ASSIGNMENT 3: NEW PRODUCT DEVELOPMENT

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Group Members:

NAME	STUDENT NO.
ASYRAFF ZULQARNAIN BIN MOHAMAD SABIR	2024429908
MUHAMMAD FARITH DANIEL BIN MOHSIN	2024217252
MUHAMMAD HANIF BIN MOHD FAUZI	2024676236
NUR AIN HANISAH BINTI MAZLAN	2024215626
NIK ALIA AMIRA BINTI NIK AZHAR	2024226602
NUR AINA NAJWA BINTI HASRAN	2024242176
NOOR QISTINA AINI BINTI MOHD JAMAL IKRAM MUDDIN	2024280596

Submitted to:

DR NOOR FAIZAH BINTI MOHD LAJIN

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EXECUTIVE SUMMARY

This report describes Maintenance Request AI Tracker, an innovative property maintenance management system that streamlines the reporting, tracking, and resolution of tenants' complaints and maintenance concerns. The idea combines AI, automation, and a centralized digital dashboard to address the inefficiencies seen in traditional methods of maintenance reporting.

This idea intends to make building maintenance management simpler, faster, and more accurate. Current methods rely heavily on informal channels such as phone calls and WhatsApp messages, which leads to report duplication, information misplacement, response time delays, and a lack of appropriate tracking of maintenance progress. Maintenance Request AI Tracker addresses all of these limitations by creating a systematic, automated, and transparent method that speeds up decisions and gives property managers more control over operations (Hauashdh et al., 2022).

The system allows renters or staff to report maintenance issues by uploading photos via a mobile or web app. Their solution uses AI picture recognition to automatically identify the type of issue for further processing, analyzes urgency, predicts potential expenses, and assigns the request to the appropriate maintenance team. All data stored in the cloud is shown on a single centralized dashboard. Managers can now track the status of the request in real time, including time and cost.

This innovation's target market includes property management companies, building managers, condominium management bodies, and large residential or commercial property owners, particularly those who manage high-density or large-scale developments with frequent and complex maintenance complaints.

The Maintenance Request AI Tracker was developed following an evaluation of numerous maintenance management techniques and systems, including those related to CSS Decision Sdn Bhd's services. Existing systems enable regulated management, but they rely significantly on manual input and processing. This innovation improves the capabilities of those systems through AI and automation, in keeping with Malaysia's drive towards smart property management and digital transformation (Scaife, 2024). The Maintenance Request AI Tracker is a unique solution that improves productivity, accuracy, and user experience during building maintenance.

1.0 INTRODUCTION

Property management must handle issues related to tenant complaints about building, but the maintenance reporting system has a number of flaws that make this task less effective. For instance, reports are frequently made informally through phone calls, conversations, and WhatsApp messages, which makes it challenging to record, analyze, and systematically organize maintenance requests. In fact, the larger the property, the more reports are made, and the more challenging it is to do so manually.

Additionally, there will be a greater chance of handling reports incorrectly, such as making reports twice, losing them, or ignoring them. Certain complaints may be handled improperly in the absence of an effective management and tracking system. Not to mention the challenge of tracking the maintenance process's advancement. Due to management's lack of knowledge, it is difficult to determine whether it has been completed, how long it will take, how much it will cost, and other details. It is quite challenging to determine whether or not complaints have been addressed because progress updates are not documented in an organized manner.

Therefore, we created a product or automatic management system to make management work in handling reports from tenants easier and faster called Maintenance Request AI Tracker. It is a system that is based on Artificial Intelligence (AI) in identifying the type of problem, cause, effect, solution cost and others which saves time for managers. The way it works is that tenants or employees need to capture pictures of problems that occur such as leaking using this system’s apps. Then, this system automatically organizes each report that is made in an orderly manner and provides every information needed by management to handle it. Finally, the system will submit the request to the appropriate maintenance team.

This assignment uses Secondary Research Methodology where we obtain the data needed through online research and not directly from respondents. This idea was inspired by a company that provides a similar service, namely CSS Decision Sdn Bhd. The strategic services offered by the company are very good but still have shortcomings. So, we made some improvements by using technology according to the times that are developing such as the addition of AI in the system. The limitation used is the service related to complaint management in the building.

2.0 NABC APPROACH

The NABC approach offers a simple and easy way to introduce new concepts. It consists of Need, Approach, Benefit and Competition. The idea to create Maintenance Request AI Tracker came from this NABC.

2.1 NEED

1) Reports made informally such as phone calls, conversations and messages via WhatsApp causes difficulties in recording, analyzing, and difficult to organize maintenance requests systematically.

2) Possibility of errors in handling reports will increase such as reports being made twice, lost or ignored. Without a good management and tracking system, some complaints can be mishandled.

3) Difficulty of knowing the progress of the maintenance process. Whether it has been done or not, the duration, cost etc. as management has limited insight.

4) Manger having problem in sorting reports and assigning the right contractor to handle the problem that cause waste of time.

2.2 APPROACH

1) Users take pictures of problems that occur, such as broken tiles, using the application provided.

2) The AI system will analyze the pictures, identify the type of problem, and other information needed by the manager.

3) The system will assign it directly to the correct maintenance team without the need for programming from the management.

4) A digital dashboard will track several data needed about the repair work such as progress, time, cost, and others.

2.3 BENEFIT

1) Very timesaving because some work is done automatically such as problem assessment and work scheduling.

2) Avoids errors such as overlooking reports, incorrect information and errors in reporting twice.

3) Good for large properties such as condominiums because they need to handle a lot of reports from tenants.

4) Reduces maintenance costs over time by identifying recurring issues such as calling a contractor to repair them simultaneously.

2.4 COMPETITION

1) CSS Decision Sdn Bhd has similarities in systematic management but requires a lot of manual work.

2) iProperty Management has similarities in easier onboarding for tenants due to user-friendly interface but is less suitable for very large properties.

3.0 NEW PRODUCT DEVELOPMENT

3.1 DEFINITION OF NEW PRODUCT DEVELOPMENT

New Product Development (NPD) is a planned and organized way for businesses to come up with, create, test, and sell goods that meet changing market needs and strategic goals. The NPD process usually has steps like coming up with ideas, screening concepts, making prototypes, testing products, and finally launching them to make sure that the solution is both technically possible and relevant to the market. (Iqbal & Suzianti, 2021) say that NPD is important for businesses that want to be competitive in fast-changing fields because it lets them keep coming up with new ideas and meet client needs. Their research underscores that NPD encompasses not just novel technologies but also any systematic methodology for product creation or enhancement.

NPD is also a strategic tool that helps businesses deal with competition and stand out in the market. (Dhargalkar et al., 2016) stated that NPD includes both completely new items and upgrades to products that are already on the market. This makes it a broad and flexible idea that may be used in many different fields. This means that organizations can come up with new ideas by adding new features, using new technology, making things work better, or changing how people use them, even if they don't make anything truly new. NPD makes sure that products stay useful and competitive, especially in places where things change quickly, and new ideas are needed to stay alive.

In this sense, Maintenance Request AI Tracker is a type of NPD because it improves the traditional maintenance request system by adding AI, automation, and predictive features. These changes make the system run better, make communication easier, and make operations more reliable. They show how improving a product within the NPD framework may lead to more effective and responsive solutions for businesses.

3.2 CLASSIFICATION OF NEW PRODUCT DEVELOPMENT

The Maintenance Request AI Tracker created in this study falls within the category of product improvement. The original maintenance request system still serves the same primary purpose of making tracking and reporting easier. Nevertheless, the incorporation of artificial intelligence, automated processing, predictive maintenance insights, and an improved user interface has greatly improved the product. These improvements show how the tracker enhances an already-existing system rather than developing a completely new product category by improving response speed, accuracy, communication, and operational reliability. As a result, the Maintenance Request AI Tracker is a strategic attempt to improve functionality and user experience by technical upgrading and is an example of a product improvement innovation within the larger NPD classification.

(Dhargalkar et al., 2016) stated that as many organizations concentrate on improving their current offerings rather than creating completely new ones, upgrading is a fundamental part of NPD. To satisfy changing expectations, this may entail enhancing features, introducing new technical capabilities, or improving design elements. According to this viewpoint, NPD is a wide notion that includes both innovation and enhancement, allowing businesses to consistently raise the value they provide to customers.

These categories acknowledge that innovation does not always need the development of brand-new goods. Another important and vital aspect of product creation is the improvement of current systems and offers. Without taking on the risks of developing a brand-new product, product enhancement enables businesses to efficiently respond to changing consumer demands, technology breakthroughs, and competitive challenges. Businesses can boost consumer happiness, prolong the lives of current goods, and stay relevant in ever-changing markets by introducing new capabilities, enhancing performance, or upgrading features. The Maintenance Request AI Tracker, for instance, might be regarded as a product improvement within this framework. These enhancements show how NPD may concentrate on methodical changes that increase user experience, operational efficiency, and total value provided to stakeholders in addition to new inventions.

3.3 NEW PRODUCT DEVELOPMENT PROCESS

3.3.1 RESEARCH AND DEVELOPMENT

The Research and Development (R&D) stage plays a crucial role in the New Product Development (NPD) process as it transforms identified problems into a systemized and creative solution. This stage emphasizes generating ideas, idea screening and selecting appropriate technology to ensure that the conceptualized product is both feasible and effective in terms of meeting market's needs. The R&D process for this innovation was guided by issues identified in property management practices in particular maintenance tracking and reporting systems, which have been found to be inefficient in maintenance reporting and tracking systems.

Idea Generation

The idea generation process began after identifying key issues in property maintenance management which derived from the previous case analysis. Common problems included informal reporting through phone calls or WhatsApp messages, lack of data structure, time-delayed maintenance response and inability to track repair process. These issues created operational inefficiencies for property managers and dissatisfaction among tenants.

Based on observation of review of existing digital maintenance systems, there are three potential product ideas that were generated:

Idea 1: Digital Maintenance Request Application (Manual Input System)

This concept was about creating a simple mobile app that allowed tenants to submit maintenance requests with written descriptions and default categories. Although this solution digitalizes the reporting process, it still involves property managers reviewing it manually and categorizing items which takes time and could potentially be less accurate.

Idea 2: Centralized Maintenance Management Dashboard

This concept introduced a universal, web-based dashboard for managers to monitor maintenance requests and contractor performance. Although this process makes better records and

accountability, it requires managers to manually enter details and assign duties, which can prove inefficient in large properties.

Idea 3: AI-Powered Maintenance Request Tracker

This idea focuses on an advanced system in which tenants can send photos of repair problems via an app or online (site portal). The system applies Artificial Intelligence (AI) image recognition to recognise and automatically identify the type of issue and assign it to the appropriate maintenance team. This solution seeks to reduce manual effort, reporting imperfections and response time.

Idea Screening

After generating the ideas, an idea was short-listed through an idea-screening exercise to evaluate each concept based on level of innovation, feasibility, operational efficiency, scalability and ability to solve the identified problems. Among the three ideas, Idea 3: AI-Powered Maintenance Request Tracker was selected for further development.

This concept was selected as it directly addresses the inefficiencies highlighted in the case, such as unstructured reporting, duplicated requests, and slow response times (Cooper, 2017). Unlike the other concepts, system operates under less human intervention since it is fully automated in issue classification and contractor is assigned to the classified issues. Furthermore, the system is scalable and may be implemented in large residential estates, condominiums or commercial buildings where maintenance requests are frequent and complex.

Furthermore, the selected idea aligns with the increasingly popular digital transformation and smart property management in Malaysia. Its ability to integrate existing property management systems through APIs also enhances its long-term viability and commercial potential.

Technology Description

The AI-Powered Maintenance Request Tracker uses image recognition to identify problems such as plumbing leaks, electrical issues or structural damage in tenant-submitted photos, which can help prevent mistakes and speed up response times.

Furthermore, records of preventative maintenance, work orders and other operational data are stored securely in the cloud, allowing property managers and contractors to access information instantly while also providing a basis for long-term analysis of recurring issues and costs.

A digital dashboard displays request status on how long responses have taken and the cost of maintenance work, improving transparency and communication. This easy connection with the property management software (PMS) through APIs provides a smooth data transfer.

The integration of AI technology, cloud system and system interface technology renders such innovation as an all-rounded high quality intelligent solution for contemporary property maintenance management.

3.3.2 PRODUCT DESIGN/FEATURES & TECHNOLOGY DESCRIPTION

An AI-based maintenance tracking system is the suggested product, which aims to improve the effectiveness and openness of maintenance reporting in both residential and commercial properties. In order to solve frequent inefficiencies in conventional maintenance management procedures, the system was created as a software-based solution that combines cloud computing, artificial intelligence, and system integration technologies.

From the perspective of product design and architecture, the system uses a cloud-based, modular architecture with three primary parts which are a management dashboard, an AI-powered issue classification engine, and a tenant reporting interface. Moreover, tenants can use messaging apps like WhatsApp via QR code access or a mobile-friendly online portal to access the system. For consumers with different levels of digital literacy, this design guarantees ease of use and reduces technological obstacles.

Furthermore, tenants can report maintenance issues through the system's features, which include voice inputs, simple text descriptions, and photos. After analyzing the given data, the built-in AI technology automatically classifies problems into pre-established maintenance categories, such as structural, electrical, or plumbing flaws. Additionally, the system allows property managers to react more quickly by ranking reported issues according to their urgency. Therefore, users are informed about their employment status through automated notifications, which enhance accountability and communication.

Besides, the emphasis of artistic and aesthetic design is based on practicality, clarity, and simplicity. To minimize reporting errors, the tenant interface makes use of clear icons, little text, and detailed instructions. In the meantime, the management dashboard offers visual tools to support decision-making and maintenance performance monitoring including status indicators, summaries, and reports.

On the contrary, in terms of technology, the system makes use of machine learning algorithms that have been trained on datasets linked to maintenance in order to gradually increase classification accuracy. Real-time accessibility and safe data storage are supported by cloud

infrastructure. Further, interoperability with current property management systems has been rendered possible through Application Programming Interface (API) integration, which minimizes data duplication and simplifies operational operations.

In overall, the product's technological features and design are created to satisfy consumer demands for dependability, efficiency, and usability. The suggested solution, which combines AI-driven automation with user-centric design and system integration, provides a scalable and useful method for enhancing maintenance management in the real estate sector.

3.3.3 CONCEPT TESTING

Concept testing is the most important stage in the new product development (NPD) process. It is to test whether a product you are making will be accepted by people or not. In short, concept testing is a type of research that involves interviewing consumers about your ideas and thoughts for a product or service before you actually launch it. To make important decisions prior to the launch, you can assess your clients' acceptability and willingness to purchase (Questionpro, 2025). Concept testing can reduce the probability of loss because it involves early feedback from users. If users respond negatively to the tested concept, the organization can avoid producing the product, thus reducing the risk of financial loss.

For the Maintenance Request AI Tracker, Concept testing was conducted among students who are currently renting, students studying in the field of real estate management, as well as workers involved in the real estate management industry. to assess the feasibility and usefulness of the proposed system. These a few key objective of concept testing :

1. To determine whether users understand the AI-based maintenance request concept
2. To evaluate user interest and perceived usefulness
3. To identify potential issues before prototype development
4. To identify aspects that can be improved
5. To measure the percentage of users who accept and like this product

For our company, the concept testing has been carried out by the online google form. There are 40 respondents in the surveys. From the survey data, 10 of the respondents are in the age range of 18 - 21 years old. And 28 respondents are age 22 - 25 years older. Other respondents are age 25 years old and above. For the survey on the occupation, 30 out of the 40 respondents are students in university and the other 10 respondents are workers.

3.3.4 USER INTERFACE DESIGN

***Figure 1.0**: Maintenance Request Dashboard*

User interface design is an important component in the development of the Maintenance Request System to ensure that the system is easy to use, clear, and effective for the target user, namely the building manager. This design was developed based on the findings of concept testing and the actual needs of building management.

This interface system is developed in the form of a centralized dashboard to make it easier for building managers to review areas that require maintenance. This is because all maintenance requests and tasks that need to be completed are displayed in the same display. The main display of the system will show the status of maintenance requests, whether they have not been implemented, are being implemented or have been completed, thus helping users to identify task priorities more quickly and effectively.

Each maintenance request will be displayed on the main display along with key information, including the location of the damage, type of damage, and level of damage, such as whether it needs to be done immediately or not. The complaint details panel allows the building manager to view contractor information and take actions such as assign and approve directly through the system. This more sophisticated and organized system will ease the burden on the building manager because there is no need to go to every place that needs to be maintained because the details are on the main display. At the same time, it reduces errors and increases operational efficiency.

Visually, the continuous use of colors and professional design provides a pleasant working atmosphere that does not divert the user's attention. Overall, the established interface design meets the needs of comprehensive maintenance management and serves as the foundation for the construction of a fully functional system in the following stage.

3.3.5 TEST MARKETING

Companies commonly use test marketing as a tool to check the viability of their new products or a marketing campaign before it is being launched in the market on a large scale. By gathering early data on customer acceptance and usability, companies can effectively mitigate risk and uncertainty of the product. Whether through simulated environments or phased rollouts, this process identifies critical areas for improvement. While it requires an upfront investment of time and capital, test marketing ensures that commercialization is supported by actual consumer insights.

The Maintenance Request AI Tracker is a new invention based on an existing maintenance request platform. A questionnaire survey was conducted using Google Forms, with responses collected from 40 participants, including residents and property management-related users. Respondents were initially questioned about their lifestyle, experience, and use of maintenance request applications in this simulated setting. The suggested AI-based system's capabilities, including automatic tracking, AI-assisted issue categorisation, and real-time status updates, were then thoroughly explained. After that, questions were posed to the respondents to gauge their comprehension of the system, their desire to buy or adopt it, and their general opinion of the product in relation to other options.

In addition, elements of a controlled test marketing concept have been included at the conceptual level. This requires considering that the system would be implemented in specific residential property or any property management companies, where the developer would have control over elements like feature visibility, system access, and advertising focus. Feedback on usability, functionality, and system interface might be closely tracked using this method, giving insights into how the system functions in a controlled but realistic setting.

For business market testing, the test was conducted primarily through online platforms. The usage of Google Forms allowed us to collect data efficiently related to system features, design preferences, perceived usefulness, and acceptable adaptability. Online market testing is particularly suitable for digital systems such as the Maintenance Request AI Tracker, as it enables access to a wider audience at a lower cost. The responses also provided an indication of public interest and the likelihood of adoption among potential users in the property management sector.

Lastly, by creating a demo version of the new maintenance system able to serve as an important tool for refining the platforms and enhancing its core elements. Allowing users to interact directly with the prototype would enable more accurate evaluation of its design, functionality, and AI features. In this early development phase, any design flaws, usability problems, and system constraints can be found with the use of consumer feedback. Early detection of such issues helps reduce future development costs, improves product quality, and increases confidence in the system's market readiness.

4.0 CONCLUSION

To summarise, the Maintenance Request AI Tracker is an effective and up-to-date solution for difficulties that may arise in traditional property maintenance administration. Insufficient reporting, intangible data, delayed response times, and under-reporting of maintenance progress are some of the issues influencing property managers' efficiency and tenant satisfaction. This solution overcomes all of these difficulties by offering a centralised, AI-powered system that automates the entire maintenance request handling process.

The integration of artificial intelligence, automation, and a digital dashboard improves the system's ability to detect maintenance concerns, reduces human error, and speeds up response time. Automatic problem classification and direct assignment to the maintenance team not only reduces the workload of managers but also organizes complaints in a systematic and transparent manner.

Furthermore, the Maintenance Request AI Tracker is best suited for larger properties, such as condominiums and commercial buildings, where maintenance requests are frequent. Its ability to track progress and time, as well as lead cost improvements, will result in a more efficient workplace while improving decision-making and long-term cost control through data analysis and preventative maintenance planning.

The main aspect of this invention is that it integrates New Product Development (NPD) indicators with existing systems in terms of product upgrades, which bring significant value to those systems. The Maintenance Request AI Tracker focuses on improving user experience, increasing managerial effectiveness, and promoting advancement towards smart property management practices, making it a long-term and competitive solution for building maintenance management.

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6.0 APPENDICES

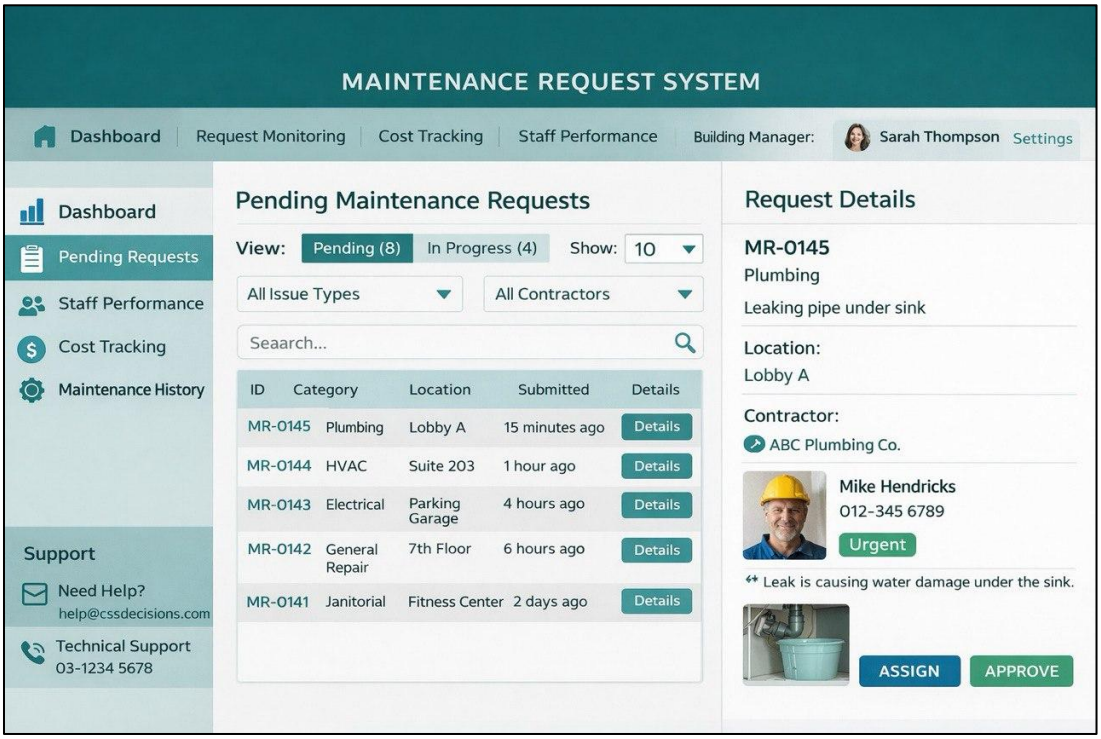

Figure 2.0: *Building manager's point of view when reviewing maintenance requests through the maintenance request system.*

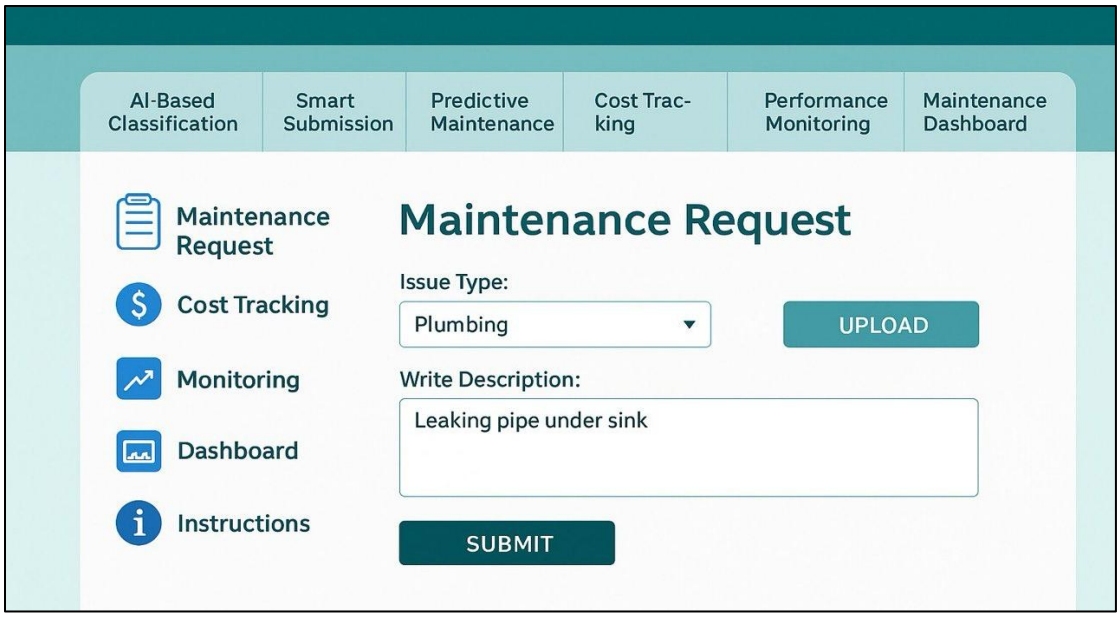

Figure 3.0: *Tenant's point-of-view during submission of a maintenance request through the system*

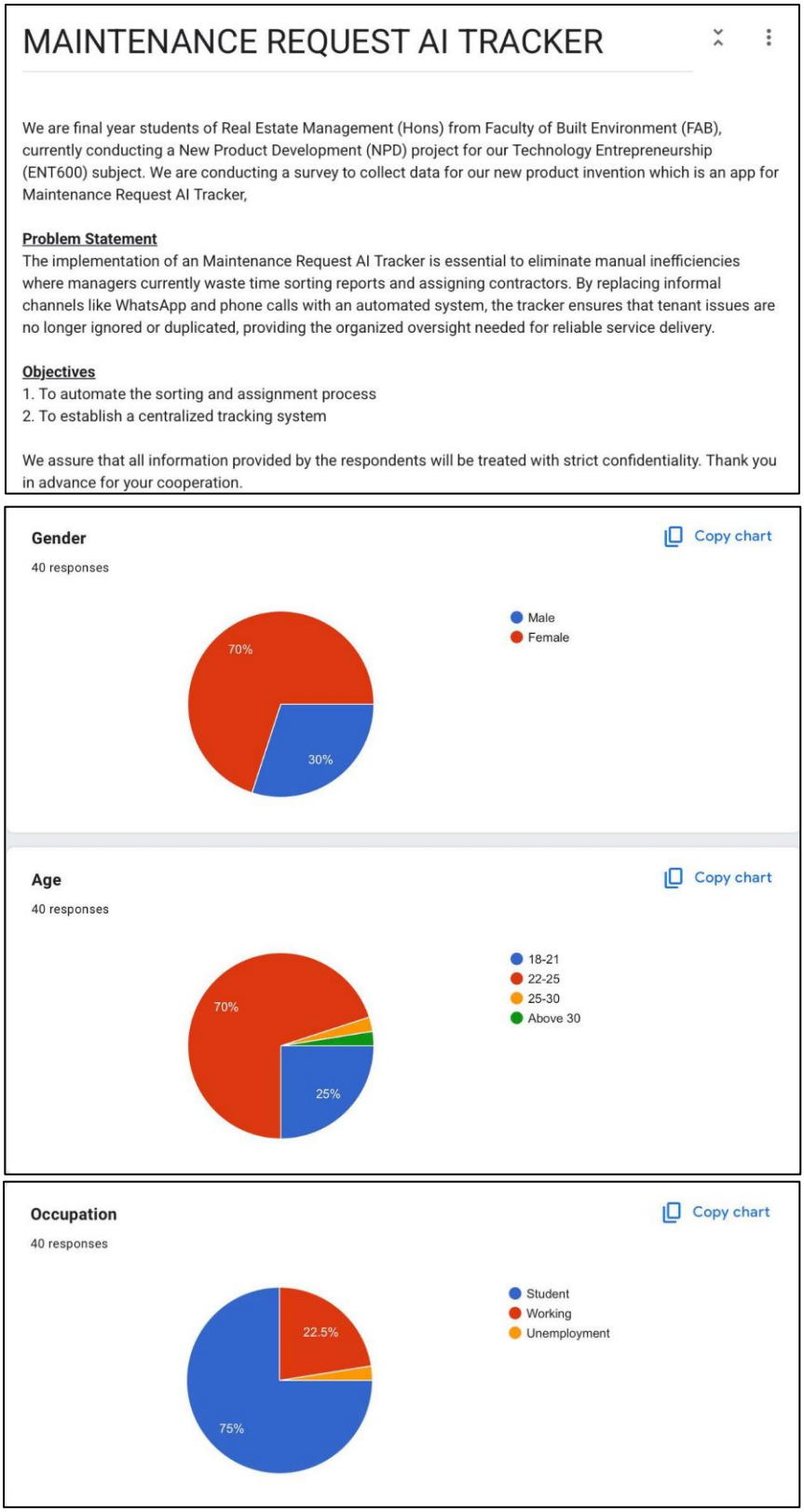

Figure 4.0: *Summary Of Responses Collected For The Maintenance Request AI Tracker Questionnairre*

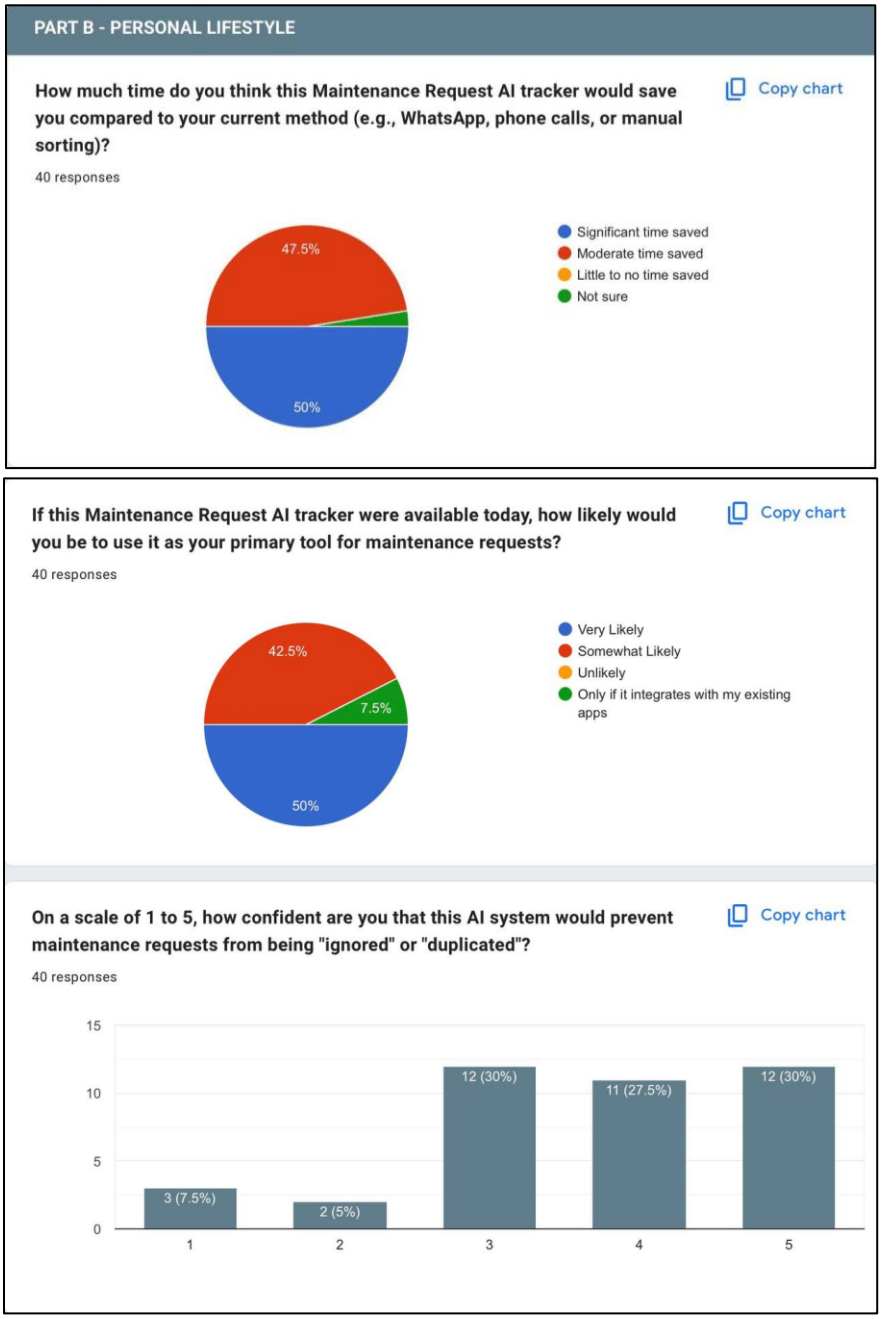

Figure 5.0: *Maintenance Request AI Tracker Questionnaire on Personal Lifestyle*

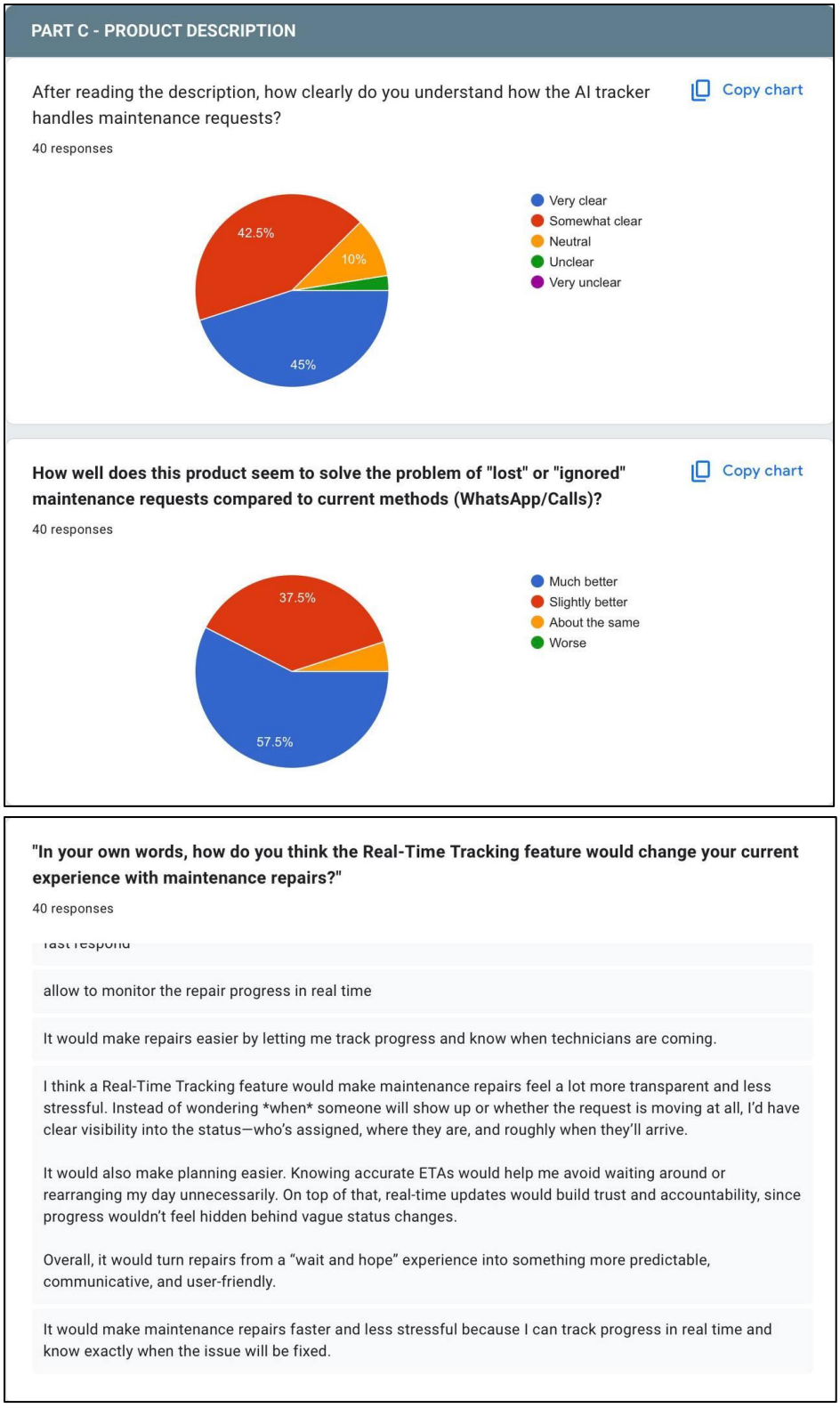

Figure 6.0: *Maintenance Request AI Tracker Questionnaire on Product Description*

Figure 7.0: *Maintenance Request AI Tracker Questionnaire on Purchase Intent*

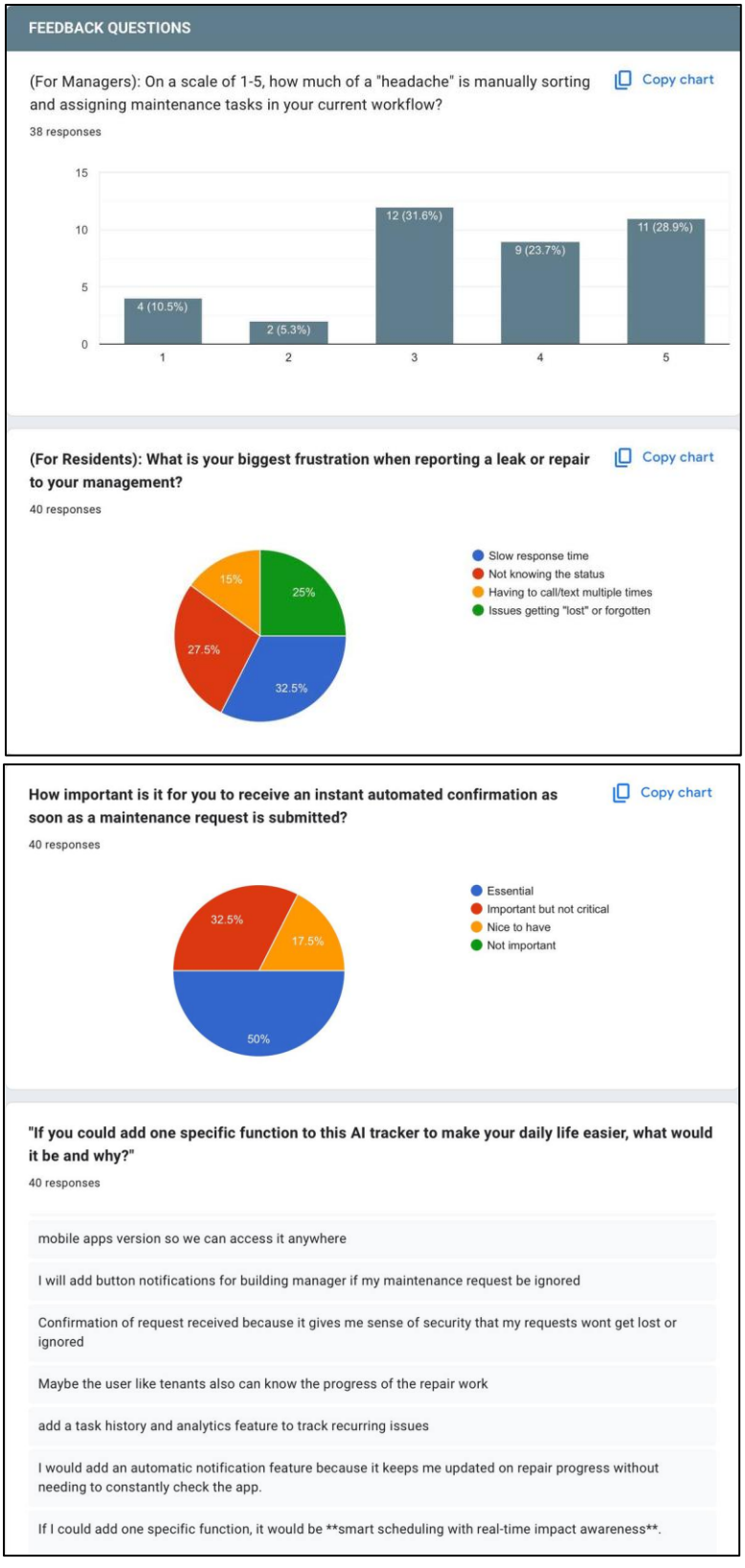

Figure 8.0*: Feedback questions for managers and residents regarding maintenance request workflow and reporting frustrations.*