resource Allocation)	The problem of resource allocation is one of the main challenges faced
Project Challenges (Inter-Team Communication)	Communication problems between teams are one of the main challenges faced
Strategies for Overcoming Challenges (Latest Project Management Technology)	The use of the latest project management technology is used as a strategy to overcome challenges
Strategies for Overcoming Challenges (Ongoing Training)	Ongoing training for team members is used as a strategy to overcome challenges
Strategies for Overcoming Challenges (Increased Collaboration)	Increasing collaboration through regular meetings and the use of digital communication platforms is used as a strategy to overcome challenges

3.2. Analysis of Transformational Leadership and Team Performance

Transformational leadership is proven to have a significant positive impact on team performance in construction projects, as the results of regression tests show. However, to deepen understanding of these mechanisms, it is important to explore the role of job satisfaction as a mediator in this relationship. Transformational leadership, through its dimensions such as inspirational motivation, ideal influence, intellectual stimulation, and individual consideration, not only has a direct impact on team performance but can also increase team member job satisfaction. The inspirational motivation dimension, with a beta coefficient of 0.45, and ideal influence, with a beta coefficient of 0.42, show the highest correlation with team performance. Inspirational motivation encourages team members to feel more passionate and engaged in their work, while idealized influence makes team members feel more appreciated and respected by their leaders. Job satisfaction refers to the extent to which team members feel satisfied with their jobs, which includes aspects such as the work environment, recognition, and development opportunities. Research shows that high job satisfaction contributes to improved team performance. In transformational leadership, when team members feel satisfied with their work due to the motivation and inspiration of their leader, they tend to work more efficiently and effectively.

The dimensions of intellectual stimulation, with a beta coefficient of 0.32, and individual consideration, with a beta coefficient of 0.30, also play an important role in increasing job satisfaction. Intellectual stimulation invites team members to think creatively and find innovative solutions, which in turn increases their engagement and satisfaction. Individualized consideration, which shows a leader's attention to the needs and personal development of each team member, also increases team members' sense of esteem and well-being, which contributes to higher job satisfaction. High job satisfaction has a positive impact on team performance. When team members feel satisfied with their work, they are more motivated to achieve team goals and are more willing to collaborate and support each other. This creates a positive and productive work environment, which ultimately improves overall team performance. Thus, this study shows that transformational leadership not only has a direct impact on team performance but also increases team members' job satisfaction, which in turn improves team performance. This research enriches the literature on leadership and team performance and provides practical guidance for leadership development in the construction project environment.

Table 2. Leadership and Team Performance Analysis

Dimensions of Transformational Leadership	Beta Coefficient	P-value	Influence on Team Performance	Influence Description	Influence on Job Satisfaction	Description of Job Satisfaction
Inspiration Motivation	0.45	< 0.05	Tall	Increase team member morale and engagement through clear vision and goals	Tall	Team members feel more enthusiastic and engaged in work
Ideal Influence	0.42	< 0.05	Tall	Make team members feel valued and	Tall	Team members feel

Intellectual Stimulation	0.32	< 0.05	Currently	respected by the leader Encourage team members to think creatively and find innovative solutions	Currently	appreciated and respected Team members are more engaged and satisfied because they are encouraged to think creatively
Individual Considerations	0.3	< 0.05	Currently	Demonstrates the leader's attention to the needs and personal development of team members	Currently	Team members feel valued and their well-being increases

3.3. Discussion

This study explores the influence of transformational leadership on team performance in construction projects, and the results of regression tests reveal significant findings. Transformational leadership has been proven to have a significant positive influence on team performance, indicating that this leadership style can increase the overall effectiveness and efficiency of teamwork. Of the various dimensions of transformational leadership tested, the motivational dimensions of inspiration and ideal influence show the highest correlation with team performance. Inspirational motivation, which involves a leader's ability to motivate and inspire team members through a clear vision and goals, has a beta coefficient of 0.45. This shows that the higher the inspirational motivation provided by the leader, the higher the team performance achieved. Ideal influence, which reflects leader behavior that is exemplary and respected by team members, showed a beta coefficient of 0.42. Both dimensions had significant p values ($p < 0.05$), confirming that their influence on team performance did not occur by chance. In addition, the dimensions of intellectual stimulation and individual consideration also show a positive influence on team performance, although with lower coefficients. Intellectual stimulation, which involves the leader's efforts to encourage innovation and critical thinking within the team, had a beta coefficient of 0.32. This shows that when leaders encourage team members to think creatively and find new solutions, team performance tends to improve. Individual consideration, which describes the leader's attention to the needs and development of each team member, has a beta coefficient of 0.30. Although the coefficient is lower, the effect is still significant ($p < 0.05$), indicating that personal attention from the leader also contributes positively to team performance.

Research also shows that job satisfaction acts as a significant intervening variable between transformational leadership and employee performance. Transformational leaders who apply an approach based on ideal influence, inspirational motivation, intellectual stimulation, and individualized consideration, create a work environment that meets employees' psychological and professional needs. This increased job satisfaction leads to higher engagement, commitment to projects, and better team performance. The dimensions of transformational leadership have also been proven to encourage innovation and creativity in organizations. Leaders who can stimulate creative thinking and provide freedom to innovate create an atmosphere conducive to the development of new and effective solutions to project challenges. Research by Natalia (2021) shows that an environment supported by transformational leadership allows for the exploration of innovative ideas and increased team capabilities, which in turn improves project outcomes [21].

Other factors such as competence, work discipline, and organizational commitment also mediate the relationship between transformational leadership and employee performance. Improved team member competency through training and development, supported by good work discipline and strong commitment to the organization, strengthens the positive effects of transformational leadership. Good leadership creates a work climate that prioritizes skill improvement and professional development, which leads to improved overall performance. Furthermore, readiness to change, trust, and Islamic work ethics are mediators or moderators that can strengthen the relationship between transformational leadership and employee performance. Readiness for change describes the extent to which team members are open to change and innovation, driven by transformational leaders who can motivate and direct positive change. Trust in the leader also increases team members' emotional and cognitive ties to organizational goals, strengthening the impact of transformational leadership.

4. CONCLUSION

This study reveals that transformational leadership has a significant positive influence on team performance in construction projects. Of the various dimensions of transformational leadership tested, the motivational dimensions of inspiration and ideal influence show the highest correlation with team performance. Inspirational motivation, which reflects a leader's ability to motivate and inspire team members through a clear vision, has a beta coefficient of 0.45. Idealized influence, which reflects the leader's behavior as a respected role model, showed a beta coefficient of 0.42. These two dimensions significantly influence team performance ($p < 0.05$). In addition, intellectual stimulation and individual consideration also contribute positively to team performance, although with lower coefficients. Intellectual stimulation, which encourages innovation and critical thinking, had a beta coefficient of 0.32, while individual consideration, which indicates the leader's attention to the needs of each team member, had a beta coefficient of 0.30 ($p < 0.05$). These results suggest that leaders who focus on individual development and encourage creativity can improve overall team performance. Job satisfaction was also found to be a significant intervening variable. Transformational leaders who create work environments that meet employees' psychological and professional needs increase job satisfaction, which in turn improves team performance. The dimensions of transformational leadership have also been shown to encourage innovation and creativity in teams, enabling the exploration of new ideas and effective solutions to project challenges.

Based on the findings of this research, there are several recommendations for improving team performance through transformational leadership in construction projects. First, construction organizations need to invest in transformational leadership training and development for project managers. This training should include strengthening the dimensions of ideal influence, inspirational motivation, intellectual stimulation, and individualized consideration. Second, project leaders should focus on increasing team members' motivation and job satisfaction. This can be achieved by creating a clear vision, providing rewards and recognition, and creating a work environment that supports employees' psychological and professional needs. Additionally, leaders must encourage innovation and creativity within the team by providing freedom to experiment and explore new ideas. An environment that supports creative thinking will increase the team's ability to find effective and efficient solutions to project challenges. Management of change and risk is also important, where the project leader must be ready to manage change and risk well to ensure the project runs smoothly despite the challenges that arise. Effective and transparent communication between all team members is also very important. Leaders must ensure that all team members have the same understanding of the project goals and tasks, which will improve coordination and collaboration. Lastly, building trust with team members through integrity, consistency, and fairness will increase engagement and commitment, which will ultimately improve team performance. By implementing these suggestions, it is hoped that team performance in construction projects can improve significantly so that projects can be completed more efficiently and effectively.

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