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EVALUATING THE EFFECTIVENESS OF MOBILE-BASED DEFECT MANAGEMENT APPLICATIONS (DMAs) ON HOMEBUYER SATISFACTION IN HIGH-RISE CONDOMINIUM PROJECTS

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Abstract

Malaysia's high-rise condominium projects continue to grapple with construction defects, as many homebuyers report unresolved issues that adversely affect their satisfaction and trust. In response, Defect Management Apps (DMAs) have emerged as digital tools designed to streamline defect reporting and resolution processes. This study evaluates the effectiveness of DMAs in enhancing homebuyer satisfaction within Klang Valley's high-rise housing market. A mixed-methods approach was employed, combining quantitative data from 191 survey respondents with qualitative insights from 20 semi-structured interviews. The results reveal several key patterns. First, the adoption of DMAs does not necessarily correlate with satisfaction; while users appreciate the convenience, they express frustration when underlying service delivery issues persist. Second, satisfaction decreases as defect counts rise, underscoring the number of defects increases, highlighting the critical role of effective back-end coordination in managing substantial volumes of complaints. Third, generational and experiential differences play a significant role. Additionally, DMA effectiveness is shaped by factors such as usability, responsiveness, communication transparency, and real-time tracking capabilities. This study concludes that technology alone cannot guarantee satisfaction; it hinges on how effectively digital platforms integrate with supportive service processes.

Keywords: construction defects, homebuyer satisfaction, digital defect management, technology

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INTRODUCTION

The growing prevalence of high-rise residential condominiums in urban Malaysian cities, particularly in Klang Valley, has intensified the need for effective defect management during the post-construction period. As more homeowners take possession of stratified properties, ensuring timely and transparent defect rectification during the Defect Liability Period (DLP) has become essential for maintaining homebuyer satisfaction (Mohd Saufi et al., 2023). Traditional defect reporting methods, which often depend on manual forms and delayed communication, have been criticized for inefficiency, lack of transparency, and poor user experience (Kam et al., 2023). For instance, a recent industry survey reported that “80% of new homebuyers face defects within the first year,” highlighting the prevalence of post-handover issues (REHDA, 2023). While such defects are common across various property types, high-rise developments present specific challenges due to their density, complex mechanical and electrical systems, and the collective management of shared facilities under strata title arrangements (Rahimin et al., 2024). These factors contribute to a higher volume of reported defects, more complicated coordination between contractors and management bodies, and greater expectations from multiple stakeholders in comparison to landed housing. Thus, concentrating on high-rise condominiums enables this study to capture the unique defect management challenges encountered in Malaysia’s rapidly urbanizing residential sector.

In response to these challenges, developers have introduced mobile-based Defect Management Applications (DMAs) as digital solutions aimed at enhancing communication, tracking, and defect resolution (Agapiou et al., 2022; Abdul Basit et al., 2023). These platforms are designed to streamline processes for both homebuyers and building management teams by offering real-time updates, photo documentation, and direct reporting channels (Hashim et al., 2023). However, the limitations of traditional defect reporting methods warrant closer examination: manual forms are time-consuming, prone to misplacement, and lack transparency; phone calls or emails create inconsistent records; and delays in communication often frustrate homeowners (Kam et al., 2023). These shortcomings justify the introduction of mobile DMAs as structured platforms to improve defect tracking, enhance transparency, and establishing a digital record of all reported issues.

Despite the convenience, numerous studies and industry reports indicate that many DMAs still fall short in practice. Common challenges encompass limited responsiveness, unintuitive interfaces, and poor integration with contractor workflows (Chen et al., 2021; Martínez-Navalón et al., 2020). This misalignment between user expectations and the actual delivery of services may diminish the capacity of DMAs to enhance overall satisfaction (Abdul Basit

et al., 2023; Azian et al., 2023). Effective communication, characterized by a willingness to assist and prompt service, has long been recognized as a significant contributor to significantly enhance customer satisfaction (Parasuraman et al., 1988; Gurmu et al., 2021). Classic service quality models emphasize that satisfaction is driven by the extent to which consumers' expectations are met by the service experience (Oliver, 1980; Zygiaris et al., 2022). In the context of housing defect management, if DMAs do not provide timely updates or user-friendly interactions, they risk failing to meet homeowners' expectations regarding service quality (Saleh et al., 2024). Against this backdrop, the objective of this study aims to evaluate the effectiveness of DMAs in enhancing homebuyer satisfaction in Klang Valley's high-rise housing market, while also understanding key factors that shape the user experience.

LITERATURE REVIEW

Technology and Defect Management in Residential Construction

The use of mobile applications for defect management is an increasingly relevant area of study, particularly in urban contexts such as Klang Valley, Malaysia (Abdul Basit et al., 2023; Kam et al., 2023). Given the rapid advancement of technology, mobile-based solutions offer significant improvements in accessibility, responsiveness, and overall service quality compared to traditional defect management systems (Aydinoğlu & Bovkır, 2020; Agapiou et al., 2022). Prior research indicates that when homeowners can report issues easily and receive swift feedback, their satisfaction with post-purchase services improves (Talebi & Bardsiri, 2023; Mohd Saufi et al., 2023). DMAs enable convenient defect reporting, status tracking, and direct communication, which heightens transparency and assures homebuyers that their concerns are being addressed (Hashim et al., 2023). This immediacy and openness can contribute positively to satisfaction levels because, timely responsiveness and clear communication are key dimensions of perceived service quality (Zygiaris et al., 2022).

The user experience is another crucial factor in the success of DMAs. Studies have suggested that user-friendly interfaces and intuitive usability lead to higher engagement and satisfaction with mobile applications (Martínez-Navalón et al., 2020; Abdul Basit et al., 2023). In the real estate context, if a defects management app is easy to navigate and notifies users about progress, homebuyers are more likely to feel in control and satisfied with the process (Chen et al., 2021; Azian et al., 2023). Conversely, a poorly designed app can cause frustration, which increases the stress associated with dealing with defects. As such, quality assessments of DMAs including usability testing are essential to ensure that they meet homebuyer expectations (Chohan, 2021; Rahimin et al., 2024).

The data-driven capabilities of DMAs also present opportunities to improve construction quality. Digital defect reports can be aggregated and analysed to identify recurring issues and their root causes (Faqih & Zayed, 2021; Abubakar et al., 2023). By leveraging insights from reported defects, developers and property managers can implement targeted improvements in construction practices and preventive measures (Aydinoğlu & Bovkır, 2020). This continuous feedback loop can not only increase current homeowners' satisfaction by reducing repeat problems but also to enhance the overall quality of future projects (Hashim Lim et al., 2024). In other words, effective defect management through DMAs can create a virtuous cycle in which customer feedback informs better building practices, leading to higher quality homes and thus more satisfied customers in the long run (Zhu et al., 2021; Saleh et al., 2024).

Digital Transformation and Defect Management Apps (DMAs)

The construction industry's digital transformation has seen the emergence of mobile apps for snagging and defect management worldwide. In Singapore, for example, the use of AI-powered defect tracking systems (integrated with their CONQUAS quality scheme) provides automated updates and analytics to preempt defect patterns. Hong Kong's adoption of Smart Facility Management integrates building management systems that handle defect reports as part of a larger smart home/building ecosystem. These international benchmarks highlight potential advanced features: automation (auto-scheduling repairs, AI-based defect recognition via photo analysis), better categorisation (machine learning to classify defect types and severity), and enhanced communication tools (chatbots or integrated chat with project teams).

Malaysia's DMA landscape is maturing as well, though many DMAs remain bespoke to developers, resulting in varying quality. A review of common DMA platforms (cited in Chohan et al., 2021; Saufi et al., 2023) indicates typical functions: defect report submission with photos, a list of reported items with status (e.g., "Open", "In Progress", "Closed"), and sometimes knowledge bases for common issues. However, consistent pain points reported include technical glitches, unintuitive interfaces, and lack of integration with contractors' workflows (leading to the app being bypassed by site teams who resort to calls or paper). These shortcomings often lead site teams to bypass the app entirely, reverting to phone calls or paper-based reporting, which undermines the intended benefits of digitalisation. Therefore, addressing these recurring weaknesses requires targeted improvements across communication, usability, and system integration, beginning with efforts to strengthen real-time information flow between homeowners and developers. The literature review suggests several recommendations to guide the improvement of mobile-based defect management applications.

Improve Real-Time Communication

A critical first step is to resolve communication gaps. DMAs should incorporate real-time status updates and notifications to address the communication gap that is commonly observed in traditional systems. Homebuyers must be kept informed at each stage such as when a defect is acknowledged, when a contractor is assigned, scheduled repair dates, and confirmation of repair completion. Implementing push notifications or in-app alerts for these milestones would greatly enhance transparency and user confidence (Parasuraman et al., 1988; Gurmu et al., 2021). A messaging feature enabling two-way communication between the homeowner and the maintenance team could further strengthen the engagement and reduce the frustration caused by uncertainty (Hashim et al., 2023; Abdul Basit et al., 2023).

Enhance Usability and Accessibility

Developers should prioritise user-centric design upgrades for their DMAs. Key features should include an intuitive interface, seamless navigation, and multilingual support to cater to Malaysia's diverse population (Talebi & Bardsiri, 2023). Built-in tutorials or guided walkthroughs could assist less tech-savvy users in navigating the platform, especially older homeowners who were identified in this study as more likely to face usability challenges. Regular usability testing with real users can help uncover design pain points and guide iterative improvements (Martínez-Navalón et al., 2020). Interface features such as large buttons, simplified language and, clear visual cues can ensure accessibility across age groups and digital literacy levels.

Integrate Comprehensive Tracking and Analytics

The DMA should function not only as a reporting tool but also as an integrated defect management and analytics platform. Developers are encouraged to synchronise the app with their internal defect systems so that every step from defect receipt to final resolution is logged and, where appropriate, shared transparently with homeowners (Aydinoğlu & Bovkır, 2020; Chen et al., 2021). Features such as progress tracking dashboards and visual timelines can give users a clearer understanding of repair status. Advanced analytics could flag recurring issues or re-open tickets, enabling managers to identify underlying quality control problems (Faqih & Zayed, 2021). Over time, aggregated data can inform proactive improvements in construction quality and resource allocation, particularly when patterns emerge (e.g., consistent plumbing issues across units).

Implement AI-Driven Defect Categorisation

Defect misclassification has emerged as a significant challenge in many systems. Integrating an AI module into the DMA could assist by automatically

categorising and prioritising reports using image recognition and natural language processing (Sundaram & Zeid, 2023). For instance, the system could distinguish between minor cosmetic flaws and potentially serious structural defects, enabling developers to respond to urgent cases more efficiently. While final decisions would still involve human inspectors, AI can improve initial triaging and reduce classification ambiguity. Moreover, AI-powered chatbots could offer users instant support by answering frequently asked questions about the Defect Liability Period (DLP) and defect reporting procedures (Talebi & Bardsiri, 2023).

Continuous Training and Capacity Building

Even the most advanced DMA system requires capable and responsive personnel. Developers should ensure that both technical and customer service staff are trained not only in app usage but also in empathetic, solution-oriented communication (Zhu et al., 2021). A technological solution is only as strong as the human processes supporting it. The staff should be tasked with promptly updating defect statuses, answering queries via the app, and resolving tickets efficiently. A dedicated support team or hotline to address DMA-related issues could enhance response quality. In addition, internal audits of the defect handling process can identify systemic bottlenecks, ensuring accountability and timely resolution (Abubakar et al., 2023).

RESEARCH METHODOLOGY

This study employed a mixed-methods research design, integrating both quantitative and qualitative data to evaluate DMA's effectiveness. The quantitative phase focused on capturing usage patterns and satisfaction levels, while the qualitative phase provided in-depth insights into user experiences. Quantitative data were gathered through an online survey distributed to condominium homebuyers in Klang Valley. The survey, conducted with support from the National House Buyers Association (HBA) Malaysia and shared through relevant social media groups, targeted homeowners of approximately 36,837 strata units completed in 2022 and 2023 (NAPIC, 2024). Using Cochran's formula for sample size, a target of 380 responses was set; 191 valid responses were obtained after data cleaning, yielding a response rate of approximately 50%. The survey captured demographic details, number of defects experienced, use of DMAs, and satisfaction levels regarding defect resolution and construction quality.

Qualitative data were collected through 20 semi-structured interviews with homeowners who had used DMAs. Participants were recruited via purposive sampling to ensure a mix of different condominiums and developers in Klang

Valley. Interviews continued until thematic saturation was reached, in line with qualitative research principles that suggest 12–15 interviews are often sufficient for saturation in a homogeneous group (Braun & Clarke, 2021). Each interview explored the participants' experiences with defect reporting and resolution, perceptions of the DMA's usefulness, and challenges they faced. The interviews (conducted in person or via video call) were recorded and transcribed with consent. All participants were assured of anonymity, and in reporting qualitative results, participants are referred to by their number (e.g., Participant 7).

The quantitative strand of the study highlighted overarching trends in DMA usage and satisfaction, including the inverse relationship between higher defect counts and lower satisfaction levels. These findings were further enriched by qualitative interviews that uncovered participants' concerns regarding unresolved or repeated defects. The integration of both strands allowed for triangulation, wherein statistical patterns were validated, clarified, and expanded upon through users lived experiences. This methodological synergy not only assessed the overall effectiveness of DMAs but also unveiled the underlying factors driving variations in satisfaction. This approach was selected because it aligns with methodological literature, asserting that triangulation through the integration of qualitative and quantitative integration enhances the credibility, depth, and explanatory strength of research outcomes (Olsen, 2004; Valencia, 2022).

FINDINGS AND DISCUSSION

Usage of DMAs and Satisfaction Levels

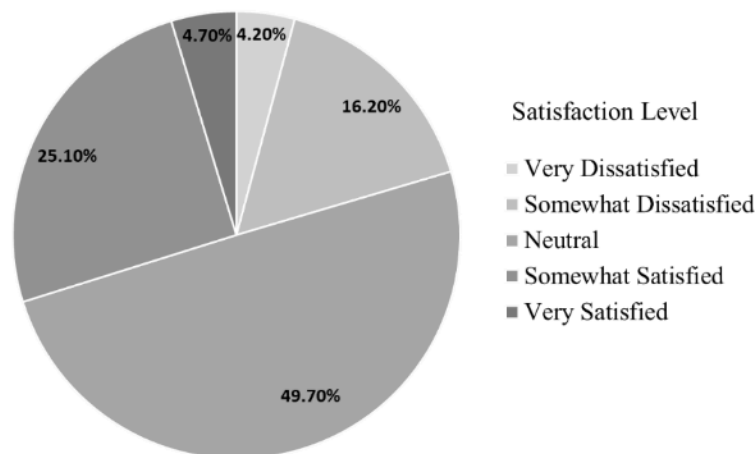


Figure 1: Homeowner satisfaction with the Defect Management App.

The survey data revealed that a large proportion of homeowners turned to DMAs to report and track these defects. Approximately 56% of respondents indicated that they used a mobile defect management app provided by the developer to lodge defect complaints. Despite this relatively high adoption rate, overall satisfaction with the DMA was low. As shown in Figure 1, only approximately 30% of users expressed satisfaction (25.1% “somewhat satisfied” and a mere 4.7% “very satisfied”) with the app-based defect management process. The majority (about 50%) remained neutral, suggesting an ambivalence or mixed experience, and roughly one-fifth of users were dissatisfied to some degree with the app’s performance in managing their issues. This indicates that adoption does not automatically translate into satisfaction, underscoring the gap between technology availability and effective service delivery.

From the qualitative feedback, even fundamental expectations such as being kept informed and receiving timely service were often unmet. One homeowner summarised: “The app makes it easy to submit defects, but I feel left in the dark afterward.” (Participant 10). This lack of feedback was a common theme. While users valued the convenience of submitting reports, they expressed frustration when weeks passed without updates or confirmation of scheduled repairs. Satisfaction with communication and responsiveness was correspondingly low: only 29.9% of surveyed owners were satisfied with developer responsiveness, while 29.4% were outright dissatisfied. This reflects the same neutral/dissatisfied pattern seen in DMA satisfaction, suggesting that the app alone cannot compensate for weak communication practices. In terms of service quality models (Parasuraman et al., 1988), this represents a persistent “responsiveness gap,” where the speed and clarity of communication fall short of expectations.

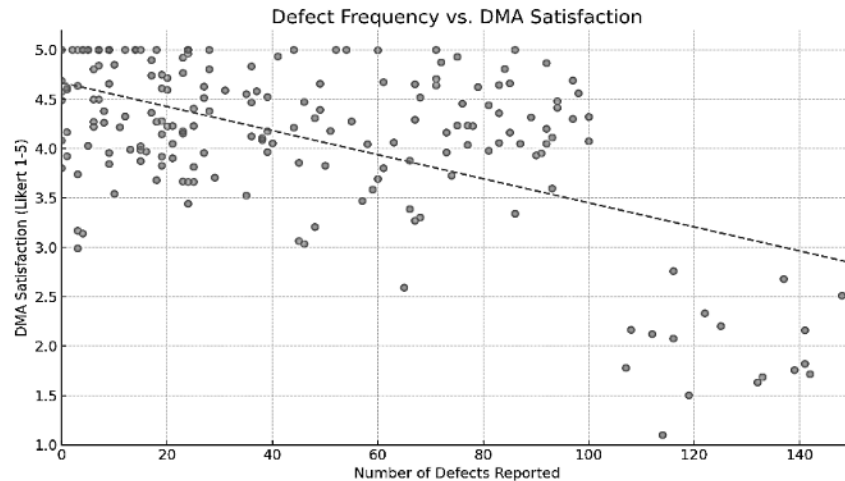


Figure 2: Relationship between number of reported defects and DMA satisfaction (with trend line)

Additionally, Figure 2 shows a clear negative correlation between the number of defects reported and satisfaction with the DMA. Statistical analysis confirmed significance ($p < 0.01$), with each additional defect associated with a -0.56 drop in satisfaction (on a 5-point scale). Satisfaction levels dropped sharply when defect counts exceeded 50, and homeowners with 100+ defects recorded the lowest scores (mean $\sim 2.5/5$). This suggests a compounding effect, where both the volume of defects and repeated failed repairs magnify dissatisfaction. In such cases, the DMA risks being perceived not as a solution but as an added layer of bureaucracy.

This study found a negative correlation between the number of defects a homeowner encountered and their satisfaction with the DMA. In general, homeowners who reported extremely high numbers of defects tended to rate the app and overall defect handling poorly. For instance, those who had more than 100 defects gave some of the lowest satisfaction scores (with a mean satisfaction around 2.5 on a 5-point scale). When defects are numerous, the capacity of the system (and the app) to manage them effectively becomes critical. Several interviewees with a high number of defects expressed frustration that the DMA and developers seemed overwhelmed. "After reporting the same issue three times, it still wasn't fixed properly," said Participant 7, who had one of the highest defect counts in the sample. This indicates that repeated occurrences of unresolved defects severely undermine satisfaction. In such cases, the convenience of the app offers little solace if the underlying problems persist or require multiple attempts to fix. This highlights that the true driver of

dissatisfaction is not the app interface but the underlying failure to resolve issues. The DMA becomes symbolic of inefficiency if repeated complaints go unresolved.

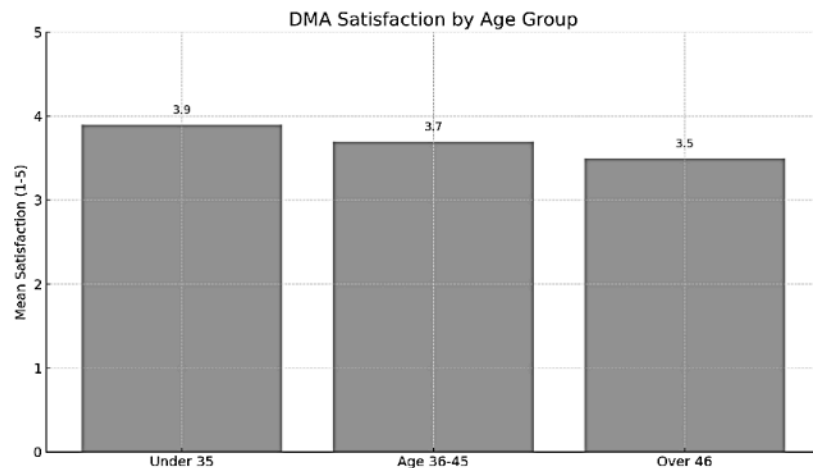


Figure 3: Homeowner Satisfaction by Demographic Groups

In addition, as illustrated in Figure 3, it is found that younger homebuyers reported higher satisfaction with the defect app than older homebuyers. In particular, respondents under 35 years old had the highest mean satisfaction (around 3.9 on the 5-point scale in this sample), compared to those in the 36–45 range (around 3.7) and those over 46 who had the lowest satisfaction (~3.5). ANOVA tests found age-based differences to be statistically significant ($p \approx 0.03$). This suggests that younger buyers were more positive about mobile-based defect management, whereas older owners were more critical or less pleased with the DMA experience, possibly due to usability hurdles or differing expectations. This generational divide mirrors findings in digital adoption research, where perceived ease of use and prior digital experience strongly shape satisfaction (Davis, 1989; Venkatesh et al., 2003).

This study also found that first-time homebuyers were more satisfied with the DMA than repeat (experienced) homeowners on average. First-time homeowners reported a mean satisfaction score of approximately 3.8, whereas those who had previously owned their property rated their satisfaction lower, around 3.5. This difference was statistically significant ($p \approx 0.02$). Researchers noted that experienced owners may have higher expectations or compare the app to prior defect management methods, making them more critical. In contrast, first-time homebuyers, with no prior baseline appeared, to view the DMA more favourably. Figure 4 illustrates these differences. First-time homebuyers had

higher average satisfaction scores than experienced homebuyers in each age category. For instance, among homeowners under 30, first-timers rated their satisfaction as around 3.5/5 on average, compared to about 3.0/5 for non-first-timers.

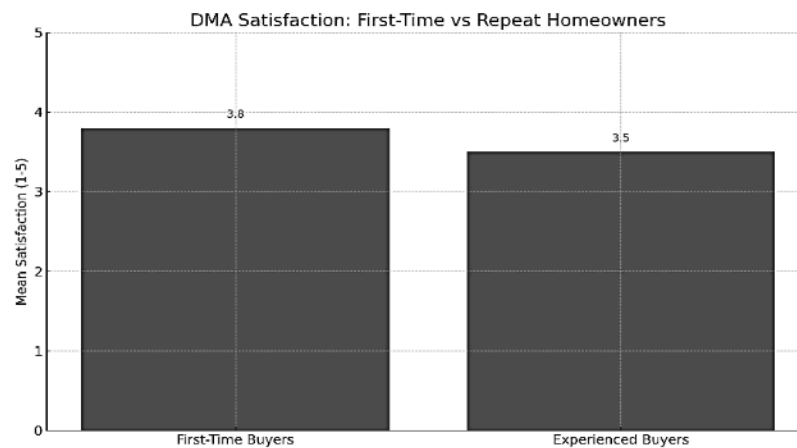


Figure 4: Homeowner Satisfaction by Demographic Groups

These patterns can be interpreted in light of expectations and familiarity. First-time homebuyers might have had lower initial expectations or simply felt grateful to have a formal system (the DMA) in place, whereas experienced owners had higher expectations and could compare the DMA's performance to previous experiences (or to an ideal standard) (Martínez-Navalón et al., 2020; Mohd Saufi et al., 2023). Older owners may also be less comfortable with mobile app technology or expect more personalised service, which could explain their lower satisfaction scores (Zygiaris et al., 2022). One older participant noted that he ultimately "had to hire a third-party inspector to follow up on the repairs," indicating a lack of trust in the app-mediated process (Participant 13). On the other hand, some younger first-time buyers expressed that while the app was "okay," they didn't know if it actually improved anything since they had no prior reference. This suggests a generational difference in how the DMA is perceived, potentially linked to tech savviness and expectations of digital services (Talebi & Bardsiri, 2023; Abdul Basit et al., 2023).

These pattern highlights a paradox in the current use of Defect Management Apps: DMAs have clearly improved certain aspects of the defect reporting process (such as convenience and documentation), yet they have not substantially improved overall homeowner satisfaction with defect handling (Kam et al., 2023; Rahimin et al., 2024). The app solves the "front end" of reporting but cannot mask deficiencies in the "back end" of service delivery. This

distinction is critical: satisfaction is ultimately tied to outcomes (repairs completed), not just processes (issues logged). This shows that although technology can streamline processes, the outcomes of those processes remain paramount in determining satisfaction (Parasuraman et al., 1988; Oliver, 1980).

One positive impact of DMAs is the simplification and centralisation of defect reporting. Homeowners no longer need to fill out physical forms or make repeated phone calls; everything can be logged through the app, creating a digital paper trail (Abdul Basit et al., 2023). This has made defect management more efficient and even environmentally friendly by reducing paperwork. Additionally, the app provides a single platform on which all defects are listed, which is convenient for both homeowners and building management to track issues. In principle, such centralisation is expected to make it easier for developers to analyse defect patterns across units, a benefit consistently highlighted in prior studies of defect management systems (Faqih & Zayed, 2021; Aydınoğlu & Bovkır, 2020). Indeed, the respondents recognised these advantages especially first-time buyers, who largely embraced the new system and, when their issues were fixed in a timely manner, felt that the app had been a useful innovation.

However, the limitations and shortcomings of the current DMAs undermine their full potential. A critical issue here is the lack of real-time updates and feedback through the app. This gap creates a feeling of being “left in the dark” (as one participant put it), which is essentially a tech-mediated continuation of the old communication problem. In terms of service quality, responsiveness is not just about doing the job quickly but, also about keeping the customer informed (Parasuraman et al., 1988; Gurmu et al., 2021). The DMAs under review failed to fully embody that principle; consequently, many users had to seek information through alternative channels, undermining the app's purpose of the app (Hashim et al., 2023; Chen et al., 2021). The app must reliably forward the complaint to the right party and then facilitate a prompt and, transparent response. Without timely updates, the app's ability to reassure and satisfy users is severely limited (Zhu et al., 2021). In service quality terms, responsiveness is not only about fixing defects but also about providing assurance through timely updates (Parasuraman et al., 1988). The absence of this feature erodes trust, sometimes prompting homeowners to bypass the app or hire third-party inspectors.

Another crucial aspect is the user interface and the design of these apps. While most users managed to use the apps, complaints about unintuitive navigation and the absence of features (like progress tracking or multilingual support) suggest that current DMAs may not fully adhere to user-centric design principles (Talebi & Bardsiri, 2023; Martínez-Navalón et al., 2020). In our context, something as simple as a progress bar or status indicator for each defect

could significantly improve user experience by setting expectations (e.g., “In progress – repair scheduled for next week”). The fact that some homeowners reverted to phone calls highlights a technology paradox: poorly designed digital tools drive users back to analogue methods, negating digitalisation goals.

It is important to note that first-time homebuyers’ higher satisfaction suggests that over time (and multiple property experiences), users become more discerning. This could mean that as DMAs become more common, simply having an app will not impress homeowners; the apps will be judged on how well they actually facilitate defect resolution (Abdul Basit et al., 2023). Developers should therefore not be complacent in deploying DMAs and assuming that DMAs will automatically improve customer relations and satisfaction. Instead, sustained satisfaction will depend on continuous feature upgrades and stronger back-end integration with contractor workflows and service culture that accompany it (Chen et al., 2021; Aydınoğlu & Bovkir, 2020).

By comparing these results with broader literature, an alignment with general customer satisfaction theory such as Oliver’s expectation-confirmation model can be observed. If DMAs failed to meet the promise of efficient defect management (unconfirmed expectations), satisfaction remained low (Oliver, 1980; Zygiaris et al., 2022). On the other hand, when an app or system exceeded what little homeowners expected (for instance, a few interviewees were surprised and pleased when a defect got fixed faster than anticipated), it led to positive satisfaction that might not have existed with traditional methods.

DMAs have the capacity to either mitigate or exacerbate the defect management satisfaction problem. They mitigate it when implemented with a strong focus on user communication and effective issue resolution but, exacerbate it when they add complexity or raise expectations that are unmet (Talebi & Bardsiri, 2023; Saleh et al., 2024). Finally, the findings resonate with local industry observations. The mixed results suggest that while DMAs are a step in the right direction representing progress in digital transformation in built environment but are not a panacea. Their success depends on combining technological solutions with organisational capacity, regulatory standards, and a culture of customer-centred service. Without these, DMAs risk being seen as symbolic gestures rather than meaningful innovations.

In short, this study evaluated the effectiveness of mobile-based Defect Management Applications (DMAs) in enhancing homeowner satisfaction within Klang Valley’s high-rise residential market. The results highlight several key patterns. First, adoption of DMAs does not equate to satisfaction; users value convenience but remain frustrated if underlying service delivery problems persist. Second, satisfaction declines as defect counts rise, underscoring the importance of effective back-end coordination to manage large volumes of complaints. Third, generational and experiential differences matter: younger and first-time buyers

tended to be more positive, whereas older and repeat buyers were more critical, reflecting differing levels of digital literacy and expectations. These findings reinforce the expectation–confirmation model, where satisfaction depends on whether outcomes meet or exceed prior expectations.

CONCLUSION

This study contributes to the growing literature on digitalisation in housing by showing that technology alone is insufficient to guarantee satisfaction; rather, satisfaction hinges on the interaction between digital platforms and the service processes they support. Future research could extend this work by conducting longitudinal studies to assess how satisfaction with DMAs evolves over time, exploring cross-country comparisons with more digitally advanced housing markets, and investigating the integration of emerging technologies such as blockchain, augmented reality, or predictive analytics. Such studies would deepen understanding of how digital tools can be embedded within organisational and regulatory frameworks to achieve sustained improvements in housing quality and consumer satisfaction.

In conclusion, DMAs represent a significant step forward in the digital transformation of Malaysia's housing industry. However, their current implementation remains limited in its impact on homeowner satisfaction. Closing this gap will require not only technological innovation but also robust service processes, effective communication, and a stronger culture of customer-centred defect management.

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