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PROCEEDINGS OF JOHOR INTERNATIONAL INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2024 (JIIICaS 2024)



*“Flourish and Nurturing Sustainable
Innovation for a Prosperous Nation”*

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Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor International Innovation Invention Competition and Symposium 2024 (JIIICaS2024), where JIIICaS2024 is a virtual platform for all creative minds to share and present their invention and innovation. Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students and get some ideas to develop future innovation products.

Foreword Rector



Assalamualaikum warahmatullahi Wabarakatuh,
Salam Sejahtera, Salam Malaysia MADANI and
Salam UiTM Dihatiku.

In the name of Allah, the Most Gracious, the Most
Merciful.

It is a great honor to welcome you to the Johor
International Innovation, Invention, Competition, and
Symposium 2024 (JIIICaS 2024). This event

connects various disciplines, focusing on education and engaging educators,
students, researchers, and innovators from all walks of life.

Innovation is not just about ideas; it demands perseverance, creativity, and
determination to turn those ideas into reality. The remarkable projects
showcased today highlight the dedication and spirit of all participants.
Initiatives like this not only explore new technologies but also cultivate skills
and leadership among our youth. At Universiti Teknologi MARA (UiTM) Johor
Branch, we are fully committed to fostering a dynamic culture of innovation,
promoting the commercialization of new products, and encouraging
meaningful collaborations with industry and society.

As we celebrate this event, I would like to extend my heartfelt gratitude to all
sponsors, judges, the College of Computing, Informatics and Mathematics,
UiTM Pasir Gudang Campus as the event organizer, as well as to the
researchers and participants for their hard work in making this event a
success. Let us continue striving for innovation and excellence. May the
ideas presented today inspire us and lay the groundwork for future
achievements.

Thank you.

Associate Professor Dr. Saunah Zainon
Rector
Universiti Teknologi MARA (UiTM)
Johor Branch

(A-PP007) PARCEL TUBE

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ABSTRACT

This abstract introduces "SecureConvey: ParcelTube," an innovative product design poised to revolutionize last-mile delivery processes. SecureConvey: ParcelTube is a cutting-edge solution comprising a large, interconnected box equipped with an integrated conveyor belt system. This system facilitates the seamless transportation of parcels from external mailboxes directly into recipients' homes. Adding to its ingenuity, SecureConvey: ParcelTube incorporates a robust security feature requiring couriers to scan a QR code for access, ensuring secure parcel deposition (Focardi, 2019). In the wake of escalating demand for efficient and secure parcel delivery solutions amidst e-commerce expansion, SecureConvey: ParcelTube addresses prevalent challenges such as missed deliveries and package theft (Morrel, 2023). By enabling direct deliveries to recipients' homes, irrespective of their presence, SecureConvey: ParcelTube offers unmatched convenience and reassurance to consumers. The design journey of SecureConvey: ParcelTube was steered by exhaustive research into user preferences and behaviours, prioritizing usability, security, and compatibility with existing delivery infrastructures. Iterative prototyping and rigorous testing phases enabled refinement of functionality, ergonomics, and reliability, ensuring optimal real-world performance. Key features of SecureConvey: ParcelTube encompass seamless integration with courier operations, remote monitoring, and control capabilities accessible via mobile app or web interface, alongside robust security measures safeguarding parcels throughout the delivery process. In essence, SecureConvey: ParcelTube signifies a monumental leap in parcel delivery technology, furnishing a scalable and adaptable solution that caters to the evolving needs of the modern delivery landscape (Americas, 2020). With its unwavering focus on convenience, security, and efficiency, SecureConvey: ParcelTube pledges to elevate the overall delivery experience for both consumers and delivery providers (Lai, 2020).

Keywords: Last-mile delivery, Parcel delivery, Connected box, QR code access, Secure delivery solution.

1.0 INTRODUCTION

In this 21st century, the landscape of e-commerce and online shopping has rapidly evolved. The final stage of the delivery journey of the packages is basically the process of receiving parcels at the doorstep, which this stage encounters numerous challenges. The frequent challenges that both recipients, senders, and delivery

providers have been facing include missed deliveries, package theft, and the need for the recipients to be physically present to accept deliveries. Therefore, the development of this product design is necessary to enhance the efficiency and security of the final stretch delivery process. This innovative solution is designed to smoothly transport parcels from an external mailbox directly into the recipients' homes. The incorporation of advanced technology, that includes a QR code access mechanism, would ensure secure parcel delivery and retrieval. Couriers are required to scan a designated QR code to unlock the box's door and drop the parcels inside, guaranteeing the safety of deliveries until they are retrieved by the recipient.

2.0 OBJECTIVE

Therefore, the innovation of Parcel Tube aims:

- To build a last-mile delivery system that is flexible and expandable to meet the changing needs of the e-commerce sector.
- To develop a smart, connected mailbox with an integrated conveyor belt and safe access control, which will improve security and convenience for recipients of e-commerce parcels.
- To design and assess a last-mile delivery system that is safe, user-friendly, and seamlessly interacts with the current delivery infrastructure.

3.0 METHODOLOGY

A systematic approach to developing innovative parcel tube delivery boxes that prioritizes user needs.

Based on market research and consultations with the lecturer, product design was conducted through analysis to identify critical problem points faced by both consumers and delivery staff (Gayst, 2021). This initial step, which included online surveys and observational studies, provided a clear understanding of the problems and areas for improvement, such as missed deliveries, package theft, and inconvenient delivery space.

Prototyping and iterative testing developed afterward following the creation of ideas.

Utilizing design software where applicable, product designs were constructed prototypes from different materials. Throughout this process, features like the conveyor belt system and secure access mechanism were carefully tested at each stage. User testing further improved the box's ergonomics and the mobile web interface's usability.

Security evaluations ensured the durability of the QR code access and remote monitoring features.



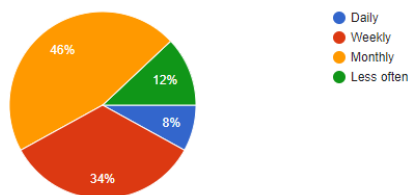
Finally, to guarantee a smooth connection with the current delivery system, analysed compatibility with standard parcel sizes and explored potential partnerships with courier companies have been made. This emphasizes how careful the parcel tube delivery boxes are to ensure that the product successfully meets the changing needs of delivery providers as well as customers.



4.0 RESULTS

Based on a survey that has been conducted among students, lecturers, and the public, it shows that as many as 46% of respondents receive parcels at their homes every month. Therefore, online purchases certainly have their own risks. A total of 54% of respondents experienced missing parcel delivery because respondents were not at home. Therefore, this can not only harm online buyers but also become a concern for buyers to continue online purchases in the future.

How often do you receive parcels (packages) at home?
50 responses



Have you ever missed a parcel delivery because you weren't home?
50 responses

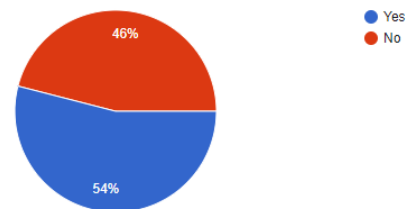


Figure 1&2: Survey on how often respondents receive parcels at home and how many times respondents have lost delivery parcels when respondents are not at home.

Next, there are 70% of respondents who are interested in using the parcel tube system if there is such a system at home to ensure that parcels are delivered safely through a tube installed directly to their home. Furthermore, a significant majority of 98% showed interest that the notification system is very important when the parcel arrives.

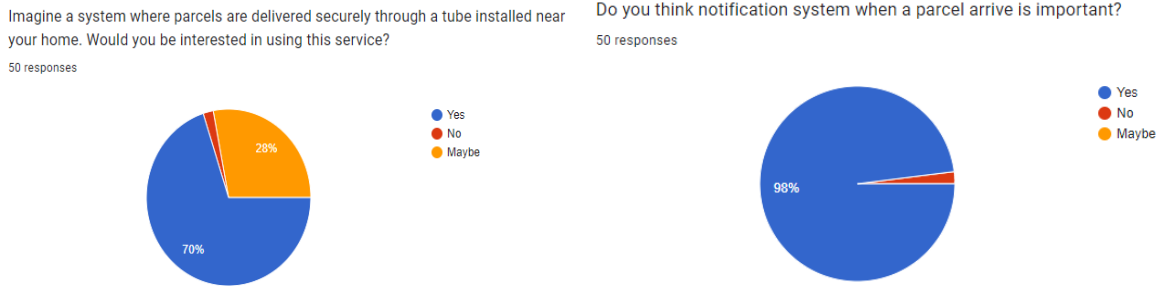


Figure 3&4: Survey on how many respondents is interested in using the parcel tube system and do respondents feel that the notification system is very important when the parcel arrives.

In addition, as many as 28% of respondents showed an interest in using a parcel tube delivery system at their home and there were as many as 56% of respondents comfortable with the idea of a tube system that delivers parcels directly to their home.

5.0 CONCLUSION

Parcel tubes offer a potential solution to increase efficiency and reduce the problem of lost parcels. Its use can provide convenience to users about the security of their packages. In addition, through the survey that has been conducted, it can be concluded that the community is interested in using the parcel tube system service in their homes. This is because people are aware of the risk they will face if they are not at home when their parcel is safely delivered.

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