

MECHAMOVE APPS: TRANSFORMING THE MECHANIC SERVICE EXPERIENCE THROUGH INNOVATIVE MOBILE TECHNOLOGY

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Abstract

Mecha Move is a prototype mobile app designed to improve the management and efficiency of the mechanic service industry. It aims to address key challenges such as inefficient appointment scheduling, lack of service tracking and the difficulty customers face in accessing car repair services. To address these issues, the project has set itself several key objectives: first, to create a user-friendly appointment scheduling system to increase efficiency and reduce waiting times; second, to introduce a service tracking feature that allows customers to closely monitor their car maintenance; and third, to provide an accessible platform through which customers can directly or indirectly request the services they need. The app was developed with Thunkable, Google Sheets and Canva and is designed to improve customer experience and service efficiency. To analyze user behavior towards the app, the Stimulus-Organism-Response (SOR) framework was applied. Data from 88 respondents selected using non-probability snowball sampling was analysed using Smart PLS 4.0.8.1. The results indicate that perceived ease of use and perceived enjoyment positively influence user attitudes, which in turn enhance their intention to use the app. The expected outcomes of this project include improved customer satisfaction, greater confidence in mechanic services and easier access to car repair services. Ultimately, this project will help improve service quality in the mechanic industry.

Keywords: Mechanic services, Mobile-technology, Service management

INTRODUCTION

The automotive repair industry has grown in complexity due to increasing vehicle ownership and advancements in automobile technology. Furthermore, with the influx of automatic transmission vehicle models with electronically regulated systems, the demand for competent automotive repairers has grown faster recently than ever before. The increase in the sales of motor vehicles has made motor vehicle servicing a critical issue in the motor industry and in the future success of motor vehicle brands (Berndt, 2009). Furthermore, data from the Bureau of Labor Statistics (2023) shows that vehicle maintenance and repair costs rose by 6.5% (Focareta, 2024). The cost of maintenance generally increases as a vehicle ages and more parts require replacement. The American Automobile Association (AAA) estimated in 2023 that the average cost of vehicle maintenance and repair came to 9.83 cents for every mile driven. In fact, more companies willing to extend their value propositions to continuously meet customer needs by offering services associated with their products (Khanra et al. 2021) while reducing environmental impact, making them highly dynamic and complex systems (Gaiardelli et al. 2021). However, operational inefficiencies, such as inadequate scheduling, lack of service tracking, and limited accessibility have pose significant challenges for mechanics and customers alike (Dassama, 2024).

The mechanic service industry faces several significant challenges that impact both customers and service providers. Nevertheless, many complaints have been lodged to the Ministry of Domestic

Trade, Cooperatives and Consumerism (MDTCC/KPDNKK) and National Consumer Complaints Centre (NCCC) concerning automotive workshops which include issues ranging from counterfeit spare parts, failure to describe repairs done and absence of price tags (Abdul Wahab *et al.*, 2017). Proper maintenance is crucial to ensure a car's roadworthiness in terms of safety and it being environment friendly (Wahab, 2018). Furthermore, from the preliminary research, researcher found that inefficient appointment scheduling systems often result in long wait times for customers, as highlighted by the 2024 Customer Service Index (CSI) Study, which found that the average wait time for a service appointment increased to 5.2 days from 4.8 days in the previous year (Youngs, 2024), highlighting the growing demand and scheduling inefficiencies in service management (Zygiaris, 2022).

Additionally, the lack of real-time service tracking exacerbates delays and miscommunication, leading to customer dissatisfaction and operational inefficiencies. Research indicates that effective communication and real-time updates are critical for identifying bottlenecks and ensuring technicians prioritize critical tasks, ultimately improving efficiency and customer experience (Griffith, 2024). Furthermore, limited accessibility to repair services poses challenges, particularly for customers in remote areas. Inconsistent communication methods and outdated systems can create confusion and hinder service delivery. The implementation of clear communication protocols and advanced field service management software can significantly improve service accessibility and reliability (FieldPromax, 2024). These issues underscore the need for innovative solutions like the Mecha-Move application to address operational inefficiencies and enhance customer satisfaction. This innovation aims to develop the Mecha-Move prototype, a user-friendly apps scheduling system with a real-time service tracking feature to create an accessible platform for seamless interaction between customers and mechanics.

LITERATURE REVIEW

The integration of technology in service industries has gained significant attention due to its potential to enhance operational efficiency and customer satisfaction. In the context of automotive repair, the role of service quality is paramount. Doucet (2004) and Palese & Usai (2018) emphasize that service quality dimensions, such as reliability, responsiveness, and effective communication, play a critical role in shaping customer perceptions and satisfaction. These dimensions are particularly relevant in hybrid service contexts that combine in-person and digital interactions, making technological solutions vital for meeting evolving consumer expectations. Digital transformation in automotive services has shown significant promise in addressing inefficiencies. Scheduling systems, as highlighted by Leung (2004), can minimize delays and optimize resource allocation.

Similarly, Pilar *et al.* (2023) demonstrated that implementing automated scheduling solutions significantly reduced vehicle downtime and improved service timelines in a Portuguese auto repair firm. This aligns with the findings of Demir & İşleyen (2013), who highlighted that efficient scheduling directly impacts service quality and operational performance.

Mobile applications have become essential tools for businesses aiming to modernize service delivery. Gyanppa (2019) notes that mobile apps enable real-time communication, fostering flexibility and efficiency in operational workflows. Platforms like Thunkable have democratized mobile app development, allowing non-technical users to design intuitive and functional applications. By leveraging such tools, businesses can address customer pain points, streamline service processes, and enhance overall user experience. Moreover, the importance of real-time service tracking has

been well-documented. Wang *et al.* (2018) argue that integrating real-time monitoring systems into service management platforms improves transparency, builds customer trust, and ensures timely updates on service progress.

Such systems also help mitigate communication gaps, which often lead to customer dissatisfaction. The implementation of these technologies aligns with broader trends in Industry 4.0, where digital solutions are increasingly used to address complex operational challenges. Lastly, the environmental and safety implications of proper vehicle maintenance have also been explored. Wahab (2018) highlights that regular maintenance not only ensures roadworthiness but also reduces environmental impact. As the automotive industry transitions towards sustainability, integrating digital solutions into repair services supports both operational efficiency and environmental goals.

In summary, the literature underscores the critical need for innovative digital solutions, such as the Mecha-Move application. By addressing scheduling inefficiencies, enabling real-time service tracking, and enhancing accessibility, Mecha-Move aligns with established best practices in service management and digital transformation.

Behavioral Analysis Using the SOR Framework

To further understand user behavior and intention to adopt the Mecha-Move app, the study also employed the Stimulus-Organism-Response (SOR) framework by Mehrabian and Russell (1974). This framework describes how external stimuli (S) influence internal organismic states (O), which subsequently drive behavioral responses (R).

In the context of Mecha-Move, **stimulus (S)** represent external factors that influence user perceptions, such as **Perceived Ease of Use (PEU)** and **Perceived Enjoyment (PE)**. PEU refers to the simplicity and intuitiveness of navigating the app, which has a positive impact on user adoption (Venkatesh & Davis, 2000). On the other hand, PE emphasizes the pleasure and satisfaction users experience while interacting with the app, which enhances engagement and acceptance (Van der Heijden, 2004). These stimuli shape the users' internal emotional and cognitive responses.

Organism (O) capture the emotional and cognitive reactions users have to the stimuli. A key variable here is **attitude**, which reflects users' overall positive or negative evaluations of the app and serves as a predictor of their intention to adopt it (Ajzen, 1991). Finally, the **response (R)** represents the behavioral outcome. In this study, the **Intention to Use (ITU)** variable measures the likelihood of users adopting the app for vehicle service management and tracking (Fishbein & Ajzen, 1975).

By applying the SOR framework, the study examined how Mecha-Move's features, including user-friendly navigation and enjoyable interaction, influenced users' attitudes and behavioral intentions. The framework guided the formulation of three key hypotheses:

H1: Perceived Ease of Use has a positive impact on users' attitudes.

H2: Perceived Enjoyment has a positive impact on users' attitudes.

H3: Users' attitudes have a positive impact on their intention to use the Mecha-Move app.

This structured methodology provided a comprehensive understanding of the factors driving user adoption of the Mecha-Move app, offering actionable insights for enhancing its functionality and user experience.

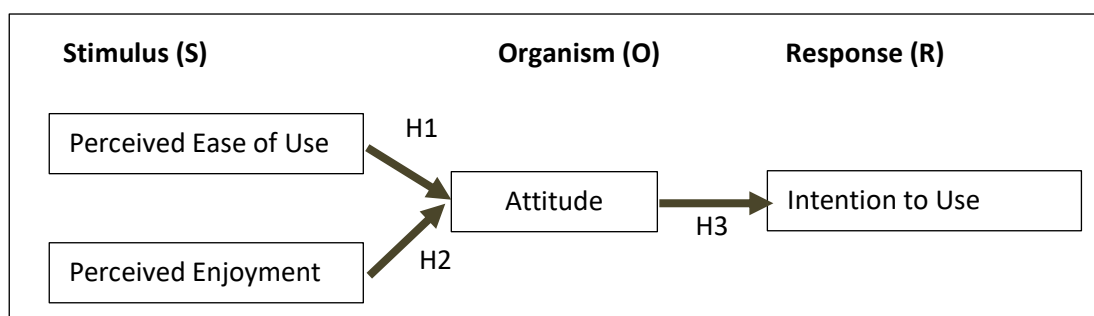


Figure 1: SOR framework

RESEARCH METHOD

The development of the Mecha-Move application prototype followed the System Development Life Cycle (SDLC) to ensure a structured and efficient process, aligning with the objectives of improving operational efficiency and customer satisfaction in the mechanic service industry.

i. Planning Phase

The project began by identifying key challenges in the automotive repair industry, including inefficient scheduling, lack of real-time service tracking, and limited service accessibility. A market analysis was conducted to pinpoint gaps in existing solutions and define the scope and objectives of the Mecha-Move application.

ii. Design and Implementation Phases

The design phase involved creating the application's architecture and interface using Thunkable, Google Sheets, and Canva. This included designing an intuitive user interface and backend to manage data and service histories. The implementation phase focused on developing the prototype, testing its core features, and iterating based on initial feedback.

iii. Testing and Feedback Collection

Once the prototype was completed, it was presented to 100 respondents to assess their interest in adopting the app when it is launched. Feedback was gathered through surveys to evaluate the usability and functionality of the app. In this study, a quantitative research method was employed to evaluate the hypotheses and validate the research framework. Since the unit of analysis focused on potential users and a complete sampling frame was unavailable, an online survey was conducted using Google Forms and distributed via a non-probability snowball sampling technique (Halimi et al., 2021). The survey link was shared through various digital platforms, including email and social media applications such as WhatsApp, Facebook, Instagram, and Telegram. Potential respondents were invited to participate and were provided with detailed information about the study. Only those who consented to participate completed the survey. In total, 88 respondents successfully submitted their responses, forming the dataset for this research. This methodology ensured that the Mecha-Move app was developed efficiently, meeting both customer needs and industry requirements. Results showed a positive reception, with most respondents indicating interest in using the app for scheduling and tracking vehicle maintenance (Details in section 4).

iv. Maintenance and Future Enhancements

Post-feedback, the app was prepared for market deployment, with provisions for future updates based on user feedback. Proposed enhancements include predictive maintenance features and extended service coverage.

RESULTS AND DISCUSSION

The Mecha-Move app introduced several innovative features designed to tackle critical challenges in the mechanic service industry. One of its standout components is the **appointment scheduling system**, which provides a user-friendly interface that significantly reduces customer wait times while enabling mechanics to manage their schedules more effectively. This feature aligns with industry research that highlights the value of streamlined scheduling systems in minimizing inefficiencies and enhancing customer satisfaction (Leung, 2004; Pilar et al., 2023).

Another prominent feature is the **real-time service tracking** capability, which allows customers to monitor the progress of their vehicle services in real time. This functionality fosters greater transparency and trust in the service process. As supported by literature, real-time tracking is a crucial tool for improving operational efficiency and ensuring clear communication between service providers and customers throughout the service cycle (Wang et al., 2018).

Additionally, the app facilitates **seamless customer-mechanic interaction** via a dedicated platform that supports live chat and feedback submission. This feature enhances communication, promotes collaboration, and ensures a more personalized service experience. It aligns with established best practices in customer service management, emphasizing the importance of effective communication in fostering satisfaction and loyalty (Doucet, 2004).

The Mecha-Move app is structured to cater to three main user domains; **Administrators**, **Mechanics**, and **Customers**; each complementing the others to create a seamless and efficient operational framework:

i. Administrators

Administrators play a key role in ensuring the smooth operation of the Mecha-Move platform. They are responsible for efficiently managing the vehicle service system, making sure it meets customer needs and runs smoothly. Administrators receive reports from both customers and mechanics about ongoing maintenance, ensuring quick responses to any issues. They also update service schedules and notify customers of any changes or updates. The app provides centralized management of service requests, schedules, and customer data, enabling administrators to monitor operational efficiency. Through access to analytics and performance metrics, they are able to drive continuous improvement, ensuring a seamless experience for all users.

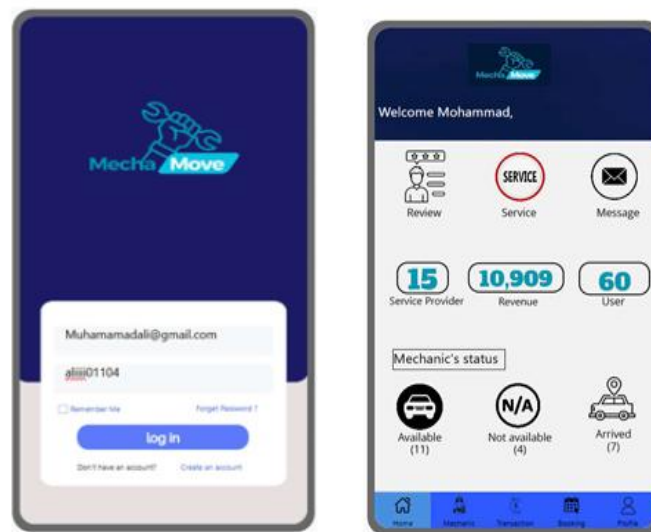


Figure 2: Administrators

ii. Mechanics

Mechanics must also register within the app to begin receiving service requests. Once registered, they can accept job requests from customers, directly through the app. Each service charge set by mechanics is subject to an additional fee to cover the use of the Mecha-Move platform. Mechanics have real-time access to assigned service requests and customer information, allowing them to efficiently manage their tasks. They can update the service progress and communicate directly with customers, ensuring the customer is always informed. The app also streamlines scheduling and workflow management, helping mechanics optimize their daily operations and deliver high-quality service.

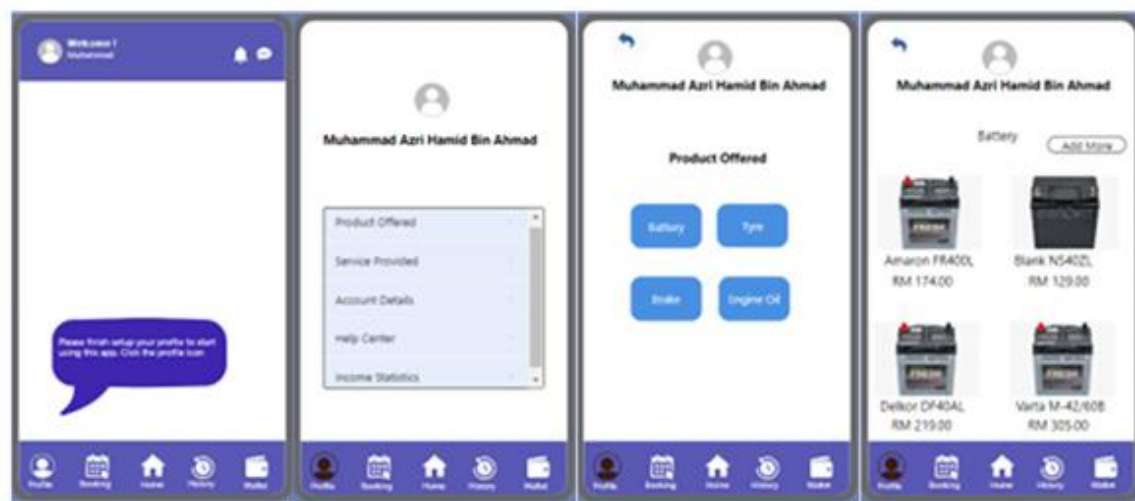


Figure 3: Mechanics

iii. Customers

Customers must first register with the Mecha-Move app to begin using its features. Once registered, they can easily schedule vehicle service appointments through a user-friendly management system that ensures efficiency and convenience. The app also allows customers to

track the progress of their vehicle maintenance in real time, providing complete transparency throughout the service process. They can access digital payment reports directly within the app, simplifying the experience. With simple tools for booking appointments and tracking service progress, customers are kept informed with real-time updates on the status of their vehicle. Additionally, they can communicate directly with mechanics and provide feedback, further enhancing the overall service quality.

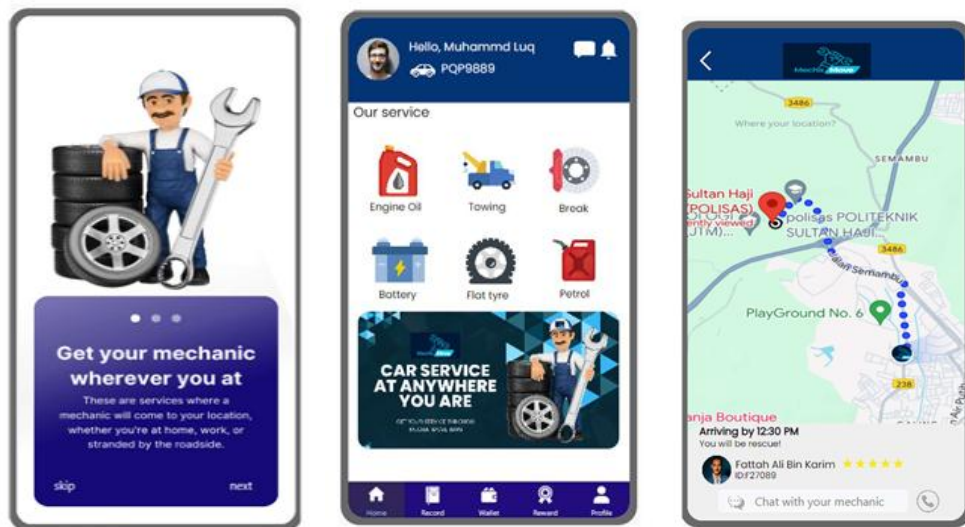


Figure 4: Customers

This seamless integration of features across customers, administrators, and mechanics ensures that the Mecha-Move app provides a streamlined and efficient service experience for all involved, creating a smooth, transparent, and engaging process for vehicle maintenance.

Data from 88 respondents, selected through non-probability snowball sampling, were analyzed using Smart PLS 4.0.8.1. The analysis followed a two-stage approach to Structural Equation Modeling (SEM): 1) the measurement model, and 2) the structural model. In the first stage, the measurement model was validated using convergent and discriminant validity. As noted by Hair *et al.* (2017b), convergent validity requires that both the loadings and average variance extracted (AVE) exceed 0.5, and that composite reliability values are greater than 0.7. Additionally, according to Franke and Sarstedt (2019), discriminant validity is demonstrated when the heterotrait-monotrait ratio (HTMT) is below 0.90.

Tables 1 and 2 present the results of the construct validity evaluation using these criteria. Table 1 indicates that all values surpassed the minimum thresholds, confirming the study's convergent validity. Following this, discriminant validity was also confirmed, as shown in Table 2, where all HTMT values were below the conservative threshold, meeting the standards set by Franke and Sarstedt (2019).

Table 1 Convergent validity

<i>Construct</i>	<i>Measurement Items</i>	<i>Loading</i>	<i>Cronbach's alpha</i>	<i>Composite reliability (CR)</i>	<i>Average variance extracted (AVE)</i>
<i>Attitude</i>	Using Mecha-Move apps is one of my preferred ways of car repair service booking.	0.931	0.941	0.962	0.894
	Using Mecha-Move apps in car repair service booking is important for me.	0.950			
	Using Mecha-Move apps in car repair service booking is easy for me to use and adapt.	0.956			
<i>Intention to Use</i>	I intend to use the Mecha-move apps.	0.965	0.967	0.979	0.939
	Using the Mecha-move apps for car service request/booking process is something I would do.	0.977			
	I could see myself using the Mecha-move apps for car service request/service booking process	0.965			
<i>Perceived Enjoyment</i>	I have fun interacting with Mecha-Move apps.	0.899	0.954	0.964	0.844
	Mecha-Move apps stimulates my curiosity.	0.954			
	Mecha-Move apps leads to my exploration.	0.914			
<i>Perceived ease of Use</i>	I would find doing car service request/service booking process using Mecha-move apps easy.	0.910	0.941	0.958	0.850
	I would find interaction through Mecha-move apps clear and understandable.	0.917			
	I would find it is easy to become skillful at navigating the Mecha-move apps.	0.935			
	Overall, using Mecha-move apps would be easy for me.	0.926			

Table 2 Discriminant validity (HTMT)

<i>Construct</i>	<i>ATT</i>	<i>ITU</i>	<i>PE</i>	<i>PEU</i>
<i>ATT</i>				
<i>ITU</i>	0.895			
<i>PE</i>	0.896	0.858		
<i>PEU</i>	0.885	0.884	0.893	

In the second stage, the structural model analysis tests the relationships between constructs. Hair et al. (2019) recommend evaluating hypotheses based on four criteria: (i) the beta values should align with the hypothesized direction; (ii) t-values must be at least 1.645; (iii) p-values should be less than or equal to 0.05; and (iv) the confidence interval (CI) should not contain zero in between LL and UL. As seen in Table 3, the study found positive relationships between perceived ease of use and attitude ($b = 0.8733$, $p < 0.001$), perceived enjoyment and attitude ($b = 0.299$, $p < 0.002$), and intention to use the app and attitude ($b = 0.655$, $p < 0.001$) based on the direct effect analysis. Therefore, all hypotheses (H1, H2, and H3) were supported, indicating that users' positive attitudes towards the app are influenced by their perceptions of ease of use and enjoyment. These

perceptions enhance their overall experience, fostering a positive attitude and, ultimately, a greater intention to use the Mecha-Move app.

Table 3 Direct effect – hypotheses testing

	<i>Beta</i>	<i>SD</i>	<i>T values</i>	<i>P values</i>	<i>LL</i> 5.00%	<i>UL</i> 95.00%	<i>Decision</i>
<i>ATT -> ITU</i>	0.873	0.030	29.259	0.000	0.817	0.916	Supported
<i>PE -> ATT</i>	0.299	0.106	2.821	0.002	0.113	0.460	Supported
<i>PEU -> ATT</i>	0.655	0.194	3.377	0.000	0.316	0.950	Supported

In addition, the survey feedback validated the app's impact, with 85% of respondents finding the scheduling system effective, and 78% reporting increased trust due to the real-time tracking feature. Furthermore, 90% expressed satisfaction with the app's overall usability, reinforcing its potential to meet user needs and expectations. These findings are consistent with previous research that underscores the importance of user-centric design and technological integration in enhancing service delivery (Griffith, 2024; Gyanppa, 2019).

CONCLUSION AND FUTURE WORK

Mecha-Move effectively addresses key inefficiencies within the mechanic service industry by combining a user-friendly design with technological innovation. The system improves accessibility, trust, and operational efficiency, benefiting both customers and service providers. Through its intuitive interface and advanced features, the app optimizes service processes, ensuring a smoother and more efficient experience for all users. This project demonstrates the transformative potential of mobile applications in service industries, showcasing how digital solutions can significantly enhance customer satisfaction while streamlining operations and optimizing resource management. By integrating technology into service delivery, businesses can offer more personalized, efficient, and transparent services, ultimately driving both customer loyalty and business success.

Looking ahead, several enhancements are proposed to further improve Mecha-Move. The integration of predictive analytics for maintenance scheduling would allow the app to forecast service needs and optimize scheduling in advance. Additionally, integrating third-party payment systems would provide users with a seamless, all-in-one solution for booking and paying for services. Expanding the app's service coverage to remote areas would also increase its accessibility, ensuring that more customers benefit from the platform. These enhancements will solidify Mecha-Move's position as a leading solution in the mechanic service sector, driving future growth and improving the overall user experience.

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