

Boosting E-Commerce Financial Performance with QuickPack: An Android-Based Packer Tracking Solution

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Abstract. *The COVID-19 pandemic has emphasized the need for financial performance improvement, especially in Indonesia's rapidly growing e-commerce sector. Manual processes are time-consuming and error-prone, making it difficult to reward productivity effectively. This study develops QuickPack, an Android Studio-based app to track packers in an online shop, enhancing efficiency through automation technology. Using the Waterfall model, Firebase, and Kotlin, QuickPack provides real-time performance tracking. Researchers applied qualitative methods, observing and interviewing packers, managers, and owners before and after implementation. The app offers features like user registration, receipt tracking, daily monitoring, performance reporting, and target setting. Results show a 63% financial performance boost and an 80-90% speed increase on peak days. QuickPack reduces labor costs, minimizes errors, improves productivity, and streamlines operations, lowering the need for additional staff. Monetization opportunities, such as premium tracking services, further enhance revenue. Improved security also mitigates fraud risks. Modernizing operations, QuickPack increases revenue, reduces financial risks, and enhances job satisfaction through transparent performance tracking. Successfully developed and tested, the app improves packing efficiency and strengthens financial performance for online shops.*

Keywords: QuickPack application, e-commerce, automation technology, financial performance, performance tracking

1. Introduction

Online shopping has surged in recent years, with Indonesia's e-commerce market projected to reach \$146 billion by 2025 (Davis & Neves, 2021). Platforms like Shopee and Lazada dominate, driven by increasing internet access and smartphone penetration (Vion, 2023). The COVID-19 pandemic further accelerated e-commerce growth, pushing offline stores to expand online (Jain et al., 2021). However, high order volumes, especially during promotional campaigns, create logistical challenges, demanding faster fulfillment and greater efficiency.

Digital tools play a crucial role in improving financial performance by optimizing operations (Baby et al., 2024; Nasiri et al., 2022). Real-time order tracking and automated systems enhance efficiency, reduce costs, and improve customer satisfaction (Caputo et al., 2019; Meutia et al., 2019). Investing in digital technologies for packaging is one of the most important choices a company can make because it can improve financial performance and draw in more business investors. By doing good investment for increasing financial performance will be followed by the other business investor (Memarista & Prasetyo, 2025).

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However, research on packaging logistics remains limited, despite its significant impact on financial performance. Indeed, prior research has shown that, although being essential to supply chain effectiveness, packaging logistics has gotten relatively little scholarly attention (Islami, 2023). In contrast to more general studies on logistics and supply chain management, packaging logistics research is still fragmented, despite the fact that it plays a crucial role in cutting financial costs, improving material handling, and promoting sustainability (Baby et al., 2024; Hellström & Saghir, 2007). More recently, there is a substantial lack of systematic research since packaging is frequently viewed as a technical problem rather than a logistics or management issue (García-Arca et al., 2016; Twede et al., 2015). Thus, businesses must balance cost and efficiency while ensuring smooth order fulfillment to maintain long-term growth and revenues (Jorge et al., 2020; Marino-Romero et al., 2023; Putra et al., 2024).

Packers play a key role in ensuring timely deliveries, yet manual tracking methods are inefficient and prone to errors with digital maturity (Nasiri et al., 2022; Saunila et al., 2014). A lack of transparency in financial performance evaluation can demotivate workers and hinder productivity (Meutia et al., 2019). A digital tracking system can provide objective performance assessments, ensuring fair rewards and fostering a positive work environment. Research on packaging logistics and conflicts of interest is limited, as these conflicts are typically viewed merely as trade-offs, despite having different origins and characteristics. For example, there may be trade-offs between financial cost and value, between packaging requirements related to sales attributes and logistics efficiency, or between the objectives of different stakeholders involved in packaging (Pålsson & Sandberg, 2020; Putra et al., 2024; Waldman et al., 2019).

Through Android, with over 3 billion active users, is an ideal platform for developing a packer-tracking app (Oliveira et al., 2020).

Its open-source nature allows customization, and Android Studio provides accessible development tools. By leveraging this technology, businesses can enhance management control systems, and employee performance monitoring while improving fair financial outcomes (Chak et al., 2023; Nguyen et al., 2019; Silva et al., 2024). A packer tracking application can boost financial efficiency, reduce errors, and optimize labor costs. Efficiency leads higher value of the firm (Putra et al., 2024). Transparent performance evaluations allow for financial fair rewards and targeted training, motivating workers and increasing job satisfaction. This digital transformation not only enhances financial performance but also fosters professional growth within the e-commerce industry (Nguyen et al., 2019; Waldman et al., 2019).

This research aims to design and develop an Android-based mobile application that effectively tracks and enhances the packer and online shop's financial performance. The study identifies and analyzes the requirements for developing this application to improve the efficiency of packers. The application design stems from an analysis of the current shortcomings in the packer performance tracking systems used in online shops, conducted through observations and interviews with packers and order fulfillment management. The research will proceed with prototype development, focusing on key features to monitor and enhance packer performance.

This study provides insights into cutting-edge technologies and methods for managing employee performance within the e-commerce sector. The findings can serve as a foundation for further research in information technology and e-commerce, particularly in advancing Android Studio-based Packer Outcome Management Software user interface design tailored to the e-commerce industry's needs. By understanding the specific requirements of this industry, developers can design more suitable application solutions and gain inspiration for critical features desired by business owners

and packers alike, especially the business financial performance.

2. Literature Review/ Hypotheses Development

Digital Transformation

The digital transformation phenomenon for packers is defined as the integration of digital technology into all aspects and operations of an organization, resulting in infrastructure packing changes in the way the organization works to deliver value to its customers (Yüksel, 2022). The process must occur quickly and be accompanied by changes in leadership, culture, mindset, perception of risk, new ways of working, new technologies, and a willingness to accept uncertainty and constant change (Senadjki et al., 2024; Sumarlan et al., 2024). Digital transformation is introducing technologies such as machine learning and analytics, which can mean endless opportunities for organizational solutions and increased financial performance with the Android Studio-based packer outcome tracking application.

Adoption Technology and Financial Performance

The adoption of technology in the workplace is crucial for boosting financial outcomes by enhancing operational efficiency, workforce productivity, and sales performance. Digital transformation impacts the advanced technological solutions to help automate routine processes, improve communication, and assist in making more informed business decisions. The company will unlock the potential digital leadership, especially in the business performance (Senadjki et al., 2024). These improvements not only lead to eco-efficiency and financial cost reductions but also optimize the use of resources (Meutia et al., 2019).

However, integrating new technologies often involves significant upfront expenses, including supply, purchasing software, training employees, and maintaining the systems (Karttunen et al., 2023). It can impact directly various financial metrics, including

revenue growth, profitability, cost efficiency, and overall competitiveness. Despite these costs, the long-term benefits—such as greater efficiency, lower operational expenses, and higher customer satisfaction—often make the investment worthwhile (Adiguzel & Cakir, 2022; Jorge et al., 2020; Memarista & Prasetyo, 2025; Putra et al., 2024). Over time, these technological advancements can foster growth, improve competitiveness, and provide substantial returns, making them an essential component of a company's financial strategy (Kahrović & Avdović, 2023).

In the context of packer performance, appraisals play a crucial role in both evaluating individual outcomes and shaping perceptions of financial fairness and justice within the workplace (Nguyen et al., 2019). When performance evaluations are conducted fairly and transparently, they foster higher employee engagement, which in turn enhances productivity and financial satisfaction (Memarista et al., 2022). A well-communicated, fair appraisal system ultimately helps create a motivated and high-performing workforce. Packer productivity reflects the ability to produce goods and services that meet organizational goals and is closely linked to Maslow's hierarchy of needs, from basic physical needs to self-actualization. This motivational framework helps packers drive their performance in online shops. Packer productivity also acts as an intermediary between employee loyalty and financial satisfaction, directly influencing the quality of services provided by online shops (Benoit et al., 2017; Memarista et al., 2022). This demonstrates that productivity is a key factor in a company's financial performance.

Goal-setting Theory

Goal-setting theory also explains the productivity that there is influences packer's behavior and performance within online shops (Chak et al., 2023). Most modern organizations implement goal-setting practices to motivate packers and encourage self-assessment for personal development. Effective goals should be specific, as this clarity enhances performance by allowing

packers to track their progress and reduce absenteeism. Additionally, somehow the goals should be difficult yet achievable to foster motivation without discouraging employees.

Mutual acceptance of goals is crucial; all parties should participate in the goal-setting process to ensure commitment. Regular feedback allows packers to gauge their performance and make necessary adjustments, while realistic deadlines serve as motivators, balancing urgency with achievable outcomes. Group goal-setting can further enhance productivity, as aligning packer goals with clear team objectives fosters motivation and financial satisfaction. When the packer's personal goals do not lead to unhealthy competition among team members, overall team performance improves.

Android Studio for Packer Application

Building data-driven mobile systems is made easier using Android Studio, the main Integrated Development Environment (IDE) for Android application development. The development process is made simpler and less expensive by its open-source nature, free accessibility, and extensive toolkit, which includes debuggers, device emulators, and a drag-and-drop interface (Liu et al., 2024). Android Studio offers dependable real-time testing and interface visualization for applications that need constant performance monitoring, like a packer outcome tracking system. This allows developers to improve usability and functionality throughout the development cycle (Caro-Álvaro et al., 2022).

Furthermore, scalability is improved by its smooth interface with Google Cloud services, guaranteeing that applications can effectively handle massive volumes of operational data. Apps created on the Android platform can attain widespread accessibility and long-term sustainability due to the platform's global domination and more than three billion active users (Sung et al., 2025). All of these elements work together to show that Android Studio is a suitable and useful platform for putting the suggested tracking application into use. Additionally, its seamless integration with

Google Cloud Platform further enhances the ability to incorporate cloud-based services.

3. Methodology

For this research, the research method used is qualitative. As shown in Figure 1, the study used a pre-post design for the prototype and testing stages. Following the creation of the prototype, a trial was held and user feedback questionnaires were distributed as part of the first testing phase (Testing 1). Any flaws found were then fixed and enhanced during the maintenance phase, which made use of the input. After then, the system underwent more testing until its performance was 100% successful.

This study chose one online shop that sells its merchandise online and currently has more than 1,800 products sold on Shopee to test the Android-Studio packer outcome tracking application later. By using the qualitative method, the researchers will focus on understanding the phenomena through detailed and in-depth exploration through interviews, observation, and surveys of the packers, managers, and owners as informants.

This method captures a comprehensive view of a subject, offering nuanced understandings of complex social and behavioral issues in packer outcome tracking applications. The researchers included all employees from the observed shop as the participants in the study. The goal of the data gathering was to gather thorough insights from the complete group being observed by include every person in the shop. It aims to obtain information from all members in this online shop, leaving no one out.

Every participant was informed of the purpose of the study and their role in testing the prototype. Employees were advised that the information collected would only be used for research and system improvement before they agreed to participate. All information was handled in confidence and no personal identifiers were recorded in order to preserve

the participants' privacy. The workers were given a clear explanation of the monitoring process to further ensure that their participation was morally righteous and voluntary.

The identification of the packer performance tracking system in the online shop began with an observation of the packers' workflow,

followed by interviews with managers and business owners. The workflow includes brainstorming, the creation of low-fidelity prototypes such as system development, implementation, and testing (Chasapis et al., 2023). Figure 1 depicts every phase of the process.

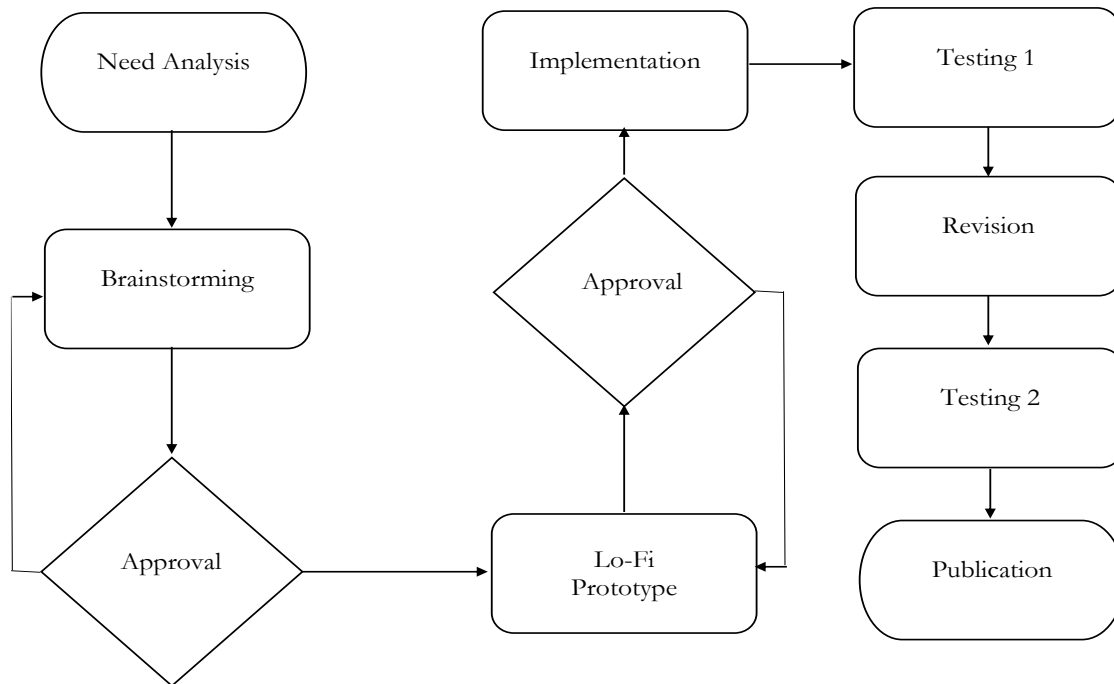


Figure 1.

Flowchart of Packer Performance Tracking System Development Process

Informed by the theoretical framework presented in the previous part, the data gathering process was carried out. In particular, packers' daily activities were observed using theories of workflow efficiency and performance evaluation, with a focus on evaluating output per session and locating operational bottlenecks.

At the same time, the prototype's design and iterative testing phases were guided by system development theory, which was operationalized through the Software Development Life Cycle (SDLC) model. By basing the technique on these theoretical viewpoints, it was made sure that the observations, interviews, and surveys were methodically organized to gather information

that represented both the conceptual aspects of performance tracking and the concrete reality of the shop's operations.

4. Findings and Discussion

Findings

This research aims to transform digital packaging by developing a packer outcome tracking application, QuickPack, by using Android Studio for online shops. QuickPack is an Android-based system designed to streamline the process of calculating and recording packages within the operational workflow of online shops. The application was tested in a shop that sells over 1,800 stationery and homeware products on

Shopee, featuring various Stock-Keeping Units (SKUs). This shop, with 123.1 thousand followers and a 4.8 out of 5 rating on Shopee, handles many orders daily, especially during sales events on special twin dates.

QuickPack simplifies the packers' tasks by recording packages according to receipt numbers, enabling faster and more accurate logging. It is also expected to improve the receipt tracking system, monitor packer performance, and set more strategic operational goals to boost financial efficiency and increase motivation. Key features of the application include user registration for access control, a logout function for session security, receipt logging for auditing purposes, display of packed receipts for daily process monitoring, receipt count calculations for financial performance reporting, a search function to quickly trace packages, sales, a goal-setting feature for admins to configure work targets, and user management

capabilities, including the ability to delete users, also controlled by the admin.

Table 1 shows the characteristics of the research informants. The informants for this research included 8 individuals, divided into two groups based on their roles in the online shop: 6 packers and 2 administrators. The packers, who interact with the system regularly, and provide valuable insights into the application's operational requirements. Their feedback focused on the app's workflow and user-friendliness. The administrators, consisting of the shop's manager and owner, were interviewed in greater detail. Their needs were analyzed more thoroughly to optimize business operations, sales, evaluate packer performance, financial performance, and support strategic planning. As a result, their requirements for the application are more complex, focusing on monitoring, reporting, and management functions within the online shop's work environment.

Table 1.
Characteristics of Research Informants

Packers	Gender	Education	Age (Years Old)
Person 1	Male	Vocational High School	27
Person 2	Female	Vocational High School	25
Person 3	Female	Vocational High School	18
Person 4	Female	Vocational High School	19
Person 5	Female	Vocational High School	18
Person 6	Male	Senior High School	19
Admin – Manager	Male	Bachelor Degree	46
Admin – Owner	Female	Bachelor Degree	48

The requirement gathering stage is the first step, in which application needs are identified through a series of interviews and observations. The results of this process are then analyzed to determine important features

that need to be implemented in the proposed application design. Table 2 shows the interview results from the manager and business owner.

Table 2.
Administrator's Interview Results

No.	Questions	Administrator's (Manager and Owner) Results Summary
Systems Currently Used		
1.	The current process for recording and tracking packages	Manually using printed templates from Excel. Package tracking is typically handled through the marketplace seller centers (Shopee and Tokopedia) to check delivery status. The system does not track who packed each package. A customized manual stamp, packstamp, is used to identify responsibility.
2.	The systems to evaluate packer performance	It has not conducted a detailed evaluation yet due to a lack of time and the absence of a specific SOP to govern the process.
3.	The challenges or obstacles in the current recording system	Managers supervising offline stores, assisting with instant courier orders (Gojek, Grab), handling complex packages, and managing order surges during events, leaving them with no time for manual control.
4.	Duration to log packages each day	The packer does the tracking manually, with the shift leader recording each package every 2 hours. This process involves counting the packed packages for each packer, which takes about 30 minutes per session.
5.	Bottlenecks or inefficiencies in the current workflow	Difficult to assess individuals objectively, to track packers' daily financial performance and capacity. There is also a risk of double counting and human error in package calculations and financial income.
6.	Performance tracked for individual packing processes or the team	It only evaluates the team as a whole by using time records and the number of packages processed by each packer. It is unreliable as it depends on the accuracy, honesty, and timeliness of data input.
7.	Bonuses or incentives to packers	Snacks and food during high package loads, such as at twin date events and the 25th of each month, and salary bonuses.
App Expectations and Features		
8.	Key features in the new app	- Real-time receipt recording tracks each packer's contribution and prevents double entries. - Simple calculations to analyze packer performance. - Exporting packer contributions to Excel for reporting to the owner, especially financial data and sales. - User management functionality to change admin and packers roles.
9.	The requirements, restrictions, or reporting	- Prevent double input. - Differentiate between admin and packer usage roles. - Prevent fraud, ensuring packers only input receipt numbers that reflect their actual contributions.

Furthermore, Table 3 shows the interview results from packers. The interviewers also ask several questions about the systems, app expectations, and features like the questions

for the manager and business owner that are listed below.

Table 3.
Packer's Interview Results

No.	Questions	Packer's Results Summary
Systems Currently Used		
1.	Daily Tasks	a. Packing many orders. b. Drop-off packages point for several couriers. c. Package calculations (especially for shift leaders). d. Conduct briefings with superiors every day.
2.	The system difficulties	Calculating the large number of packages.
3.	The current reporting	Manually count and record each person for two hours.
4.	The current error system or problems	Making wrong calculations, packing twice (double receipts), and losing focus. Time-consuming packages and large and complex orders allow greater focus than smaller or individual orders.
5.	Job motivation for continue doing this job	a. Good teamwork. b. Financial reward for having difficulty packing complex orders (various volumes) and large quantities, yet no clear incentive mechanism
App Expectations and Features		
6.	Key features in the new app	a. Displays each packer's count. b. Carrying out total packages packed in one day. c. Using barcodes to collect data on package receipt numbers or orders d. Look for packages based on the receipt number to find out whether they have been packed or not and see who packed them.

The observations were conducted over one week at the offline store as shown in Figure 2. It was found that the workflow described by the owner and the packers themselves closely matched the actual activities observed.

Packers begin their work at 8:00 a.m. During the first 15 minutes, they prepare by clocking in via fingerprint attendance, storing their

bags or belongings in lockers on the second floor, cleaning the packing area, gathering their equipment, and cutting bubble wrap. On certain days at 11:00 a.m., an additional packer joins the team as a backup in case sufficient orders are processed. It's important to note that these packers are part of the store's internal team. At around 11:30 a.m., couriers arrive to pick up packages.

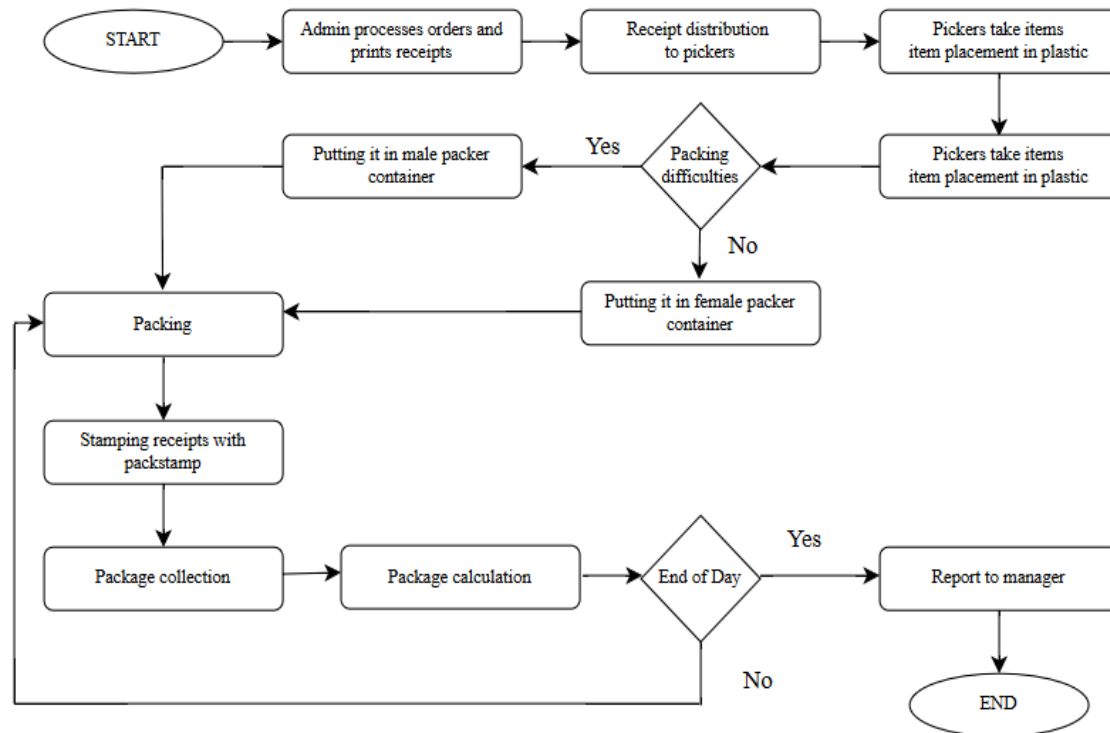


Figure 2.
Processing Orders to Reporting Flowchart

During this time, the shift leader assists by loading the packages into the sacks carried by the couriers. Packers work daily, and their shifts depend on the number of orders received through the marketplace or online shop. In the afternoon, they take breaks in turns with their respective team members, with each break lasting an average of one hour per packer. Towards the end of the day, around 7:30 p.m., the packers clean the packing area and make final records, as well as tally the day's packing results. At 8:00 p.m., the packers perform a final roll call before leaving for the day.

In the packing process, packers typically divide tasks based on the complexity of the orders. An order is considered complex if it meets one or more of the following criteria: large volume, heavy weight, fragile items like glassware, or multiple different items. Complex orders are usually assigned to a specialized packer. Before starting, the packer marks the order receipt with a unique pack stamp, which is a number identifying the packer. This helps prevent errors in packing or non-compliance with SOPs, which will

later be reviewed by the manager with the support of marketplace customer service. Additionally, the pack stamp serves as a reference for the supervisor when calculating figures at the end of each period.

For package recording, the shift head starts the count at specific times: 11:00, 14:00, 16:00, 18:30, and 20:00. However, at 18:00, the shift head usually begins recording earlier, as couriers (J&T, Shopee Express, Anteraja, and IDExpress) can pick up packages at any time. This prevents the shift head from working optimally, as they could otherwise focus on packing more complex and high-risk items. Such a shift in managerial focus is consistent with other studies showing that a reduction in monitoring and control usually results in a deterioration in operational efficiency and governance quality (Sumarlan et al., 2024).

Starting as an offline store, this shop has limited space due to the large number of goods displayed in-store. With this restricted workspace, packers need to be meticulous in counting and storing packages for each order to avoid duplicate counts by the shift leader.

Additionally, the unpredictable volume of orders sometimes leads the owner to assign packers as pickers, responsible for selecting the items to be packed. It is important to note that the lack of written procedures could pose challenges in the future, especially when new workers are brought on board.

Based on responses from admin and packers in the interview and the observation process, existing problems were identified, such as operational inefficiencies, no performance evaluation, and no clear incentive mechanism. Current manual recording and tracking system take time because the shift packer leader calculates the results of one shift's work more than 30 minutes and is prone to human error. There is no adequate system for evaluating performance individually packer and in teams, making it difficult for management to carry out objective and effective assessments. The lack of mechanisms to recognize and incentivize packers based on the performance achieved influence motivation and productivity.

From identifying these problems, we can conclude several crucial needs and outline

system requirements for the application, categorized into business needs, system features, technical requirements, and non-functional requirements. Business needs include the automation of package recording and tracking to save time and reduce errors, performance analysis tools for objectively assessing individual and team packer performance, and features for recognizing and incentivizing high-performing packers.

System features comprise real-time receipt recording to prevent double inputs and ensure data accuracy, performance analysis tools for packer and team data, reporting capabilities (e.g., exporting data to Excel), and user management to differentiate roles like admin and packer. Technical requirements demand a friendly user interface for ease of use by all roles and robust data security to protect user privacy. Lastly, non-functional requirements ensure the system's high availability with minimal downtime and scalability to support increasing users and data volumes. Referring to the needs analysis, the researcher then converted the needs into a use-case diagram (Chasapis et al., 2023). It will be used as a framework as shown in Figure 3 below.

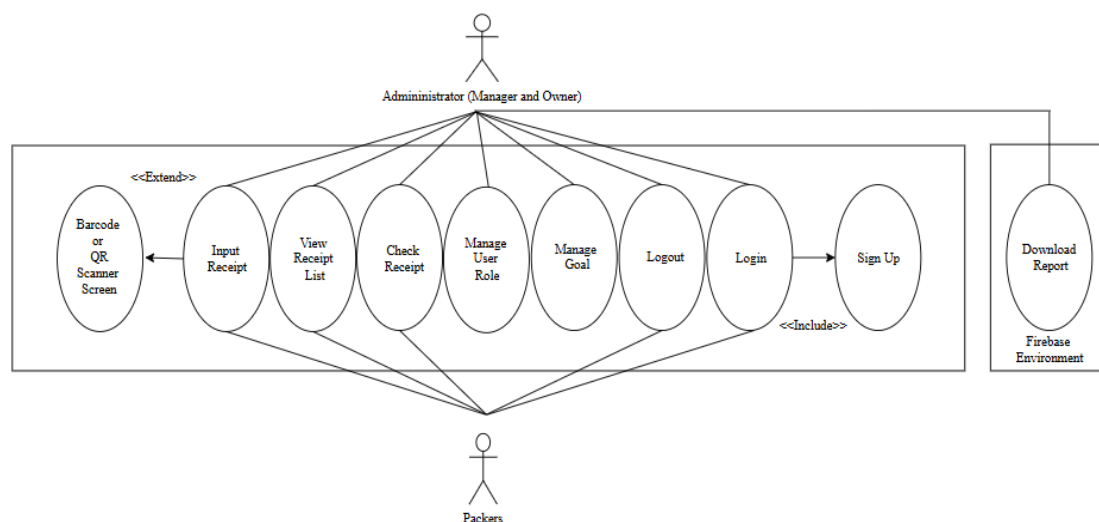


Figure 3.
Use Case Diagram QuickPack

Brainstorming Phase

Figure 3 illustrates the use case diagram that defines user interactions with the system, a key reference point during brainstorming sessions involving owners and managers. The

QuickPack App system boundary encapsulates all functionalities accessible to two primary user roles: Packers and Administrators. One essential function, Receipt Input, allows both roles to enter receipt numbers, supporting an optional

Barcode or QR Scanner Screen for efficiency. This scanning feature enhances the user experience by enabling quick and accurate data entry, minimizing manual errors. Beyond input functionalities, users can leverage View Receipt List to review tracking numbers and Check Receipt to verify package statuses.

Administrators have exclusive access to management functions such as Manage User Roles, which allows them to assign or change user permissions, and Manage Goals, which helps set team targets. Other fundamental features include Login, which serves as the system's entry point with an integrated Sign-Up function, and Logout, ensuring secure session termination. Data storage and backend operations are facilitated by the Firebase Environment, with functions such as Download Report highlighting Firebase's role in maintaining operational data integrity. The use case relationships are mapped using

include and extend connections, ensuring clarity in feature interactions.

Lo-Fi Prototype Development

Following the brainstorming phase, the project transitioned to the Lo-Fi Prototype development, which serves as a preliminary design framework for the QuickPack application. The prototype focuses on structuring the user interface (UI) and interaction flow for both packers and administrators. This design phase clarifies navigation, ensuring a smooth and intuitive user experience. Figure 4 provides an overview of the Lo-Fi Prototype, but due to page limitations, the complete design details are available in the appendix via the provided Figma link:

(https://go.ukwms.ac.id/Appendix_QuickPackApp).

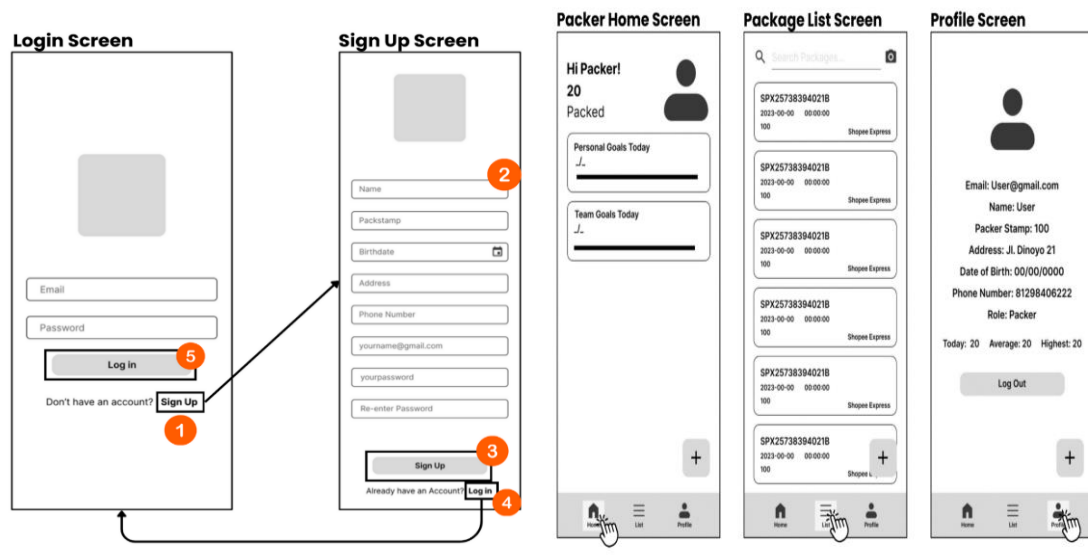


Figure 4.
Representative of Lo-Fi Prototype (Figma)

Implementation and Database Setup

Before actual development, a robust database schema was established in Firebase, utilizing its No-SQL structure for flexibility (Rakhmasari & Anwar, 2018). The schema includes configurations for both the Realtime Database and Firestore Storage, ensuring seamless data management. This phase involved defining a structured data hierarchy, including nodes and sub-nodes, along with

reading and writing permissions. Following the completion of the database structure, the development process shifted to Android Studio, where the Figma designs were combined to create a finished, working application. The implementation process included setting up the project, establishing Firebase connectivity, and coding the logic to align with the planned system architecture.

App Development and Feature Integration

The development process in Android Studio began by setting up the project with Kotlin as the primary programming language. Dependencies such as Firebase Authentication, Firestore, and other essential libraries were integrated through the build.gradle file to support core functionalities. UI components, including TextView, EditText, and RecyclerView, were implemented to optimize usability and responsiveness. Barcode scanning features were integrated using MLKit and CameraX, allowing efficient receipt entry and package tracking. Additionally, SharedPreferences was utilized for local data storage, streamlining user preferences, and login persistence.

Final Testing and Optimization

The final stages of development involved testing and optimizing various app components. RecyclerView and Paging functionalities were refined for efficient data handling, while role management features enabled admins to oversee user activities seamlessly. UI consistency was maintained by organizing visual assets in the drawable folder and applying Material Theme Builder-generated color schemes. Security considerations were also addressed through AndroidManifest.xml, defining necessary permissions for camera access and network functionalities. Upon completion, the QuickPack application was ready for

deployment, offering an efficient and structured solution for packers and administrators in the e-commerce logistics process.

First Testing

In the next phase, researchers will conduct user testing and implement the application in the packaging process. Testing is scheduled to run from November 5 to November 11, 2024, during which packers will scan each package that has been prepared. This testing phase will also help determine the average number of packages each packer can handle, which will later be used as a benchmark in setting team and individual targets.

Testing will be closely supervised by the researchers, ensuring they do not influence respondents while they complete the questionnaire. The distributed questionnaire focuses on the usability of the application and the effectiveness of its features.

Questionnaires will be administered via Google Forms, with predefined criteria for assessing the successful functionality of the application. Supervision during questionnaire completion is essential, as it allows for immediate guidance and collects valuable feedback from users that will inform future maintenance.

Table 4.

Admins and Packer's Testing Results

No.	Testing Site	Test Criteria
1	Sign up Activity	Sign up using e-mail
2	Sign in Activity	UsersLog in using e-mail and password
3	Home Fragment	After signing in, the user goes straight to Home Fragments
4	Profile Fragment	Displays the same user data at signup
5	ListPack Fragment	Displays package data and searches for packages based on receipt number
6	Form Activity	Users successfully accessed the camera in the Activity Form
7	CameraX Activity	Users successfully scanned the package
8	Filled Form Activity	Users successfully entered the receipt number in the application

Above is Table 4 summarizing the results of application testing with 8 people during the first testing period with 100% success. This confirms that the application is functioning smoothly. Table 4 presents the application testing findings from the first evaluation phase. Every participant finished every job they were given, yielding a 100% task

completion rate. This suggests that the main features of the program worked as planned, allowing users to navigate and carry out tasks without encountering usability issues or system failures. Therefore, the testing results show that the prototype is both usable and functionally stable in its current state.

Table 5
Admins Testing Results

No.	Testing Site	Test Criteria	Success	
			Yes	No
1	User Management Activity	See the registered packers	100%	0%
2	Profile Activity	See the Packer profile details	100%	0%
3	Edit Profile Activity	Made changes to the packer data	50%	50%
4	Goal Setting Activity	Opened the goal packer list	100%	0%
5	Personal Goal Activity	Opened Personal Goal per-packer	100%	0%
6	Personal Goal Setting	Setting goals for each packer	100%	0%
7	Team Goal Setting	Setting goals on a certain day	100%	0%
8	End-of-the-Day Process	Enter packing results at the end of th	100%	0%

Based on the admin's special test in Table 5 with 2 people, an issue was identified with the Edit Profile Activity. Names, dates of birth, pack stamps, and phone numbers were all formatted inconsistently, according to the manager. In addition to impacting aesthetics, these variations may make it difficult to enter data into the database.

Maintenance and Second Testing

Following initial testing, feedback from admins and packers highlighted issues such as inconsistent user data formats and invalid package inputs. In order to solve this, an input-matching mechanism was created and the SignupActivity UI was improved for consistent data entering. Confirming courier identity based on receipt number forms, was added along with a new courier field. It is maintained package authenticity by the getCourierByResiNumber function. A second round of testing introduced a goal-setting framework based on five key criteria: specificity, challenge, acceptance, feedback, and deadlines. Using data from November 5–11, 2024, the Personal Goals Screen helped define daily achievement targets for packers, which were then aggregated into team goals.

The framework ensured goals were realistic, collaboratively set, and structured around daily work performance. The goal-setting strategy was implemented over 13 days (November 12 until 24) to evaluate its effectiveness. At the individual level, only a few packers met their personal goals, while at the team level, targets were achieved on just two working days, suggesting the goals were challenging. To enhance motivation, the strategy incorporated incentives such as snacks and bonuses, balancing workload expectations with rewards. This approach aimed to improve productivity while maintaining a positive work environment for both individual packers and the team.

Discussion

QuickPack is a Kotlin and Firebase-based Android application designed to track packer performance in e-commerce. It enhances efficiency by recording and auditing receipt numbers, improving productivity and operational management. Researchers view QuickPack as a potential tool for optimizing logistics and revenue while motivating packers through structured performance tracking.

Testing involved 8 respondents consisting of 6 packers and 2 admins. The application demonstrated near 100% success in usability, but initial issues were identified, such as inconsistent profile formats and invalid

receipt inputs. These were resolved through UI improvements and the addition of a regex-based validation function.

Table 6

Financial Data: Sales Orders Packaged

		Number of Orders Packed in September				Information	Amount
Packer Name (Packstamp)		9/9	10/9	11/9	12/9		
Packer A	Female	144	134	142	0	Total ordered packed	2,196
Packer B	Male	21	55	0	0		
Packer C	Female	2	59	57	36		
Packer D	Female	151	135	187	149	Total incoming orders	2,753
Packer E	Female	52	112	202	119		
Packer F	Female	107	127	86	119		
Total		477	622	674	423	Percentage complete	80%
Average		79.5	104	135	106		
		Number of Orders Packed in November				Information	Amount
Packer Name (Packstamp)		11/11	12/11	13/11	14/11		
Packer A	Female	178	163	120	58	Total ordered packed	1,829
Packer B	Male	29	34	30	12		
Packer C	Female	0	0	40	48		
Packer D	Female	138	108	110	0	Total incoming orders	2,015
Packer G	Male	114	75	62	0		
Packer H	Female	187	158	165	0		
Total		646	538	527	118	Percentage complete	91%
Average		129	108	88	139		

Researchers analyzed productivity by converting Firebase JSON data to CSV and Excel for structured performance tracking. Table 6 shows a four-day analysis (November 11 until 14) compared packer output during high-demand shopping events (11.11 vs. 9.9), revealing a 63% increase in average packing per packer. A speed improvement in completing orders, rising from 80% in September to 91% in November despite fewer packers. Thus, table 6 shows that financial performance gains attributed to QuickPack's

tracking and reporting tools. Researchers also took 3 samples to verify the improvements in individual packer's sales performance for 3 consecutive days in August and November. Individual performance analysis is carried out by dividing the results packing per person by a sale package that entered Shopee on that day. The results obtained are significant and show an increase in performance in November when the application was used as shown in Figure 5.



Figure 5.
Packer Individual Sale Packaged Performance Comparison Chart

The study found gender-based role differences in packing duties. Male packers handled large, fragile, high-risk items (e.g., glassware). Female packers worked with smaller, uniform products. This disparity complicated goal-setting, requiring an SOP (Standard Operating Procedure) to regulate task allocation and ensure fair performance expectations. Between November 12 until 24, the researchers also analyzed goal-setting effectiveness. There 21% of packer activities met personal targets. There is 15% of team shifts achieved set goals. The strategy was supported by performance-based incentives (snacks and financial bonuses).

The results show that users have embraced QuickPack's implementation, especially in terms of how it has improved the financial efficiency and organization of packing tasks. Participants frequently reported that the technology helped them to streamline their work, cut down on manual tracking time, and minimize parcel identification errors. The study looks at how users perceive increased workflow efficiency, reduce financial cost,

more transparent job monitoring, reduce risk, and have better packing crew cooperation. QuickPack has the potential to be a helpful tool for everyday operational management since it is generally thought to improve operational dependability and smoothness in e-commerce packaging procedures.

By decreasing process mistakes and improving workflow consistency, QuickPack is thought to promote operational dependently and provide better financial outcome. Thus, financial investment for this application is required for maintenance and training, the long-term benefits, increased output, cost reduction, and streamlined operations justify the expense. Future refinements should focus on enhanced reward systems and data-driven SOP improvements to optimize goal-setting and ensure sustained financial success.

5. Conclusion

The QuickPack application, developed using Firebase and Kotlin with a waterfall methodology, has effectively improved packing efficiency at the online store. The creation of Standard Operating Procedures (SOPs) further enhanced operational consistency, streamlined workflows, and financial performance. Beyond efficiency gains, the participants reported that QuickPack improved their packing jobs' enjoyment, data correctness, and reporting organization. According to these impressions, the system facilitates more efficient work procedures and cultivates an operational environment that is more organized and dependable. The project demonstrates the potential of technology to transform e-commerce operations and improve both financial performance and employee well-being.

Further research should explore the psychological impact of performance-tracking systems and the relationship between financial incentives and packer motivation. Comprehensive SOP development with user input is crucial. Firebase API setup should be prioritized early in development, and innovation through features like machine learning integration is encouraged. E-commerce owners should invest in such technology and employee training while fostering continuous feedback. Close collaboration between store owners and developers is essential for tailoring the application to specific needs. Packers should actively provide feedback to enhance usability and workflow.

The research encountered limitations in technical expertise, particularly with complex Firebase features and financial performance calculations. The analysis of goal-setting influence on packer performance revealed low success rates, indicating a need for better goal-setting strategies. The short data collection period, focused on peak conditions, limits the assessment of long-term productivity impact. Firebase client-side restrictions pose challenges for efficient paging with large

datasets. Security vulnerabilities exist due to incomplete Firebase rule configuration. The User Interface (UI) requires improvement for intuitiveness and User Experience (UE). The application currently lacks weight or mass detection and Shopee API integration. Code organization and modularity could be enhanced for better maintainability.

Declarations

Author contribution

All authors contributed equally to this paper and are listed as co-primary contributors. All authors read and approved the final paper.

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Competing interest

The authors declare that they have no conflicts of interest to report regarding the present study.

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