

Critical Success Factor Of Construction Projects For Middle-Class Contractors In East Java - Indonesia

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Abstract— The success of construction projects is a key indicator of contractor performance, particularly for medium-scale contractors who play a vital role in regional infrastructure development in East Java, Indonesia. This study aims to identify and analyze the key determinants influencing the success of construction projects, focusing on both internal and external factors that affect project performance among medium-class contractors. A descriptive-qualitative approach supported by simple quantitative analysis was employed. Data were collected through in-depth interviews with 15 project managers and surveys administered to 50 respondents, including contractor executives, supervising consultants, and field supervisors across Surabaya, Sidoarjo, and Malang. The analysis classified success determinants into five major categories: (1) project management, (2) human resources, (3) financial management, (4) technology utilization, and (5) external project factors. The findings reveal that effective project management is the most dominant factor determining project success, followed by human resource quality and financial stability. External factors such as government regulations, market conditions, and weather exert indirect yet significant influences on project implementation. Moreover, the adoption of digital project management tools and information technologies has begun to positively impact coordination efficiency and schedule control. In conclusion, the success of construction projects among medium-scale contractors in East Java is highly dependent on the companies' ability to integrate managerial, technical, and financial aspects in a balanced manner. The implementation of modern project management practices, continuous workforce capacity building, and adaptation to digital technologies are identified as critical strategies to enhance competitiveness at both regional and national levels.

Keywords: construction project, project success, project management, medium-scale contractors, East Java.

I. INTRODUCTION

The construction industry plays a crucial role in supporting infrastructure development and national economic growth. In East Java, medium-scale construction projects dominate regional development activities, both funded by local governments and private sectors. Medium-scale contractors serve as the backbone of these projects due to their flexibility, local capacity, and familiarity with the socio-economic context of the region. However, construction project success among medium-scale contractors often faces complex challenges such as project delays, cost overruns, low-quality outcomes, and weak coordination. These issues arise mainly from limited resources, suboptimal management systems, and low levels of digital technology adoption. Success in construction projects is not only measured by time and cost completion but also by client satisfaction, quality of output, and sustainable working relationships. Therefore, this study aims to identify and evaluate the most influential factors determining construction project success among medium-scale contractors in East Java, considering the region's unique economic, geographic, and bureaucratic characteristics.

The research problems are :

1. What are the key factors determining construction project success among medium-scale contractors in East Java?
2. Which factors have the most dominant influence?
3. What are the practical implications of these factors for improving contractor performance in the future?

The research objectives are :

1. To identify the main factors influencing the success of construction projects among medium-scale contractors in East Java.
2. To analyze the level of influence of each factor.
3. To provide strategic recommendations to enhance project management practices among medium-scale contractors.

Theoretically, this research contributes to the body of knowledge in construction management, particularly regarding success models in medium-scale projects. Practically, the findings can serve as:

- A reference for contractors to develop strategies for improving project performance.
- Guidance for local governments in designing contractor development policies.
- Academic material for further studies in project management and construction efficiency.

II. LITERATURE REVIEW

Project success refers to the extent to which project objectives are achieved as planned. Pinto and Slevin (1988) distinguished between project management success and project success. Atkinson (1999) proposed the "Iron Triangle" concept—time, cost, and quality—as the primary indicators of project success. Previous studies have identified several key factors influencing construction project success [3] [4]:

- Effective Project Management : The systematic application of PMBOK principles—planning, execution, monitoring, and closing (PMI, 2021).
- Human Resource Competence: Technical expertise, experience, and managerial capability (Jarkas & Bitar, 2012). Communication and Coordination : Quality of communication among stakeholders to prevent conflict (Ling et al., 2009).
- Risk Management : Ability to identify, analyze, and respond to risks (Zou et al., 2007).
- Technology Utilization : Implementation of BIM, project control software, and digital reporting (Azhar, 2011).

According to the East Java Public Works Office (2023), medium-scale contractors possess moderate capital and equipment but underdeveloped quality management systems and digitalization. They typically handle projects valued between IDR 2–50 billion, with high competition in local tenders and dependency on government-funded projects.

III. MATERIALS AND METHODS

This research uses a descriptive–quantitative approach to illustrate the influencing factors of project success based on practitioners’ perceptions. Data were obtained through surveys and interviews with professionals directly involved in construction project management. The study was conducted in Surabaya, Sidoarjo, Gresik, Malang, and Jember over six months (April–September 2025) [5][6][7]. The population consists of all medium-scale contractors registered in the East Java LPJK. Sampling used a purposive technique with criteria minimum of three completed projects in the last five years and medium business classification. A total of 60 respondents were involved, including project managers, engineers, and site supervisors. Data Collection Techniques are closed questionnaires using a Likert scale (1–5), In-depth interviews with five key informants and project documentation (reports, tenders, performance records). Data Analysis uses descriptive statistical analysis, factor analysis, and correlation tests were used to identify dominant factors and their interrelations [8][9][10].

IV. RESULT AND DISCUSSION

4.1 General Profile of Respondents

This study involved 60 respondents from various medium-scale construction companies located in five major regions of East Java: Surabaya, Gresik, Sidoarjo, Malang, and Jember. Most respondents (68%) served as project managers or site supervisors directly engaged in construction project execution, while the remainder were company directors, technical consultants, and field inspectors. Regarding project types, approximately 65% of respondents handled government-funded projects—such as road, building, drainage, and small bridge works—while 35% were involved in private-sector projects, including housing, warehouses, and industrial facilities. The respondents’ professional experience ranged from 5 to over 20 years. This composition reflects the real conditions of medium-scale contractors in East Java, who possess practical experience managing mid-value projects (contract values between IDR 2–50 billion) and face operational challenges representative of the regional construction sector.

4.2 Factor Analysis Results

Factor analysis was employed to group interrelated variables and reveal the core dimensions determining project success [11][12]. Using the Principal Component Analysis (PCA) method with varimax rotation, five major factors were identified, each with an eigenvalue greater than 1, collectively explaining 81.2% of the variance in project success.

Table 1. Main factor

No.	Main Factor	Dominant Indicators	Influence Weight (%)
1	Project Management and Planning	WBS, CPM, Cost Control	27.4

No.	Main Factor	Dominant Indicators	Influence Weight (%)
2	Human Resource Competence and Field Supervision	Certification, Experience, Discipline	22.1
3	Stakeholder Communication and Coordination	Coordination Meetings, Weekly Reports	18.5
4	Risk Management and On-Site Adaptation	Risk Register, Weather Response	17.3
5	Technology Utilization and Digitalization	Project Applications, BIM, Digital Reporting	14.7
6	Project Management and Planning	WBS, CPM, Cost Control	27.4
7	Human Resource Competence and Field Supervision	Certification, Experience, Discipline	22.1
8	Stakeholder Communication and Coordination	Coordination Meetings, Weekly Reports	18.5
9	Risk Management and On-Site Adaptation	Risk Register, Weather Response	17.3
10	Technology Utilization and Digitalization	Project Applications, BIM, Digital Reporting	14.7

The first factor—project management and planning—was found to have the greatest influence, emphasizing that effective project management remains the key determinant of construction success among medium-scale contractors. Although technology utilization ranked lowest in influence, it exhibited a notable upward trend, indicating growing digital transformation efforts across companies [13][14][15].

4.3 Discussion

4.3.1 Project Management and Planning

Project management emerged as the most critical factor affecting project success. Field findings indicate that contractors employing structured planning systems such as Work Breakdown Structure (WBS) and Critical Path Method (CPM) are better able to control project duration, minimize delays, and reduce cost overruns [16].

Most medium-scale contractors in East Java have yet to fully adopt formal project management methodologies as recommended by the Project Management Body of Knowledge (PMBOK). Project plans are often prepared manually, without professional software tools such as Microsoft Project or Primavera. Consequently, estimation errors in work duration and sequencing are still common, particularly in multi-location projects.

Cost control also poses a major challenge. Many contractors reported difficulty maintaining cash flow stability due to delayed client payments. Companies equipped with proper accounting and cash flow monitoring systems demonstrated higher resilience to financial fluctuations [17].

In addition, quality control is a vital component. Contractors that established formal quality assurance systems recorded fewer client complaints and rework incidents.

Overall, project management quality depends not only on technical planning but also on the integration of time, cost, quality, and communication within a consistent management framework [18].

4.3.2 Human Resource Competence and Field Supervision

Human resource competence ranks as the second most influential factor. Experienced personnel with professional certifications (SKA/SKT) significantly contribute to project success. Based on the survey, 82% of respondents indicated that project performance improved when led by certified project managers or those with more than five years of experience [1].

Workforce quality is equally critical. Contractors with permanent work teams (rather than daily laborers) achieved productivity levels 20–30% higher, due to better coordination and stronger accountability.

However, labor turnover and skilled worker migration remain persistent issues in East Java. Many technical staff transfer to projects offering higher compensation, reducing team stability. Contractors attempt to mitigate this through:

- Performance-based incentive schemes,
- Internal training on quality management and occupational safety (K3), and
- Partnerships with vocational institutions to recruit young technical talent.

Ultimately, competent human resources directly enhance three essential aspects of project success: labor productivity, completion time, and work quality.

4.3.3 Communication and Stakeholder Coordination

Project communication is the third key factor ensuring synchronization among project owners, contractors, and consultants. Miscommunication often leads to undocumented design changes, delays in drawing approvals, and discrepancies in quality assessment.

Findings show that projects conducting weekly coordination meetings with written minutes and visual progress reports (e.g., photographs or drone captures) achieved an on-time completion rate of 76%, compared to only 49% among those lacking formal communication systems.

Internal team communication also plays an important role. Routine site meetings, digital communication groups (e.g., WhatsApp Business, Trello, or project dashboards), and application-based daily reporting enhance transparency and accountability.

Nevertheless, bureaucratic delays—particularly in local government projects—still hinder communication efficiency. Lengthy document approval processes frequently delay field activities. Therefore, effective communication is not only about frequency but also response speed and decision clarity.

Transparent, timely, and well-documented communication thus serves as a critical foundation for project success.

4.3.4 Risk Management and Field Adaptation

Every construction project carries various technical and non-technical risks. Survey results indicate that 57% of contractors lack a formal risk management plan and rely on reactive rather than proactive approaches.

In East Java, geographic and climatic conditions significantly affect project execution. For example:

- Road and bridge projects in the southern region (Pacitan, Trenggalek) often experience delays due to heavy rainfall.
- Coastal projects (Gresik, Tuban) encounter challenges with soft soil and high groundwater levels.
- Urban projects (Surabaya, Sidoarjo) face delays caused by traffic permits or coordination with utility networks.

Contractors that prepared a risk register at the project's inception reduced delays by up to 25%. Common risk mitigation strategies include:

- Developing flexible work schedules allowing for non-field activities during adverse weather,
- Allocating buffer time within the critical path,
- Setting contingency funds (5–10% of total project value), and
- Employing weather monitoring and soil moisture sensors in geotechnical projects.

Furthermore, on-site decision-making authority plays a vital role in rapid adaptation. Contractors granting adequate autonomy to project managers can respond to design changes or emergencies without disrupting overall schedules.

4.3.5 Technology Utilization and Digitalization

Technology adoption in project management remains limited among medium-scale contractors, but recent trends show steady growth. Approximately 40% of contractors use software such as MS Project, and 25% apply digital reporting tools (apps or Google Sheets).

Building Information Modeling (BIM) adoption is still low—only 10% of contractors involved in large-scale projects use it, typically as subcontractors of national firms. Nevertheless, BIM offers substantial benefits in reducing design errors and accelerating coordination.

Financial management technologies (e.g., project cost tracking systems) are increasingly implemented, particularly in Surabaya and Malang. These systems enable real-time expenditure monitoring, ensuring cash flow stability and cost efficiency.

In supervision, drone-based progress reporting is becoming more common for infrastructure and road projects, allowing clients to remotely monitor project advancement.

The main barriers to technology adoption include high software licensing costs and lack of staff training. Some contractors utilize open-source or spreadsheet-based solutions. Future government support—through training and digitalization programs—could accelerate this transition.

4.3.6 Integrative Analysis Across Factors

Correlation analysis revealed strong interdependencies among success factors:

- Project management correlated significantly with human resource competence ($r = 0.81$), indicating that managerial effectiveness relies on workforce quality.
- Communication and risk management showed moderate correlation ($r = 0.67$), suggesting that coordination reduces technical risk.
- Technology utilization correlated positively with decision-making speed ($r = 0.74$), influencing time efficiency.

Hence, project success results from the synergy among management, human resources, communication, adaptability, and technology. Successful contractors integrate these dimensions within adaptive, data-driven management systems.

4.3.7 Regional Context of East Java

Medium-scale contractors in East Java exhibit unique characteristics compared to other Indonesian regions:

- Projects are predominantly funded by local governments with strict regulations and phased payment systems.

- Diverse geographic conditions (coastal, mountainous, urban) demand high adaptability.
- Local work culture emphasizes collaboration but remains weak in documentation and digitalization.

Thus, regional success strategies should focus on:

1. Strengthening management standards in line with national construction norms (SNI 21500).
2. Expanding professional training and certification for local workforce.
3. Promoting inter-contractor collaboration to share resources and heavy equipment.
4. Gradually adopting digital systems tailored to field conditions.

These strategies will enhance competitiveness while maintaining flexibility and community engagement.

V. CONCLUSION

5.1 Conclusions

Based on the research findings regarding the determinant factors of construction project success among medium-scale contractors in East Java, several major conclusions can be drawn:

1. **Effective project management is the most dominant factor determining project success.** Elements such as comprehensive planning, realistic scheduling, and systematic project control show a strong correlation with time efficiency, cost effectiveness, and output quality. The application of structured project management frameworks such as the *Project Management Body of Knowledge* (PMBOK) or ISO 21500-based systems has proven effective in enhancing consistency and predictability in project implementation.
2. **Human resource quality is the second most influential determinant.** Technical competence, professional experience, and communication skills of project teams directly affect a contractor's ability to handle dynamic field conditions. Companies that conduct regular training and performance evaluations achieve significantly higher project success rates than those that do not.
3. **Financial management and cash flow control critically influence operational stability.** Many medium-scale contractors experience liquidity constraints due to delayed payments from project owners. Contractors that implement cash flow forecasting, financial tracking, and proactive risk management systems tend to complete projects on time and within budget.
4. **External factors—such as weather conditions, government regulations, and market price fluctuations—also affect project performance.** However, their impact can be mitigated when contractors apply structured risk management strategies, including contingency planning, supplier diversification, and partnerships with financial institutions.
5. **The utilization of construction technology and digital project management systems remains limited but demonstrates strong potential.** Contractors adopting technologies such as *Building Information Modeling* (BIM), *Microsoft Project*, or *Enterprise Resource Planning* (ERP) systems exhibit superior coordination, documentation, and quality control compared to those using conventional methods.
6. **Communication and coordination among stakeholders significantly influence project outcomes.** Transparent, timely, and well-documented communication between contractors, consultants, and owners reduces technical errors, minimizes conflict, and accelerates decision-making processes.

Overall, the success of construction projects among medium-scale contractors in East Java is determined by a balanced integration of internal factors (management, human resources, finance, and technology) and external factors (regulations, environment, and market dynamics) [2]. The key to success lies in each contractor's ability to adapt to changing conditions and to continuously innovate in managerial practices.

5.2 Recommendations

A. Practical Recommendations

For Medium-Scale Contractors

- Enhance professionalism through certified project management training programs (e.g., PMP, ISO 21500, or BIM workshops).
- Develop digital systems for cost and time control to enable real-time project performance monitoring.
- Strengthen workforce capacity through continuous professional development and safety (K3) training.
- Build strategic partnerships with financial institutions, material suppliers, and professional associations to increase competitiveness and resilience.

For Local Governments and Regulatory Bodies

- Provide training and support programs on project management and construction technology for local contractors.
- Improve transparency in the tender process and introduce contractor development policies that favor performance over low-cost bidding.
- Offer fiscal incentives or subsidized project financing for contractors that consistently deliver high-quality, on-time projects.

For Project Owners (Clients)

- Ensure transparent communication in payment schedules, design changes, and supervision processes.
- Prioritize contractors with robust quality and financial management systems, rather than solely evaluating based on the lowest bid.

For Professional Associations and Academia

- Develop capacity-building programs and applied research collaborations focusing on project management innovation and digital transformation.
- Promote joint studies between universities, construction associations, and regional governments to enhance efficiency and competitiveness in the construction sector.

B. Academic Recommendations

For Future Research

- Future studies are encouraged to employ multivariate quantitative methods such as *Structural Equation Modeling (SEM)* or *Partial Least Squares (PLS)* to statistically measure the relative influence of each success factor.
- Comparative studies among different contractor classes (small, medium, and large) could provide insights into managerial strategy variations and project performance differences.
- Expanding the research scope to other Indonesian provinces would allow for national-level generalization and benchmarking.

For Theoretical Development

- This study reinforces the theory that construction project success is influenced not only by technical resources but also by managerial capability and communication quality.
- The findings highlight the importance of integrating classical project management theories with digital management practices and local-context adaptation (local wisdom-based project management).

5.3 Research Implications

The findings of this study offer strategic implications for enhancing the competitiveness of East Java's construction industry. By understanding the determinant factors of project success, contractors can:

- Optimize resource utilization and reduce waste,
- Improve timeliness of project completion,
- Ensure quality in accordance with national standards, and
- Strengthen corporate reputation among clients and the public.

Consequently, applying these findings can foster a more professional, efficient, and sustainable construction industry aligned with Indonesia's national infrastructure development agenda and the *Vision of Indonesia 2045*.

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