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The Impact of Construction Management Patterns on Housing Quality in Housing Residences

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Abstract

This study examines how construction management patterns, self-performance versus subcontracting, and Project Manager (PM) leadership relate directly to housing quality in a residential project. Using a case study of the Vila Rizki Insani development (IDR 3,800,000/m²), a mixed-method approach integrated unit-level complaint records during a 90-day retention window, pre-handover homecare checklists for ready-stock units, project documents, and semi-structured interviews with PMs, foremen, and estate staff. Quantitative analysis compared the outcomes across two contractors: a self-performing contractor delivering 297 units and a subcontracting contractor delivering 106 units. Self-performing output showed lower normalized complaint rates (minor 2.36%, moderate 2.36%) but included a small incidence of serious defects (0.34%), whereas subcontracting showed a higher minor-complaint rate (8.4%), lower moderate complaints (1.88%), and no serious cases recorded during retention period. Qualitative findings indicate that contracting schemes structure accountability and inspection routines, shaping the PM's practical leverage over workmanship; transactional control is easier to operationalize under self-performing teams, whereas fragmented trade packages in subcontracting increase interface gaps and finishing rework risk. Overall, contracting schemes and workforce capacity emerged as primary drivers of quality consistency under tight pricing, with complaint response speed influencing perceived quality. The study recommends aligning work packages with supervision capacity and formalizing inspection and post-sales response routines.

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INTRODUCTION

In residential construction projects, contractors typically appoint a Project Manager (PM) to coordinate delivery, ensure accountability, and act as the operational link between the developer's plans and day-to-day execution on site. While housing development is often discussed in terms of design and engineering requirements, project outcomes in practice also hinge on how effectively people, time,

materials, and workflows are managed in the field. As the main person in charge, the PM integrates technical planning with on-site supervision, aligning labor productivity with the project's core constraints of cost, time, and quality. When schedules slip, overtime and accumulated overhead costs can quickly erode margins, making progress acceleration not simply a technical objective but also a managerial necessity.

A central managerial decision shaping on-site dynamics is the payment or contracting scheme used to organize the labor. In field construction, two dominant approaches are commonly applied: self-performance and subcontracting. Under self-performing arrangements, a single contractor is responsible for the entire work package, including labor procurement, supervision, and completion control. In subcontracting, work is divided into smaller specialized units, such as foundations, walls, roofing, floors, or installations, handled by different foremen or craftsmen who are typically paid upon completion of specific tasks (Hua et al., 2025). These schemes are not merely administrative mechanisms for disbursing wages; they influence scheduling discipline, coordination complexity, overhead exposure, and incentives that drive worker motivation and output. Differences in responsibility scope, payment timing, and coordination patterns can create distinct productivity trajectories and quality risks across housing project phases (Hua et al., 2025).

Beyond the contract structure, leadership remains an important contextual factor in shaping site performance. Leadership styles commonly observed in project environments include authoritarian, transactional, transformational, and democratic approaches (Northouse, 2016). In theory, certain styles may align more effectively with specific work systems. Self-performing teams tend to be more stable and centrally managed, potentially enabling transactional leadership through clearer targets and incentives, and transformational leadership through a shared quality vision and sustained commitment (Northouse, 2016). Authoritarian leadership may produce short-term compliance but can undermine motivation and workmanship quality if used excessively, while democratic leadership may improve communication but risk slowing decision-making when rapid execution is required (Northouse, 2016). In subcontracting contexts, where workers are often task- and volume-oriented and operate in separate units, the PM's leadership influence may be more constrained by fragmented accountability and dispersed control, making the contracting scheme itself a dominant driver of outcomes. This interaction between the work system and leadership suggests that the effectiveness of field management cannot be understood without examining how contracting choices structure daily supervision, incentives, and coordination demands.

From a project delivery perspective, each scheme presents a trade-off. Self-performing arrangements can strengthen coordination efficiency, consistency of workmanship, and ease of oversight because activities are managed under one accountable party (Clough et al., 2015). When executed professionally, this approach can offer stronger predictability in terms of cost and time for

project owners. In contrast, subcontracting can provide cost flexibility because payments are tied to completed work segments and may be better suited to small-scale projects, renovations, or tasks requiring detailed specialization (Clough et al., 2015). However, subcontracting also increases the risk of task overlap, inconsistent quality, and coordination delays when multiple parties operate independently without strong integration. Because real projects often face shifting constraints, contractors may combine both schemes; for instance, they may keep structural works under self-performing control while delegating finishing works to subcontractors to balance speed, cost exposure, and quality assurance. This makes the selection and configuration of contracting schemes a strategic management decision shaped by the project scale, technical complexity, available resources, and on-site managerial capacity.

These issues become especially visible under financially constrained contracts, where thin margins can pressure contractors to prioritize speed over workmanship and may increase the likelihood of disputes and occupant complaints after the handover. In the Vila Rizki Insani housing project, contractor withdrawal emerged as a major operational disruption, reportedly driven by the perceived low contract value of Rp 3,800,000.00 per square meter. From a field management perspective, such conditions intensify the need for efficient labor planning and payment management because schedule slippage magnifies overhead accumulation and threatens profitability. They also raise practical concerns about unit readiness at handover, formalized through the Handover Report or Berita Acara Serah Terima (BAST), which represents a critical quality and accountability checkpoint for developers, contractors and consumers. Under these pressures, the PM's responsibilities expand beyond routine supervision into sustained operational problem-solving: maintaining workforce performance, safeguarding minimum quality standards, and ensuring units are deliverable for occupancy despite constrained financial headroom.

This study examines how contracting schemes implemented by PMs shape worker motivation and performance, and how these effects translate into construction progress acceleration. Using a real-life case study of the Vila Rizki Insani housing project, this study aims to produce an empirical account of field-level management dynamics, including how PMs sustain delivery under low contract values and how contracting choices interact with leadership practices to influence work efficiency, overhead exposure, and building quality. By focusing on the operational reality of payment structures and site leadership, this study seeks to generate practical recommendations for managing similar housing projects where time pressure, cost constraints, and handover readiness must be balanced in a highly variable field environment.

As a case-based inquiry, this study was designed to provide depth rather than broad generalization. The findings are necessarily shaped by local project conditions and participant perspectives, and workers' responses to leadership and payment structures may reflect subjective

judgments. In addition, external influences such as weather, household constraints, wage expectations, and owner pressure can affect motivation and productivity but may not be fully captured within the study's scope. The analysis also reflects a relatively short observational window and relies on a combination of secondary progress data and limited direct observations, which may not comprehensively represent all dimensions of productivity, such as long-term cost efficiency or post-occupancy quality performance. Despite these constraints, the study's strength lies in offering grounded insights into how contracting schemes function as managerial levers in the field and how PMs navigate trade-offs between speed, quality, and financial survival within real residential development conditions.

A rigorous literature review should ground the study in established theory and prior empirical findings so that the observed field phenomena can be interpreted through a coherent academic lens. In housing construction, managerial choices are rarely neutral: the contracting scheme used to organize work (self-performing contracts versus subcontracting) and the Project Manager's (PM) leadership approach jointly shape coordination patterns, labor behavior, and ultimately the quality consistency of delivered units. Accordingly, this review synthesizes the core concepts underpinning contracting schemes, leadership style classifications, the project success triangle of cost–quality–time, and work motivation theory, followed by a focused discussion of prior studies that explain how these elements interact in construction settings and where the current evidence remains incomplete for small-to-medium residential projects.

Leadership style is generally understood as the way in which a leader influences, directs, and motivates a team to achieve shared objectives. Northouse (2016) described several leadership styles that frequently appear in organizational settings, including authoritarian, transactional, transformational, and democratic leadership. Authoritarian leadership is characterized by centralized decision-making, strict supervision, and a strong emphasis on discipline. This approach is often considered useful under conditions requiring rapid compliance or strict control, such as emergencies or highly constrained operational environments (Lewin et al., 1939; Northouse, 2016). Transactional leadership is defined by an exchange-based relationship between leaders and followers, in which performance is reinforced through rewards and corrected through sanctions, making it well-suited to work systems with measurable targets and structured routines (Bass & Riggio, 2006; Burns & Burns, 2008). In contrast, transformational leadership focuses on articulating a compelling vision, inspiring commitment, and attending to individual development; it is frequently associated with sustained engagement, loyalty, and long-term performance improvements (Bass & Avolio, 1990; Burns, 1978). Democratic leadership emphasizes participation, two-way communication, and shared decision-making, which can strengthen accountability and ownership of outcomes, although it may require strong facilitation to avoid delays when quick decisions are required (Gastil, 2014; Northouse, 2016). These typologies suggest that leadership in construction should not be treated as a single uniform influence; rather, different styles

may be more or less compatible with the coordination demands and incentive structures embedded in a project's work system.

Construction projects also operate through distinct work implementation systems that determine responsibility allocation, coordination complexity, and control of productivity and quality. Two widely recognized systems are self-performing and subcontracting. In a self-performing contract scheme, one contractor carries comprehensive responsibility throughout the project lifecycle, including labor management, material procurement, supervision, and completion. This configuration can strengthen coordination efficiency and promote consistent quality, but it also raises the managerial burden and requires strong on-site control capability to translate plans into reliable execution (Clough et al., 2015; Costantino & Pietroforte, 2004; Eccles, 1981; Faraji et al., 2022). In a subcontracting scheme, the work scope is decomposed into smaller specialized packages that are delivered by multiple parties or individual contractors. This approach can provide flexibility and allow detailed technical attention to specific trades; however, it also increases coordination demands and can weaken quality consistency if integration and supervision are inadequate (Costantino & Pietroforte, 2004; Hsieh, 1998; Karim, 2020). Because each system carries different operational risks and control mechanisms, the selection of an appropriate contracting scheme is typically contingent on the project scale, technical complexity, resource availability, and management capacity present in the field.

Project success in construction is commonly framed through the interdependence of cost, quality, and time factors. Cost–quality–time logic highlights that performance in one dimension often produces trade-offs in the others, especially under tight constraints. Accelerating schedules without adequate quality control can increase rework and defects, whereas delays can inflate overhead and undermine financial viability. Therefore, project leaders are expected to balance resources and supervision intensity so that targets remain achievable across all three dimensions (Atkinson, 1999; Kerzner, 2017). This perspective is particularly relevant for residential projects, where contract values, delivery deadlines, and customer satisfaction are tightly connected, and where repeated units intensify the visibility of inconsistencies in the workmanship.

The behavioral pathway through which leadership and contracting schemes influence project outcomes is often mediated by motivation and performance. Herzberg's Two-Factor Theory distinguishes between hygiene factors, such as pay, working conditions, and security, and motivator factors, including recognition, achievement, responsibility, and opportunities for growth (Herzberg, 1966). In construction contexts, hygiene factors are frequently salient because work is physically demanding and schedule pressures are high, while motivator factors can determine whether workers sustain effort and attention to workmanship when constraints are tightened. Leadership can shape both sets of factors by structuring rewards, enforcing standards, recognizing contributions, and providing clarity regarding expectations. Under low contract-value conditions, where financial buffers are limited

and overtime can quickly increase overhead, motivation becomes even more critical as a determinant of productivity and quality.

Empirical research has examined leadership and contracting arrangements in construction, offering evidence that leadership style is associated with motivation and performance, but its effectiveness may also depend on project conditions and management systems. Toor and Ofori (2008) reported that transformational leadership is positively related to workforce motivation and loyalty in construction settings, arguing that leaders who communicate vision, provide emotional support, and attend to individual needs are more likely to generate engagement and productivity. Their findings also suggest that authoritarian approaches, particularly when participation is suppressed over extended periods, can create resistance and weaken work quality, which is consequential for residential projects that require consistent standards across multiple units. This line of evidence supports the idea that leadership is not merely an interpersonal variable; it can shape how workers interpret demands and how willing they are to maintain quality under time pressure.

Complementary evidence comes from Chan et al. (2012), who showed that transactional leadership can be effective in construction projects characterized by strict structures and measurable targets. Their results indicate that clear expectations combined with a consistent reward-and-punishment system can improve efficiency and contribute to faster progress in the learning process. However, they also imply that purely transactional approaches may be insufficient in more dynamic settings, where unexpected site constraints require flexibility and maintaining morale is essential to prevent conflict and performance deterioration. This suggests a practical synthesis: transactional mechanisms may stabilize productivity when tasks are well defined, whereas democratic or transformational elements may be needed to sustain cooperation and resolve on-site uncertainties.

The contracting scheme literature similarly indicates that work system design influences coordination, time control, and quality outcomes, often by shaping the accountability and integration. Arditi and Mochtar (2000) emphasize that contracting arrangements are closely tied to field management methods and that different systems produce different time and quality profiles. Projects operating under self-performing arrangements often show stronger consistency and clearer time management because a single party retains the full responsibility. However, this advantage can be reversed if the cost and schedule estimates are inaccurate, thereby increasing financial exposure. Subcontracting can be cost-effective for staged or smaller packages; however, it may heighten coordination conflicts and compromise quality if interfaces between trades are poorly managed. These findings align with the broader view that contracting schemes are structural determinants of project behavior because they define how work is divided, supervised, and incentivized in projects.

Evidence from local contexts further underscores the relationship between contracting schemes, contractor capacity, and housing quality. Mallawaarachchi et al. (2024) highlight that subcontracting is

frequently used in low- to mid-range housing as a cost-control strategy, but it can produce uneven quality across units when supervision and integration are weak. Their work highlights the PM's role as a critical quality controller, especially when cost pressure encourages speed-oriented execution that risks workmanship defects. This has important implications for the present study: contracting schemes may establish the baseline level of quality risk, while leadership and supervision practices determine whether that risk is contained or amplified in day-to-day execution.

Prior research indicates that leadership style and contracting schemes each matter for project performance; however, the evidence base remains less explicit about how these variables jointly influence the final construction quality in small-to-medium residential developments, where cost sensitivity is acute and repetition of units magnifies variability. Many studies have examined leadership outcomes, such as motivation, loyalty, and efficiency, while contracting studies have often focused on coordination and cost–time performance. Few studies have integrated leadership style, contracting scheme choice, and quality outcomes within a single explanatory model for the housing sector. This gap is practically meaningful because residential projects commonly operate under tight margins and strict handover expectations, making the alignment between leadership practices and contracting structures central to sustaining quality while meeting the delivery targets.

Building on these theoretical and empirical insights, a conceptual framework for the present study positions the PM leadership style and contracting scheme (self-performing versus subcontracting) as core antecedents of housing construction quality (Figure 1).

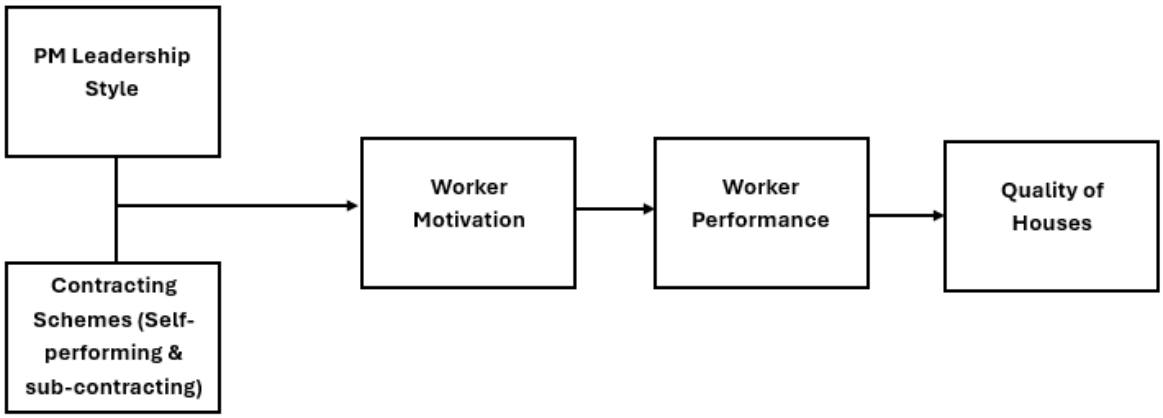

Figure 1. Conceptual Framework

The framework assumes that both variables can directly influence quality by shaping oversight intensity, accountability clarity, and coordination reliability. It also anticipates indirect effects through employee motivation and performance. Leadership is expected to affect motivation by shaping recognition, discipline, communication, and expectations, which then influence performance in terms of speed, adherence to specifications, and overall productivity. Contracting schemes are expected to

affect motivation and performance by structuring incentives, workflow continuity, and team stability. Simultaneously, contracting schemes may directly affect quality consistency because self-performing systems centralize control under one entity, whereas subcontracting disperses responsibility across multiple parties and increases interface risks. By analyzing these relationships simultaneously, this study aims to explain how managerial design and leadership behavior combine to shape construction outcomes and to produce recommendations for improving quality control and delivery reliability in resource-constrained housing projects, particularly within the operational realities observed in the Vila Rizki Insani case.

METHOD

This study employed a mixed-method research design that integrated construction field data, surveys, project documentation, and semi-structured interviews to examine how Project Manager (PM) leadership style and contracting schemes influence housing construction quality, both directly and indirectly, through worker motivation and performance (Han et al., 2025). The quantitative component was used to systematically measure patterns of quality outcomes across housing units and test associations between management practices and observed performance indicators. The qualitative component was used to capture contextual explanations, decision rationales, and lived experiences of key actors on site, allowing the study to interpret statistical patterns within the operational realities of a low-contract-value housing project.

This research was conducted as an embedded case study within the Vila Rizki Insani housing development. The case study approach was selected because it enables a close, context-sensitive examination of how leadership practices, work system choices, and field constraints interact under real-project conditions (Amadi, 2023). The primary participants included PMs, foremen, and workers involved in the construction process, as well as representatives from the developer's estate function, who manage consumer complaints and pre-handover quality checks.

Data collection was based on three sources. First, quantitative housing unit data were compiled from field observations and project records. Units were counted and assigned to the contractor responsible for the block or cluster based on the Work Agreement issued after the Surat Perjanjan Kerja (SPK). A Work Agreement (SPK) is a formal document that defines the rights and obligations of the developer and contractor, including the scope of work, contract value, implementation timeframe, and quality standards. It also functions as a control reference and dispute resolution basis when field execution deviates from the agreed terms. Housing units were classified by sales status into occupied (sold) and ready-stock (unsold) units to ensure the comparability of quality information across different occupancy conditions. For occupied units, quality outcomes were operationalized through documented complaints received by the estate department and direct reports from residents. For ready-stock units, quality was

assessed using the developer's homecare or pre-handover assessment records conducted by the estate or project manager. This strategy allowed us to evaluate building quality based on observed conditions and documented service events rather than relying solely on respondent perceptions.

To standardize outcome measurements, the study applied complaint severity criteria that distinguished between minor, moderate, and severe issues. Minor complaints included cosmetic or finishing-related defects such as hairline cracks, floor gaps, and general cleanliness or aesthetic deficiencies. Moderate complaints referred to functional issues that indicated partial system failure or water intrusion, such as roof or ceiling drips, wall seepage, minor electrical short-circuits, or intermittent water quality problems. Severe complaints captured high-impact defects that affected safety or structural integrity, including major roof leaks, collapsed ceilings, and structural damage or defects. In addition to complaint records, a resident satisfaction survey was administered to provide supplementary perception-based information on unit quality and post-occupancy experience, which supported the interpretation of the complaint data.

Qualitative data were collected through semi-structured interviews with key informants, particularly PMs and foremen, who were actively engaged in the project. The interviews were designed to elicit explanations of why specific leadership approaches were adopted in the field, how contracting schemes were determined (self-performing or sub-contracting), what constraints were faced under low contract values, and what strategies were used to sustain motivation, performance, and acceptable quality. The interview protocol used open-ended prompts aligned with the study variables while allowing flexibility for respondents to introduce unanticipated factors relevant to performance and quality (Mallawaarachchi et al., 2024).

Secondary documentation was gathered to corroborate field accounts and quality outcomes, including work progress reports, worker-attendance records, technical drawings, and handover-related unit records. These materials were used to verify unit-level data, contextualize the schedule and workforce conditions, and strengthen the factual basis of the analysis.

Data analysis followed an integrated mixed-methods procedure. Quantitatively, unit data were organized in Microsoft Excel and summarized using descriptive statistics to profile the quality patterns across contractors and unit types. The analysis examined the distribution of complaints by severity level and complaint domain (e.g., structure, architecture, finishing, plumbing, and electrical), alongside basic counts of total units built per contractor and the breakdown of occupied versus ready-stock units. Summary measures, such as totals, percentages, and ranges, were calculated to identify contractors or clusters associated with higher complaint loads or greater severity. These descriptive results served as the baseline for interpreting the potential relationship between field management approaches and quality outcomes observed across units.

Qualitative interview data were analyzed using thematic analyses. The interviews were transcribed

verbatim and coded to identify recurring concepts related to leadership patterns, reasons for selecting contracting schemes, on-site obstacles, incentive and coordination issues, and perceptions of how work systems shape quality consistency. Themes were then compared against the quantitative patterns to explain why certain contractors or arrangements were associated with specific complaint profiles and to illuminate the mechanisms linking leadership and contracting decisions to worker behavior and workmanship.

To enhance validity, triangulation was applied by cross-checking the consistency across three sources: housing-unit and complaint records, interview accounts, and project documentation. Convergence across these sources was considered stronger evidence, whereas discrepancies were examined as potential indicators of reporting bias, incomplete records, or context-specific factors affecting observed quality outcomes.

RESULTS AND DISCUSSION

This section reports the quantitative and qualitative findings from the Vila Rizki Insani housing project and synthesizes both strands to explain how contracting schemes and PM leadership practices relate to construction quality outcomes, complaint patterns, and project risk in a low contract-value environment. The analysis relies on complaint records gathered during an active retention window, combining resident reports for occupied units and homecare/checklist assessments for ready stock units. Because the complaints captured were limited to units still within retention at the time of data collection, the findings should be read as conservative estimates of quality issues rather than a full life-cycle defect inventory.

4.1. Result

4.1.1. Quantitative findings: complaint patterns by contracting scheme

The quantitative analysis focused on the unit output by the contractor and the distribution of complaints by severity. Two contractors were used for primary comparisons because they applied distinct work systems in the same project context. PT. Kharisma Sherina Mulia (PT. KSM) implemented a self-performing scheme, whereas PT. Pindo Bangun Mandiri applied a subcontracting/piecework approach in which workers were paid per trade and task specialization. Unit counts and complaint rates were compiled from the project as of October 10, 2025, and the complaint data reflected a 90-day retention period that was active during collection.

For PT. The total volume of KSM observed was 297 units. Despite this large production scale, the recorded complaint rate was relatively low when expressed as a proportion of units, although the absolute number of complaints was notable because of the high unit count of the product. The

distribution of complaints suggests that most issues fell into the minor and moderate categories, with a small number escalating to serious defects. The complaint profile for the self-performing contractor is summarized below:

Table 1. Self-performing result

	Minor Complaint	Moderate complaints	Serious complaints
Total units complain	**7**	7	1
Percentage	2,36%	2,36%	0,34%

In contrast, PT. Pindo Bangun Mandiri built 106 units using a subcontracting arrangement. The absolute number of complaints recorded during retention was lower than that of the PT group. KSM's, but the pattern changed when normalized to the number of units: minor complaints appeared at a higher rate, while moderate complaints were comparatively lower, and no serious complaints were captured during the retention window. The subcontracting contractor's complaint profile is summarized below:

Table 2. Sub-contracting result

	Minor Complaint	Moderate complaints	Serious complaints
Total units complain	9	2	0
Percentage	8,4%	1,88%	0%

Two points emerge clearly when these profiles are read together. First, the difference between absolute complaint counts and normalized complaint rates is important for interpretation. PT. KSM recorded more total complaints because it delivered nearly three times as many units, but its complaint percentage remained lower overall. PT. Pindo delivered fewer units but showed a higher proportion of minor complaints. Second, the severity distribution differed between the schemes. The self-performing contractor had at least one serious complaint recorded within retention, whereas the subcontracting contractor recorded no complaints during the same window. This does not prove that severe defects did not occur in subcontracting, but it does indicate that within the observed retention data, serious defects were more visible in the self-performance output.

Field records indicate that the most common issues across both contractors were finishing-related and completeness problems rather than structural failures. Minor complaints typically involve small imperfections, such as patchy paint, hairline cracking, or imprecise finishing details. Moderate complaints generally reflected water intrusion symptoms (e.g., drips and seepage) or functional issues that required remedial work but did not necessarily imply structural instability. Serious complaints were rare and were more aligned with major leaks or defects that could degrade habitability and increase the likelihood of escalated resident dissatisfaction.

The unit-level review also suggested that many units contained multiple minor findings rather than a single, isolated defect. As observed in the field, units frequently had several minor issues documented at once, followed by a smaller number of moderate issues, whereas major issues were uncommon. The typical pattern was that minor findings tended to cluster, indicating variability in the thoroughness of the final checks and the consistency of the finishing supervision. In practical terms, these defects are the most sensitive to supervision intensity and workflow discipline, especially under time pressure.

From an operational standpoint, the quantitative pattern implies different quality risk profiles for each system. Subcontracting may produce a higher volume of minor imperfections relative to output, potentially because segmented responsibilities create interface gaps and make “last-mile” completion work more difficult to standardize across units. Self-performing may produce fewer complaints proportionally but can still experience variability, especially when the high production volume stretches the supervisory capacity, increasing the chance that isolated serious defects slip through. This interpretation is consistent with the observation that retention data often reflect not only the underlying defect rate but also the capacity and discipline of the project team to document, track, and close issues before the handover.

4.1.2. Interpreting the quantitative pattern through PM control and leadership application

A key explanatory factor emerging from the field interpretation is the degree of PM control over labor and work processes in each scheme. In a self-performing arrangement, PM control tends to be more direct because labor is organized within a single management structure, enabling the PM to assign tasks, manage discipline, and enforce productivity standards more immediately. This structure can support transactional leadership practices that rely on clear targets, monitoring, and performance-based reinforcement to stabilize daily output (Northouse, 2016). However, the same structure also concentrates supervisory responsibility, which becomes difficult to maintain when the production scale is large. When the unit volume rises, the PM’s capacity to supervise finishing details across many units

can become a bottleneck, creating variability between blocks or teams and allowing a small number of higher-severity defects to persist into retention.

In subcontracting, PM control over daily workmanship tends to be more constrained because work is delivered by separate trade teams or foremen who may operate with greater autonomy and prioritize task completion over cross-trade coordination. In this environment, transactional leadership can become more administrative, focusing on scheduling, recording, and interface management rather than continuously shaping work behavior on the ground. Consequently, the PM's influence on the fine-grained quality discipline can weaken, and minor defects can accumulate because the system depends heavily on coordination across multiple specialized actors. This interpretation aligns with field observations that subcontracting units were often "neat" in finishing when supervision was tight but could still show recurring minor defects, such as hairline cracks and uneven paint, when integration and re-checking were inconsistent.

4.1.3. Qualitative findings: mechanisms behind quality and profitability trade-offs

The qualitative analysis aimed to explain how PMs, foremen, estate staff, and residents experienced the work systems and interpreted the relationship between leadership practices, contracting choices, complaint patterns, and profitability under the low contract value of Rp 3,800,000/m². Interview data were processed through coding to identify recurring themes regarding quality variability, speed, supervision constraints, and complaint responsiveness.

The PM interviews revealed a consistent tension between production speed, supervisory coverage, and financial stability. PMs described self-performing as effective for rapid civil execution when materials were available, but also acknowledged that finishing quality could suffer when the number of units and the scale of mobilization exceeded the supervision capacity. They also framed self-performing as producing smaller but steadier margins because rework costs could be controlled systematically. Subcontracting in PM accounts could create opportunities for higher profits early on through task-based payments and tight control of each work item; however, the same structure could expose the contractor to budget shocks when complaints were high and remedial work had to be financed after completion. The table below preserves the PM interview coding exactly as it was captured.

Table 3. PM Interview

	Quality	Profit
Self-performing	The building quality is quite good and fast, especially in the civil section, but in terms of finishing there are several complaints due to the large number of units and manpower, so there are several missed supervisions.	According to PM, the profits generated from the self-performing system are relatively small but more stable. Additional costs due to re-repairs can be reduced, thus maintaining profit margins, even though the contract price of Rp 3,800,000/m² is relatively low.
	"There are weekly reports that must be filled out and submitted every weekend, the problem is that the scale is large and requires more agile mobilization." -Salma (PM PT. KSM)	"For a tight price like this, it's a bit difficult, the important thing is that there are materials on site and the work is completed quickly so there's not much loss." - Salma (PM PT. KSM)
Sub-contract	The quality of the building is neat in terms of finishing, but even though the civil construction is not as fast as the contract, supervision can be maximized.	Actually, for wholesale work, you can get a big profit, especially in the beginning, as long as there are no complaints about our work costing too much. The good thing is that we can fully supervise each job.
	"Usually, each foreman (per job) will have a progress report, which I will then record in the progress report." - Exe, PM PT. Pindo	"If you are working as a wholesaler, you must be fully supervised so that the work is done properly so that there will be no complaints after it is finished." - Exe, PM PT. Pindo

The foremen provided a complementary perspective that clarified how incentives and risks were distributed across the two systems. In self-performing work, foremen emphasized speed and the ability to reallocate labor across tasks, which helps absorb shocks and reduce losses when certain activities are stalled. They framed civil works as particularly compatible with the system because the output can accelerate quickly if the material supply is stable. Simultaneously, they highlighted that

finishing requires sustained oversight, and post-handover complaints can become a recurring burden that consumes time and resources. In subcontracting, foremen stressed that the scope is clearer and supervision per trade can be maximized, but financial exposure increases because each craft team's margin is thinner, and any complaint can directly erode pay. This mechanism helps explain why subcontracting can look better at handover when tightly supervised but can also be fragile when complaint rates rise because trade teams may lack incentives or capacity to return after payment is settled. The coded foreman narratives are presented below.

Table 4. Foreman Interview

	Quality	Profit
Self-performing	The quality of the contract system is excellent from a civil engineering perspective, as the workers can work quickly as long as the materials are available. However, finishing work requires more supervision.	The relatively small contract price requires efficient workmanship, especially with regard to time, to ensure timely delivery. Furthermore, since the price is agreed upon from the start, budget management can be more precise.
	"If you buy in bulk, the quality in terms of civil and finishing is faster, but you have to make more effort after handing over to the consumer to handle complaints." - Maulana, Foreman of PT. KSM	"If it's a contract, it's fine as long as the deal is clear from the start. So that later when we hire people to work, we both understand the conditions." - Maulana, Foreman of PT. KSM
Sub-contract	The quality of the building for handover can be better than contract work because each job has its own foreman and supervision can be maximized.	The profit for contract work is smaller for the craftsman because the craftsman only does one job without being able to substitute it with other types of work, so when there are complaints it becomes a financial problem.
	"So, if you sub-contract, you need to be very careful so that there are no complaints because if there are complaints, we could suffer losses." - Adam, Foreman of PT. Pindo	''For this wholesale keteng, the price is cheap for the craftsman because we only do the work, so if there are complaints, it really has an impact on

		the budget for paying people.'' - Adam, Foreman of PT. Pindo

Estate staff accounts focus on the practical visibility of defects during the checklist and early occupancy phases. Their observations reinforce the idea that minor complaints are common and, to a degree, expected during the handover stage, especially before a unit is fully occupied by the patient. However, the estate narratives also distinguish between systems in terms of finishing neatness and the types of defects commonly found. Estate feedback tended to frame subcontracted finishing as visually cleaner when supervision was maximized, while acknowledging that hairline cracks and uneven paint still occurred in the final product. The estate interview coding is presented below.

Table 5. Estate Interview

	Quality
Self-performing	In general, there are some complaints about quality after handover or during the checklist, even if they are minor, so they can be addressed immediately.
	"Minor complaints like leaks, hairline cracks, and defects are normal, especially if the building hasn't been occupied yet." - Fallah, estate staff of PT. KSM
Sub - contract	The completion of the subcontract work was neat, although there were still minor issues found such as hairline cracks and uneven paint.
	"If the finishing is fully supervised by a sub-contract contract, the handover can be more beautiful." - Syam, estate staff of PT. Pindo

Resident interviews add an important demand-side lens that connects defect types to lived experience and satisfaction. Residents frequently described hairline cracks and minor leaks as salient early issues, but their overall judgment was strongly conditioned by the responsiveness during the retention period. When contractors acted quickly, residents tended to interpret defects as manageable and part of early building adjustments. When responses slowed, especially after retention expiry, satisfaction declined even when the defects were not severe. Residents also hinted at variability within self-performing outputs, where some units were perceived as very good and others required repeated follow-up. The resident interview coding is presented below.

Table 6. Resident Interview

Theme	General Contract	Sub-contract
Dominant Complaint	Most complaints concern finishing issues, such as uneven paint and hairline cracks. However, some units experience severe leaks, not just water droplets.	Common hairline cracks and defects.
Early Damage	Hairline cracks, defects, leaking water droplets, and seepage on the walls.	Uneven paint, hairline cracks, seepage.
Delayed repair	Still based on the retention period, but handling is quick because manpower is available on site.	Handling is based on the retention period, but because the craftsman works on a per-job basis, there may not be someone on standby for specific complaints.
PM Leadership Style	Directions are clear, instructions, and communication are discussed in a healthy manner before work begins.	Directions are clear, instructions, and communication are discussed in a healthy manner before starting work.
Profitability	Tends to be more stable because all work is delegated to the foreman.	The price can be higher as long as there are minimal complaints, as craftsmen are paid per job.
Key Differences	Quality, risk, profit	Quality, risk, profit

Across stakeholder groups, the interviews converged on a shared mechanism: quality outcomes are not evaluated solely by defect presence but also by the reliability and speed of complaint handling. This is particularly relevant in residential projects, where handover marks the transition from production logic to customer experience, and where even minor defects can become reputational risks if not resolved quickly and transparently.

The selective coding stage consolidated the interview evidence into thematic comparisons that aligned with the quantitative patterns. In both schemes, finishing issues dominated; however, differences emerged in how defects were produced, how repairs were organized, and how risk was translated into profitability. The synthesized themes are presented below.

Table 7. Selective Coding

Theme	**General Contract**	**Sub-contract**
Dominant Complaint	Most complaints concern finishing issues, such as uneven paint and hairline cracks. However, some units experience severe leaks, not just water droplets.	Common hairline cracks and defects.
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Discussion

When both data streams are read together, the contracting scheme functions as the primary structural driver of quality risk, whereas PM leadership and supervision intensity determine whether the risk is contained, redistributed, or amplified at the unit level. The quantitative results show that subcontracting is associated with a higher proportion of minor complaints, which is consistent with the qualitative accounts of interface complexity and the tendency for small finishing imperfections to persist when the coordination is fragmented. Subcontracting can still produce visually "neat" handover outcomes, especially when each trade is closely supervised, but the system's sensitivity to complaint costs and standby capacity creates vulnerability. If defects appear after completion, the project can struggle to mobilize the correct trade team quickly, and repairs can be delayed or disputed.

In contrast, self-performing entities appear to generate fewer complaints, suggesting stronger systemic control and more uniform processes. However, qualitative evidence clarifies that uniformity is not guaranteed when the unit volume is high and supervision becomes stretched. In such conditions, finishing and quality checks can become inconsistent across units, creating variation that residents experience as "some units are very good, others have many complaints." The presence of a recorded serious complaint under the self-performing contractor may reflect the downside of scaling pressure: when teams are driven to meet output targets, rare but high-impact defects can slip through if inspection is uneven.

Leadership style, especially the transactional orientation reported in the field, operates as a practical instrument for aligning behavior with targets under cost and time pressure. Transactional leadership, as applied here, emphasizes clear work instructions, productivity control, and discipline through monitoring and consequences, making it a realistic approach for constrained projects (Northouse, 2016). The qualitative data suggest that transactional control is easier to operationalize when the PM has direct leverage over labor allocation and daily routines, which is more characteristic of self-performing arrangements. Under subcontracting, transactional mechanisms tend to shift toward paperwork, progress recording, and interface control; this makes them necessary for order but less effective for continuously shaping workmanship habits on site. In this sense, differences in complaint profiles are not solely "quality outcomes" but reflections of how much behavioral control the system grants the PM and how easily quality standards can be enforced as routines rather than as exceptions.

These findings also illuminate why profitability narratives differ by role type. PMs and contractors described self-performing as generating smaller yet more stable profits because rework can be managed internally, and the cost impact of complaints can be controlled through coordinated mobilization. Subcontracting was described as potentially more profitable early on because payments

are tightly matched to completed tasks; however, it becomes financially fragile when complaint rates rise because remedial work consumes the budget without generating new progress value. Foremen under subcontracting expressed this fragility most directly, noting that complaints can immediately erode their already thin margins because they cannot offset losses by shifting to other tasks. This clarifies why subcontracting can incentivize careful completion at handover but can also lead to avoidance or slower engagement after payment is settled, particularly when retention incentives weaken.

Resident satisfaction is a practical "bridge variable" between technical defects and perceived quality. The interviews showed that residents could tolerate minor cracks or early leaks if the responses were prompt during retention. However, satisfaction drops sharply when responsiveness slows or when issues persist beyond retention boundaries. This suggests that quality management in housing cannot be treated as purely construction-phase control; it must extend into structured complaint handling and transparent service processes that preserve trust, even when early defects occur. In other words, a project's reputation is shaped not only by defect incidence but also by the predictability of remedial workflows.

The evidence supports a targeted set of managerial implications framed as quality-risk control rather than one-size-fits-all prescriptions. First, developers can reduce variability by standardizing which work packages must be executed under self-performance control and which may be subcontracted. The observed pattern suggests that using self-performing for major structural and architectural work strengthens coordination and reduces proportional complaint rates, while subcontracting can be reserved for limited, well-defined tasks where trade specialization adds value and interface risks can be controlled through strict checklists and sign-off gates. Second, the minimum workforce capacity appears to be functionally linked to finishing quality and repair responsiveness. When manpower is available and organized, repairs are executed faster, and small defects are less likely to accumulate across units. This implies that developer oversight should include enforceable expectations regarding labor availability, particularly for finishing and post-handover response teams.

Third, PM supervision routines are important because they determine whether transactional leadership drives disciplined workmanship or simply accelerates volume. In constrained housing projects, a transactional leadership mode may be unavoidable and even efficient; however, it must be anchored in explicit work standards, consistent inspections, and clear escalation channels to ensure that target orientation does not degrade finishing quality. This aligns with the field conclusion that transactional leadership is the most operational approach under the current project constraints; however, its effectiveness depends on consistent supervision, disciplined quality checks, and a structured management system (Northouse, 2016).

Fourth, after-sales complaint handling should be treated as part of the quality system, rather than an informal add-on. A transparent complaint intake and tracking mechanism can reduce disputes, shorten response times, and stabilize resident satisfaction, even when initial defects are unavoidable. Qualitative evidence indicates that responsiveness is a decisive driver of satisfaction; therefore, service process design becomes a quality intervention, not merely a customer service improvement.

Based on the combined results, the most defensible "business solution" is to redesign the operating standard so that the contracting scheme choices align with the defect risk and supervision capacity. Standardization should require self-performing execution for major work packages, where integration and coordination strongly determine outcome consistency, while allowing subcontracting only for minor or clearly bounded tasks that can be supervised through trade-specific checklists and acceptance criteria. This approach reduces the probability that minor defects accumulate through interface gaps and reduces the likelihood that rare but severe defects escape detection under high-volume output.

The second solution concerns workforce structuring. The findings indicate that manpower availability influences both the completeness of the finishing and the speed of the complaint response, which in turn shapes resident satisfaction. Implementing minimum workforce requirements by work stage is therefore justified as a quality-control mechanism: it is not primarily about increasing labor costs, but about preventing systemic under-resourcing that leads to repeated defects and expensive rework cycles.

The third solution targets PM routines. Daily checklists and weekly technical coordination meetings can shift transactional leadership from target chasing to disciplined execution by making quality verification the default part of the workflow. Training for PMs should focus on inspection discipline, defect prevention in finishing work, coordination across trades, and structured complaint closure because finishing was repeatedly identified as the dominant complaint source.

The fourth solution is to formalize contractor performance scoring. Using a transparent scorecard based on complaint rates per unit, repair speed, compliance with workforce standards, and finishing quality can create incentives for sustained quality, reduce opportunistic behavior near retention boundaries, and help developers make better contractor-selection decisions for future phases.

CONCLUSION

This study concludes that building quality in the Vila Rizki Insani housing project is primarily shaped by the contractor's work system under a low contract price of IDR 3,800,000/m², with the contracting scheme and workforce capacity emerging as the most dominant determinants. Self-

performing arrangements produced more consistent quality than subcontracting because they supported a more stable workforce, clearer cost control, and better planning. In contrast, subcontracting under tight margins intensified operational pressure, which reduced workforce stability, constrained material availability, and increased finishing errors. Workforce capacity also proved decisive for both quality and contractor profitability: too few workers led to rushed workmanship, schedule delays, higher overtime and rework costs, and more occupant complaints, whereas an adequately sized workforce improved finishing accuracy, reduced defects, and protected profit margins even at low unit rates. The Project Manager's leadership style had a significant but secondary influence, functioning mainly as a process optimizer, maintaining discipline, enforcing standards, and controlling material waste; however, its effectiveness depended on the contractor's organizational structure and labor availability. Building quality was further reflected in occupant complaints, particularly related to finishing (e.g., painting, frames, plumbing), while occupant perceptions were also strongly affected by the speed and effectiveness of complaint handling, indicating that post-construction responsiveness forms part of the perceived quality. Overall, the findings show an interaction among contracting schemes, labor capacity, and PM leadership, where the first two dominate under cost pressure and jointly shape progress control, supervision effectiveness, defect rates, and the contractor's ability to respond to occupants, providing a basis for managerial actions such as prioritizing self-performing methods, setting minimum labor standards, strengthening routine supervision, improving after-sales response systems, and investing in workforce training for finishing work.

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