

AI-Enabled WhatsApp Workflow Automation for Improving Customer Inquiry and Booking Process in a Makeup Artist Business

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Abstract: *This study designs and validates an AI-enabled WhatsApp workflow automation prototype to improve the inquiry-to-booking process at LenyPW Makeup Artist. The current manual process causes delayed and inconsistent responses, repetitive inquiries, scattered customer data, manual availability checks, and limited lead tracking, reducing operational efficiency and customer experience. The research adopts a case study approach using Design Thinking for problem identification and prototype development, and the Lean Startup Build–Measure–Learn framework for validation. Mixed methods were applied through customer surveys, interviews, observations, prototype testing, questionnaires, and operational evaluation involving 30 female participants with makeup service experience. The proposed prototype functions as an AI-powered WhatsApp virtual admin that provides pricing information, checks availability, collects booking details, sends payment instructions, supports follow-ups, and stores customer data in a structured database while assisting booking management and lead tracking. Validation results indicate high user acceptance, with positive ratings for response speed (91.73%), information clarity (92.67%), booking structure (92.00%), customer comfort and trust (89.07%), and human handoff (90.17%). Although improvements are still required in context handling and response quality, the prototype is feasible for reducing repetitive administrative tasks while allowing the owner to focus on delivering high-quality makeup services.*

Keywords: AI workflow automation, WhatsApp, customer inquiry, booking process, makeup artist, operational feasibility

I. Introduction

The beauty industry continues to experience significant global and national growth, driven by changing lifestyles, increasing demand for personal care, and the influence of digital media. Globally, the industry was valued at US\$446 billion in 2023 and is projected to reach US\$580 billion by 2027, while Indonesia's beauty and personal care market is expected to generate US\$10.55 billion in revenue in 2026, with continued annual growth (McKinsey & Company, 2023; Statista, 2026). Makeup artist (MUA) services have become an important part of the creative economy, supporting industries such as fashion, photography, and weddings, while requiring not only technical expertise but also effective communication and professional service quality (Agusniar, 2025; Imani, 2025; Ultimarchya, 2024). As competition among makeup artists intensifies, responsive customer communication and efficient booking management have become critical factors influencing customer trust and booking decisions (Moko, 2024; Research, 2024; Setyowati, 2022).

LenyPW Makeup Artist currently manages customer inquiries primarily through WhatsApp using a manual process. This approach creates operational challenges, including delayed and inconsistent responses, repetitive inquiries, scattered customer information, manual availability checking, inconsistent follow-up, and increasing administrative workload. Business records from 2023–2025 also indicate a growing lost lead rate, suggesting that inconsistent inquiry handling may reduce booking opportunities. These findings highlight the need for a structured inquiry-to-service workflow supported by digital automation to improve customer experience and operational efficiency (Agusniar, 2025; Puspa; et. al., 2025; Ramadhani, 2025).

Internal WhatsApp records from LenyPW show that the business received 1,445 leads during the 2023–2025 period, with 335 leads or 23.2% recorded as lost leads. Although the number of monthly leads remained relatively stable, the lost lead rate increased from 16% in 2024 to 32% in 2025. This indicates that the main issue is not only how to attract potential customers, but also how to manage incoming inquiries, follow-ups, and booking progress more consistently. The data suggests that a fragmented inquiry process can create a business opportunity loss, especially when potential customers are not guided properly from the first inquiry to booking confirmation.

Previous studies have demonstrated the effectiveness of digital booking systems, workflow automation, and AI-powered WhatsApp chatbots in improving operational efficiency. Existing research has developed solutions such as mobile applications, web-based booking platforms, e-commerce systems, AI-powered WhatsApp chatbots, workflow automation using n8n, and AI-supported professional service systems. These studies have shown improvements in booking management, customer communication, scheduling, reminders, and operational efficiency. However, most focus on websites, standalone mobile applications, internal management systems, or industries outside makeup services, leaving a gap in AI-enabled WhatsApp workflow automation specifically designed to improve the inquiry-to-service process of freelance makeup artist businesses (Bestari; et. al., 2025; Ikrimach, 2024; Izzana; et. al., 2024; Puspa; et. al., 2025; Ramadhani, 2025; Spring; et. al., 2024; Wali; et. al., 2024).

AI-enabled service automation offers an opportunity to support this type of process improvement. AI can assist in responding to common inquiries, structuring information, recognizing customer intent, guiding booking steps, and recording customer data. However, in trust-based services such as makeup artistry, automation should not fully replace human interaction. Customers still need emotional comfort, personal communication, and access to the owner or admin when the inquiry becomes specific, sensitive, or complex. Therefore, the role of AI in this study is positioned as a virtual admin that supports repetitive and administrative tasks while preserving human handoff for personal consultation and final confirmation. Based on this background, this study aims to design and validate an AI-enabled WhatsApp workflow automation prototype to improve the customer inquiry and booking process at LenyPW Makeup Artist. The study focuses on identifying customer pain points and operational issues, defining process improvement requirements, developing a prototype solution, and validating the prototype based on customer-side value and operational feasibility.

II. Literature Review

2.1 SERVICE SCIENCE

Service Science views service as a system that involves interaction among people, technology, information, processes, and other resources. In this perspective, value is not created only by the service provider, but through interaction between the provider and the customer. This perspective is relevant to makeup artist services because the customer is involved before the service is delivered by providing information such as event date, location, makeup preference, skin condition, outfit, payment confirmation, and other service needs.

In the case of LenyPW Makeup Artist, the business can be understood as a service system that includes the customer, makeup artist, admin, hairdo or hijabdo partner, WhatsApp, booking data, payment information, calendar, reminder, and follow-up process. If one part of this system is not well coordinated, the overall service process may be affected. For example, delayed response, scattered customer data, or missed partner coordination can reduce the quality of the customer experience even before the actual makeup service takes place. Therefore, improving the inquiry and booking process is not only a communication issue, but also a service system improvement (Maglio et al., 2010; Vargo et al., 2010).

2.2 SERVICE MANAGEMENT

Service Management focuses on how service organizations design, manage, and improve service processes to create better customer experiences and operational performance. In service businesses, quality is not only evaluated from the final output, but also from the process that customers experience before, during, and after the service. For makeup artist services, customers do not only evaluate the final makeup result. They also evaluate how fast the provider responds, how clear the information is, how easy the booking process is, and how professionally the service provider communicates.

This is important because makeup artist services are personal and trust-based. Customers often decide to book before they can experience the final result directly. As a result, early service encounters such as WhatsApp inquiry, price list delivery, availability checking, payment instruction, and booking confirmation become part of the perceived service quality. If the process is slow, unclear, or inconsistent, customers may lose trust and move to another makeup artist. Therefore, the inquiry-to-booking process needs to be managed as an important part of the overall service delivery system (Fitzsimmons et al., 2021).

In this study, Service Management is used to understand the operational problems faced by LenyPW, especially in customer-facing processes. The manual WhatsApp process creates repeated administrative work, such as answering the

same questions, checking schedules, recording booking details, confirming payments, and following up with customers. A more structured workflow is needed to support the owner or admin, reduce repetitive tasks, and make the booking process more reliable for customers.

2.3 SERVICE QUALITY AND AISAQUAL

Service quality refers to how customers evaluate the performance of a service based on their expectations and actual experience. In digital and AI-supported services, service quality is not only related to human interaction, but also to how well the technology supports the customer journey. Customers may evaluate whether the system is fast, clear, easy to use, reliable, and able to provide access to human assistance when needed.

AISAQUAL, or Artificial Intelligence Service Agent Quality, is a service quality framework developed to assess customer experience with AI service agents. It includes several dimensions, such as efficiency, availability, anthropomorphism, enjoyment, and contact. Efficiency refers to how well the AI helps users complete their tasks. Availability refers to whether the AI service is accessible when needed. Anthropomorphism refers to how human-like or natural the AI interaction feels. Enjoyment refers to the comfort or positive feeling that users experience when interacting with the AI. Contact refers to the availability of human support when the AI cannot fully handle the customer's needs (Noor et al., 2022).

In this study, AISAQUAL is adapted to the context of AI-enabled WhatsApp workflow automation. Efficiency and availability are used to evaluate response speed, information clarity, and booking structure. Anthropomorphism and enjoyment are used to evaluate customer comfort and trust, especially whether the automated response feels natural, friendly, and not too robotic. Contact is used to evaluate human handoff, or whether customers understand when they can be assisted directly by the owner or admin. This adaptation is important because the prototype is not only an internal workflow tool, but also a customer-facing service agent that interacts with customers during the inquiry and booking process.

2.4 DESIGN THINKING AND LEAN STARTUP

Design Thinking is a human-centered approach used to understand user needs, define problems, generate ideas, and develop solutions through iteration. This approach is relevant when the problem is complex and closely related to user experience. In this study, Design Thinking is used because the problem is not only technical, but also related to customer pain points, communication experience, booking behavior, and internal workflow. The empathize stage is used to understand customer and admin problems, the define stage is used to formulate the main problem and How Might We questions, the ideate stage is used to compare alternative solutions, and the build stage is used to develop the prototype (Brown, 2008).

Lean Startup complements Design Thinking by emphasizing rapid experimentation and validated learning. The Build-Measure-Learn cycle helps a business build a minimum viable product, test it with users, measure responses, and identify areas for improvement. This approach is suitable for small service businesses because it reduces the risk of building a solution that does not match customer needs or operational capacity. Instead of implementing a full system immediately, the business can first test a prototype and refine it based on user feedback (Ries, 2011).

By combining Design Thinking and Lean Startup, this study develops the prototype through a practical and iterative process. Design Thinking helps ensure that the solution is based on real customer and operational problems, while Lean Startup helps validate whether the proposed AI-enabled WhatsApp workflow automation creates value for customers and is feasible for the business. This hybrid approach supports the development of a solution that is not only technically possible, but also relevant, usable, and aligned with the needs of LenyPW Makeup Artist (Brown, 2008; Ries, 2011).

III. Conceptual Framework & Hypotheses Development

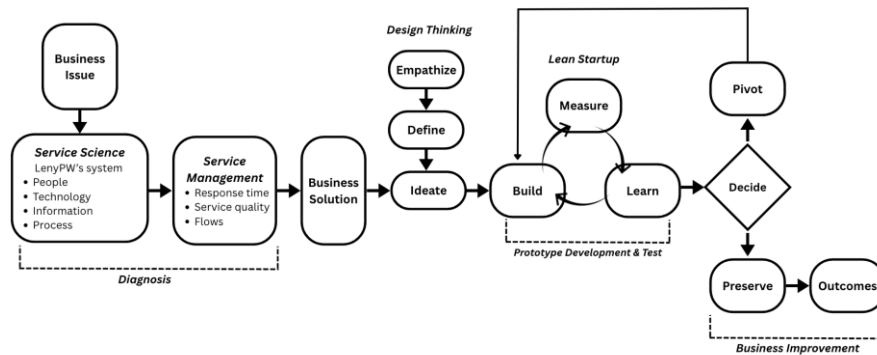


Figure 1. Conceptual Framework

The conceptual model positions AI-enabled WhatsApp workflow automation as a process improvement solution that is expected to create two types of value. The first is customer-side value, which includes faster response, clearer information, a more structured booking process, customer comfort and trust, and clear human handoff. The second is operational value, which refers to the ability of the system to support the owner or admin in managing inquiry data, booking status, payment tracking, follow-up, partner coordination, and lost lead records. Based on the literature review and the purpose of this study, the value hypotheses are developed as follows:

H1: The AI-enabled WhatsApp workflow automation prototype improves response speed in the customer inquiry process.

This hypothesis is based on the idea that automation can reduce waiting time by providing immediate responses to common inquiries. In the context of LenyPW, customers often ask repetitive questions about price lists, availability, service packages, and booking procedures. A faster response is expected to help customers receive basic information earlier and reduce the risk of losing potential bookings.

H2: The AI-enabled WhatsApp workflow automation prototype improves information clarity during the inquiry and booking process.

This hypothesis assumes that standardized and structured responses can help customers better understand service information. Clear information is important because customers need to know the price list, package details, availability, down payment requirements, terms and conditions, and next steps before confirming a booking. When information is delivered clearly, customers may feel more confident in continuing the booking process.

H3: The AI-enabled WhatsApp workflow automation prototype makes the booking process more structured and easier to follow.

This hypothesis reflects the need for a more organized booking flow. In the manual process, customers may receive information in separate messages and the admin may need to repeat several steps manually. Through workflow automation, the customer can be guided from inquiry, availability checking, booking data collection, payment instruction, and confirmation in a more systematic sequence.

H4: The AI-enabled WhatsApp workflow automation prototype maintains customer comfort and trust during the interaction.

This hypothesis is developed from the understanding that makeup artist services are personal and trust-based. Although automation may improve speed and structure, customers still need the communication to feel natural, polite, friendly, and not overly robotic. Therefore, the prototype is expected to support efficiency without reducing the personal feeling of the service.

H5: The AI-enabled WhatsApp workflow automation prototype provides clear human handoff when customers need direct assistance.

This hypothesis is based on the AISAQUAL contact dimension, which highlights the importance of human support in AI service interactions. In this study, human handoff is needed for complex questions, makeup consultation, booking

changes, complaints, negotiation, payment proof validation, and final confirmation. Clear handoff helps customers understand that AI supports the process, but human assistance remains available when needed.

H6: The AI-enabled WhatsApp workflow automation prototype supports operational feasibility for the owner or admin.

This hypothesis evaluates whether the prototype provides internal operational value. The system is expected to help the owner or admin record customer inquiries, monitor booking status, track payment and follow-up, coordinate hairdo or hijabdo partners, document customer preferences, and record lost leads. If these activities become more structured, the prototype can reduce repetitive administrative work and support better service management.

IV. Research Methods

4.1 RESEARCH DESIGN

This study used an applied case study approach to examine the customer inquiry and booking process at LenyPW Makeup Artist. A case study approach was considered suitable because the research focused on one specific business context and aimed to understand the operational problem in depth before proposing a practical solution. The purpose of the study was not to generalize the findings to all makeup artist businesses, but to design and validate a workflow automation solution that fits the customer behavior, communication style, and operational capacity of LenyPW.

The research was developed using Design Thinking and Lean Startup Build-Measure-Learn as the main methodological framework. Design Thinking was used to understand customer needs, identify pain points, define the main problem, and generate solution ideas. This approach was relevant because the inquiry-to-booking problem was not only a technical issue, but also related to customer experience, trust, communication, and service flow (Brown, 2008).

Lean Startup was used to validate the proposed solution through testing and learning. Instead of assuming that the workflow automation would automatically solve the problem, the prototype was tested with users to measure whether it created value in the inquiry and booking process. The Build-Measure-Learn cycle helped the study evaluate whether the solution should be continued, refined, or adjusted before broader implementation (Ries, 2021).

This study also applied a mixed-method approach by combining quantitative and qualitative data. Quantitative data were used to measure user responses through survey results, task completion rate, Likert-scale questionnaire, percentage score, and agreement rate. Qualitative data were used to understand user experience, admin problems, open-ended feedback, and operational feasibility. The combination of both data types was used to provide a more complete understanding of the problem and the value of the proposed solution (Creswell & Creswell, 2018).

4.2 DATA COLLECTION

Data were collected through several sources to understand both customer-side and operational-side problems. The first source was a customer insight survey, which was used to understand how potential customers search for makeup artist services, what information they need during the inquiry stage, their expectations toward response time, their communication preferences, and their openness to automated responses.

The second source was an interview with the admin of LenyPW Makeup Artist. The interview was conducted to understand the daily operational problems in handling WhatsApp inquiries, such as repetitive questions, delayed responses, scattered customer data, manual schedule checking, payment confirmation, follow-up, and partner coordination. This interview helped provide the internal perspective of the inquiry-to-booking process.

The third source was process observation. The existing WhatsApp booking process was observed to identify which activities were still manual, repeated, unclear, or difficult to monitor. This included how customers ask questions, how the admin sends information, how booking details are collected, how payment is confirmed, and how customer status is recorded. The observation helped map the current workflow and identify opportunities for improvement.

The fourth source was internal business data. This included WhatsApp inquiry records, booking notes, price list information, calendar records, payment status, customer follow-up notes, and lead records. These data were used to support the problem identification process and to understand the scale of lost lead and operational inefficiency in the current process.

The fifth source was prototype testing. A total of 30 female participants who had experience searching, contacting, or booking makeup artist services were involved in the testing. The participants followed a WhatsApp booking simulation, starting from sending an inquiry, asking for price list information, checking availability, submitting booking details,

receiving payment instructions, and giving feedback on their experience. After completing the simulation, participants filled out a Likert-scale questionnaire and open-ended questions to evaluate the prototype.

4.3 DATA ANALYSIS

The data analysis was conducted in several stages. First, root cause analysis was used to identify the main causes of the inquiry-to-booking problems. This analysis was based on customer survey findings, admin interview results, process observation, and internal business data. The purpose was to understand whether the problem was caused by slow response, unclear information, manual workflow, scattered data, weak follow-up, or other operational issues.

Second, descriptive analysis was used to summarize quantitative data from surveys, task completion results, and Likert-scale questionnaires. The analysis included frequency, percentage, total score, ideal score, percentage score, and agreement rate. The percentage score was used to interpret the strength of user evaluation toward each value hypothesis, while the agreement rate was used to show the proportion of respondents who selected agree and strongly agree.

Third, thematic analysis was used to analyze qualitative data from interviews, open-ended feedback, and operational evaluation. User comments were grouped into several themes, such as response speed, information clarity, booking flow, naturalness of response, repetitive answers, context memory, image handling, payment proof handling, message formatting, and human handoff clarity. This method was useful because it helped explain the meaning behind the numeric results and identify specific areas for improvement (Braun & Clarke, 2006).

Fourth, process analysis was used to compare the current manual inquiry-to-booking workflow with the proposed AI-enabled WhatsApp workflow automation. The comparison focused on whether the proposed workflow could reduce repetitive tasks, structure customer data, improve booking tracking, support follow-up, and make customer status easier to monitor.

Fifth, usability testing analysis was conducted using task completion rate. Each participant was asked to complete several tasks in the WhatsApp booking simulation. A task was counted as successful if the participant could complete it without major difficulty. The task completion rate was calculated using the following formula:

$$\text{Task Completion Rate} = (\text{Number of Successfully Completed Tasks} / \text{Total Number of Tasks}) \times 100\%$$

Sixth, value hypothesis validation was used to evaluate whether the prototype created customer-side value. The five customer-side hypotheses measured response speed, information clarity, booking structure, customer comfort and trust, and human handoff. The results were interpreted using percentage score and agreement rate. The customer-side questionnaire was adapted from the AISAQUAL framework, especially the dimensions of efficiency, availability, anthropomorphism, enjoyment, and contact. In this study, these dimensions were adjusted into five customer-side value areas: response speed, information clarity, booking structure, customer comfort and trust, and human handoff. Operational feasibility was also evaluated from the owner/admin perspective to assess whether the prototype could support customer data recording, booking status monitoring, payment tracking, reminder, follow-up, partner coordination, and lost lead documentation (Noor et al., 2022).

Finally, operational feasibility assessment was used to evaluate whether the prototype could support the internal workflow of LenyPW Makeup Artist. This assessment focused on inquiry recording, booking status monitoring, payment tracking, reminder, follow-up, partner coordination, customer preference documentation, and lost lead recording. The findings from all analysis stages were then synthesized to determine whether the prototype should be continued, refined, or changed before full implementation.

V. Results and Discussion

5.1 EMPATHIZE FINDINGS

The empathize stage was conducted to understand customer behavior and operational problems in the inquiry-to-booking process of LenyPW Makeup Artist. The findings show that the main issue was not only the number of incoming inquiries, but also how those inquiries were handled, recorded, followed up, and converted into confirmed bookings.

The customer insight survey showed that 65% of respondents usually contacted two to three makeup artists before making a booking decision. This indicates that the inquiry stage is highly competitive. Customers do not only compare makeup results or prices, but also compare how fast, clear, and professional each makeup artist responds. Therefore, the first interaction through WhatsApp becomes an important part of the customer decision-making process.

The survey also showed that the most important information customers wanted to know at the beginning of the inquiry was the price list. Around 45.5% of respondents stated that price or price list was the first information they wanted to receive, followed by availability of date and time at 22.7%, and package details at 18.2%. This finding shows that

customers want to quickly understand whether the service fits their budget and whether the makeup artist is available on their event date.

Response speed was also found to be a critical factor. Around 89.1% of respondents stated that fast response from a makeup artist was important. In terms of expected response time, 37.3% of respondents expected a reply within 5-15 minutes, while 38.2% still considered 15-60 minutes acceptable. However, 69.1% of respondents stated that they had previously decided not to book a makeup artist because the response was too slow. In addition, 73.6% said that delayed response influenced their booking decision, and 62.7% would contact another makeup artist if their message was not answered quickly.

The client survey of LenyPW also showed a similar pattern. Although many clients perceived LenyPW's communication positively, 40% of respondents stated that they had waited longer than expected for a reply, and 28% had sent a follow-up message because they had not received a response. Furthermore, 68% stated that they would consider another makeup artist if they did not receive a timely response, while 84% stated that they would be more interested in booking LenyPW if the response was faster and the information was clearer.

From the operational side, internal WhatsApp records showed that LenyPW received 1,445 leads during the 2023-2025 period, with 335 leads or 23.2% recorded as lost leads. The lost lead rate increased from 16% in 2024 to 32% in 2025. This finding indicates that the challenge was not only attracting potential customers, but also managing the inquiry, follow-up, and booking process more consistently.

Another important finding was that customers were open to automation as long as the response remained clear and natural. Around 71% of respondents stated that they were comfortable if common questions such as price list, availability, booking steps, and terms were supported by automated responses. However, customers still expected the communication to feel warm, polite, and not too robotic. This finding shows that automation can be accepted in the early inquiry stage, but it should still include a clear option for human assistance.

5.2 DEFINE: HOW MIGHT WE QUESTIONS

Based on the empathize findings, the main problem in the current inquiry-to-booking process is the absence of a structured workflow that can manage customer inquiries quickly, clearly, and consistently. The process still depends heavily on manual responses from the owner or admin. As a result, repeated questions, availability checking, booking data collection, payment instruction, follow-up, and lead tracking are not yet managed in one integrated flow.

The problem statement of this study is formulated as follows: *"LenyPW Makeup Artist needs a support system that can improve response speed, clarify service information, structure the booking process, and support customer data recording without removing the personal touch that is important in makeup artist services".*

Table 1. How Might We Questions and Proposed Solutions

Identified Problem	How Might We Question	Proposed Solution
Customers need quick access to basic service information.	How might we help customers receive basic information more quickly?	Provide automated WhatsApp responses for frequently asked questions such as price list, service package, booking steps, down payment terms, and terms and conditions.
Slow response may cause customers to consider another makeup artist.	How might we reduce customer waiting time during the inquiry process?	Create an automatic reply mechanism for common questions before the owner or admin takes over more specific inquiries.
Customers need clearer and more transparent booking information.	How might we present booking information in a clearer and easier-to-understand format?	Develop a standard booking information flow that includes price list, availability, service package, payment, confirmation, cancellation policy, and reminder.
The inquiry and booking process is still manual and not fully structured.	How might we make the inquiry and booking process more structured for both customers and the admin?	Develop an integrated booking workflow that guides customers from inquiry to booking confirmation and records customer data in one database.
Follow-up, reminder, payment confirmation, and partner coordination are not yet systematic.	How might we help LenyPW manage follow-up and coordination more consistently?	Prepare reminder and follow-up triggers for down payment, event reminders, post-service messages, testimonial requests, and partner coordination checklists.
Automation can only be accepted if it still feels clear, natural, and personal.	How might we use automation without making the response feel robotic?	Adjust the automated response tone to remain warm, polite, natural, and aligned with LenyPW's communication style, while providing human handoff when needed.

5.3 IDEATE:
ALTERNATIVE SOLUTION SELECTION

The ideate stage was conducted to generate and compare possible solutions based on the problems and How Might We questions. The main focus was to find a solution that could improve customer response, structure the booking process, and support internal operations while still fitting the behavior of LenyPW customers, who mainly use WhatsApp to communicate.

Several alternative solutions were evaluated using a weighted decision matrix. The criteria included customer value, operational impact, feasibility, cost efficiency, and scalability. The result of the scoring is presented in Table 2.

Table 2. Alternative Solution Scoring

Alternative Solution	Score	Percentage	Main Consideration
WhatsApp Business quick replies and labels	340/500	68.0%	Easy to use, but still depends heavily on manual admin response.
Google Form and Google Sheets booking tracker	280/500	56.0%	Helps data recording, but customers need to leave WhatsApp and slow response remains unresolved.
Website or landing page booking	235/500	47.0%	Can provide complete information, but does not directly solve WhatsApp communication problems.
CRM system	270/500	54.0%	Good for customer tracking, but too complex for current operational capacity.
Custom mobile application	270/500	54.0%	Can be developed with complete features, but requires high cost and customers must download a new application.
AI-enabled WhatsApp workflow automation	455/500	91.0%	Uses the existing WhatsApp channel while supporting automated responses, data recording, availability checking, follow-up, reminder, payment instruction, partner coordination, and human handoff.

5.4 BUILD: PROTOTYPE DEVELOPMENT

The selected solution was developed into a minimum viable product in the form of an AI-enabled WhatsApp virtual admin. The prototype was designed to support the early inquiry and booking process at LenyPW Makeup Artist. It was not created as a separate application, but as a workflow improvement within WhatsApp, which is already familiar to customers.

The prototype used n8n as the workflow automation platform. In the proposed workflow, n8n connects WhatsApp, AI response logic, Google Sheets, Google Calendar, and human handoff. WhatsApp functions as the main communication channel. AI response logic helps recognize customer intent and generate structured responses. Google Sheets records inquiry data, booking details, payment status, follow-up status, partner needs, and lost lead information. Google Calendar supports availability checking and confirmed booking records. Human handoff allows the owner or admin to take over conversations when customers need personal consultation or final confirmation.

The proposed workflow starts when a customer sends a message through WhatsApp. The system reads the customer’s intent, such as asking for a price list, checking availability, asking about booking steps, or requesting specific service details. For common questions, the system provides an automated response using prepared templates and AI response logic. If the customer wants to continue booking, the system helps collect event details, such as name, date, time, location, service type, hairdo or hijabdo needs, and special notes.

The main workflow includes customer inquiry, automated greeting, intent recognition, information delivery, availability checking, booking data collection, payment instruction, booking status update, reminder, follow-up, partner coordination, booking change request, human handoff, and lost lead tracking.

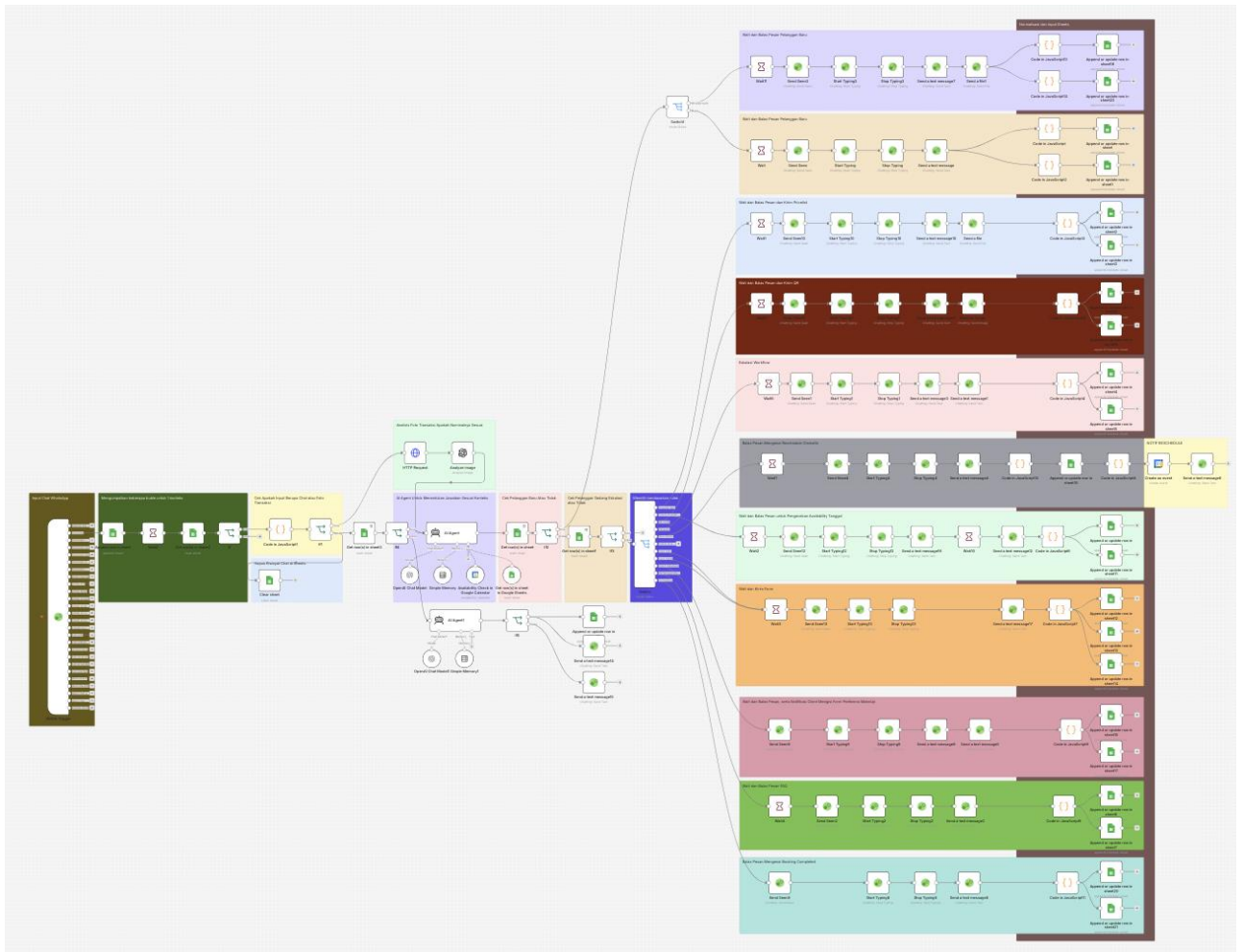


Figure. 2. AI-Enabled WhatsApp Workflow Automation Using n8n

5.5 MEASURE: TASK COMPLETION AND VALUE HYPOTHESES VALIDATION

The measure stage was conducted to evaluate whether the prototype could be used by customers and whether it created value in the inquiry-to-booking process. Prototype testing involved 30 female participants who had experience searching, contacting, or booking makeup artist services. Each participant followed the same WhatsApp booking simulation, from sending an inquiry to receiving payment instructions and giving feedback.

The first evaluation used task completion rate. The result showed that the prototype achieved a total task completion rate of 90.42%, with 217 tasks successfully completed out of 240 total task attempts.

The result shows that the prototype was strong in supporting the basic inquiry-to-booking flow, especially for requesting information, checking availability, submitting booking details, and receiving payment instructions. However, the lower scores in T7 and T8 show that the prototype still needs improvement in more personal consultation tasks, such as handling makeup references, discussing makeup needs, and collecting customer preferences. These tasks may require clearer guidance or direct human assistance because they involve visual preferences and personal service expectations.

Table 4. Task Completion Rate of Prototype Testing

Code	Testing Task	Successful Completion	Task Completion Rate
T1	Starting inquiry through WhatsApp	30 of 30	100.00%
T2	Asking for price list information	30 of 30	100.00%
T3	Checking service availability	30 of 30	100.00%
T4	Providing booking details	30 of 30	100.00%
T5	Receiving payment instructions	30 of 30	100.00%
T6	Sending payment proof or dummy proof	30 of 30	100.00%
T7	Sending makeup reference or discussing makeup needs	18 of 30	60.00%
T8	Completing customer preference details	19 of 30	63.33%
Total	Total task completion rate	217 of 240	90.42%

The second evaluation was value hypotheses validation. The customer-side value hypotheses measured response speed, information clarity, booking structure, customer comfort and trust, and human handoff. Prototype validation was conducted by adapting the AISAQUAL dimensions to the context of AI-enabled WhatsApp workflow automation. AISAQUAL was used because this framework is relevant for assessing the quality of AI-based service agents, such as chatbots or virtual assistants. However, this study did not fully utilize all AISAQUAL dimensions. The results are summarized in Table 5.

Table 5. Customer-Side Value Hypotheses Validation

Hypothesis	Code	1	2	3	4	5	Total	Total Score	Ideal Score	Agreement Rate
H1	RS1	0	0	0	14	16	30	136	150	100,0%
	RS2	0	1	2	11	16	30	132	150	90,0%
	RS3	0	0	0	6	24	30	144	150	100,0%
	RS4	0	0	2	12	16	30	134	150	93,3%
	RS5	0	0	0	8	22	30	142	150	100,0%
Total H1								688	750	96,7%
PCT H1									91,73 %	Strongly Agree
H2	IC1	0	0	1	9	20	30	139	150	96,7%
	IC2	0	0	2	13	15	30	133	150	93,3%
	IC3	0	0	1	6	23	30	142	150	96,7%
	IC4	0	0	0	5	25	30	145	150	100,0%
	IC5	0	0	2	10	18	30	136	150	93,3%
Total H2								695	750	96,0%
PCT H2									92,67 %	Strongly Agree
H3	BS1	0	0	1	8	21	30	140	150	96,7%
	BS2	0	0	1	9	20	30	139	150	96,7%
	BS3	0	1	1	9	19	30	136	150	93,3%
	BS4	0	0	6	8	16	30	130	150	80,0%
	BS5	0	0	0	5	25	30	145	150	100,0%
Total H3								690	750	93,3%

PCT H3									92,00 %	Strongly Agree
H4	CT1	0	1	0	12	17	30	135	150	96,7%
	CT2	1	1	1	11	16	30	130	150	90,0%
	CT3	0	1	2	7	20	30	136	150	90,0%
	CT4	0	1	1	12	16	30	133	150	93,3%
	CT5	0	0	2	12	16	30	134	150	93,3%
Total H4								668	750	92,7%
PCT H4									89,07 %	Strongly Agree
H5	HH1	0	1	2	19	8	30	124	150	90,0%
	HH2	0	0	1	15	14	30	133	150	96,7%
	HH3	0	0	2	6	22	30	140	150	93,3%
	HH4	0	0	0	6	24	30	144	150	100,0%
Total H5								541	600	95,0%
PCT H5									90,17 %	Strongly Agree

The highest score was found in information clarity at 92.67%. This shows that the prototype helped customers understand service information, price lists, booking steps, and payment instructions more clearly. Booking structure also received a high score of 92.00%, indicating that the prototype made the booking process easier to follow. Response speed received 91.73%, showing that customers felt the benefit of faster automated responses during the early inquiry stage.

Human handoff received 90.17%, which indicates that customers understood the availability of human assistance when needed. Customer comfort and trust received 89.07%. Although this score was still high, it was the lowest among the five customer-side values. This suggests that speed and clarity are not enough; the prototype also needs to maintain a natural, friendly, and human-like communication style.

Open-ended feedback provided deeper insight into the user experience. Many participants stated that the prototype was easy to follow and that they did not experience major confusion during the simulation. However, several participants suggested improvements in package details, price list explanation, down payment information, and add-on services such as hairdo or hijabdo. Some participants also noted that the response sometimes felt repeated or did not fully remember the previous context. This indicates that the prototype still needs improvement in response logic, context memory, message formatting, and response relevance.

Operational feasibility was also evaluated from the owner/admin perspective. The result showed that the prototype could support internal workflow activities such as customer inquiry recording, booking status monitoring, automated price list delivery, availability checking support, follow-up automation, partner coordination, and lost lead recording. However, some areas were still partial, especially payment proof handling, context memory, and response consistency. These findings support H6, but also show that the prototype needs refinement before full implementation.

Operational Need	Evidence	Result	Improvement Notes
Customer inquiry data recording	Customer inquiry and booking data can be recorded in Google Sheets.	Worked	Data consistency needs improvement when customers change booking details.
Automated price list delivery	The prototype can send price list and service package information automatically.	Worked	Package details and add-on services need to be clearer.
Availability checking support	The prototype guides customers to provide event date and time for availability checking.	Worked	Availability response needs to be more consistent.
Booking status monitoring	Customer status can be monitored, such as new inquiry, waiting for down payment, confirmed, or lost lead.	Worked	Status update should be more automatic.
Partner coordination automation	Hairdo, hijabdo, or assistant needs can be recorded for partner coordination.	Worked	Partner availability still requires human verification.
Payment and down payment tracking	Payment status and instructions can be recorded in the system.	Partial	Payment proof recognition still requires improvement and human validation.
Follow-up automation	The prototype supports reminders and follow-up messages.	Worked	Follow-up timing and message variation need refinement.
Lost lead recording	Lost lead status and reason can be documented.	Worked	Lost lead categories can be made more detailed.
Context memory	The prototype can use some customer data during the conversation.	Partial	The system needs to avoid repeated questions and better remember booking changes.
Response consistency	The prototype can answer common questions with standardized responses.	Partial	Response logic needs refinement to avoid duplicated responses.

Table 6. Operational Feasibility Validation

5.6 LEARN: BUSINESS SOLUTION

The learn stage showed that the AI-enabled WhatsApp workflow automation prototype was feasible to continue as a business solution for LenyPW Makeup Artist. The validation results indicated that the prototype created positive customer-side value and supported several internal operational needs. The prototype was especially useful for repetitive and administrative tasks, such as sending price lists, explaining booking steps, checking availability, collecting customer data, sending payment instructions, supporting reminders, and recording customer status.

However, the prototype was not yet ready for full implementation without refinement. Several areas still needed improvement, especially context memory, repeated responses, image handling, payment proof handling, response timing, message formatting, and human handoff clarity. These issues were mainly found when the conversation became more personal, visual, or complex, such as discussing makeup references, changing booking details, validating payment proof, or handling special customer requests.

Based on the findings, the recommended decision is to persevere with refinement. This means that the solution should be continued because the validation results show strong potential, but the prototype should be improved before being used in daily operations. The recommended business solution is to continue the prototype into a limited pilot for three months. During this period, the system can be tested with real customer inquiries under owner/admin supervision. The pilot should focus on improving response logic, knowledge base, context memory, payment proof handling, message format, follow-up timing, and human handoff mechanism.

Overall, the result shows that AI-enabled WhatsApp workflow automation can support LenyPW Makeup Artist by improving the inquiry-to-booking process without removing the human role. The prototype works best as a virtual admin that handles repetitive administrative tasks, while the owner or admin remains responsible for personal consultation, payment validation, booking changes, partner coordination, and final service decisions.

VI. Conclusion

This research aims to design and validate an artificial intelligence-based WhatsApp workflow automation prototype to improve the inquiry and booking process at LenyPW Makeup Artist. Based on the research results, the main issues in the current process are slow responses, repetitive information delivery, scattered customer data recording, manual schedule checking, inconsistent follow-up, and the risk of lost leads. These conditions indicate that the inquiry-to-booking process requires a more structured and easily monitored workflow.

The developed prototype is an AI-based WhatsApp virtual admin connected to n8n, Google Sheets, Google Calendar, and a human handoff to the owner/admin. This prototype is designed to assist with initial activities such as automated greetings, sending price lists, checking availability, collecting booking data, payment instructions, recording customer status, reminders, follow-up, partner coordination, booking change requests, and lost lead tracking. Thus, the system functions not only as a chatbot but also as a workflow automation that supports operational processes.

Testing results with 30 respondents showed that the prototype could support most of the basic inquiry-to-booking flow, with a total task completion rate of 90.42%. Validation of the customer-side value hypotheses also showed high results, with response speed at 91.73%, information clarity at 92.67%, booking structure at 92.00%, customer comfort and trust at 89.07%, and human handoff at 90.17%. These results indicate that the prototype is considered to help make the booking process faster, clearer, more structured, and more convenient for customers.

From an operational perspective, the prototype was also deemed beneficial because it can help owners/admins record customer data, monitor booking status, manage follow-ups, support partner coordination, and document lost leads more systematically. However, the prototype still requires refinement before full implementation, particularly in context memory, duplicated responses, image handling, payment proof handling, response timing, and the clarity of human handoff.

This study concludes that AI-enabled WhatsApp workflow automation is feasible to be continued use as a supporting solution for the inquiry-to-booking process at LenyPW Makeup Artist. This system isn't intended to replace human intervention, but rather to assist with repetitive administrative tasks, allowing owners/admins to focus more on personalized consultations, service coordination, and the quality of makeup results. The next recommendation is to advance the prototype to a refinement stage and a limited pilot for three months before wider use in daily operations.

6.1 MANAGERIAL IMPLICATIONS

The findings provide several practical implications for LenyPW Makeup Artist and similar small service businesses. First, AI-enabled workflow automation can help reduce repetitive administrative tasks without removing the personal role of the owner or admin. This allows the business to respond faster while still maintaining human involvement for personal consultation and final confirmation. Second, WhatsApp remains an important channel for customer communication because customers are already familiar with it. Instead of asking customers to use a new application, small service businesses can improve the existing channel by adding automation, structured data recording, and follow-up support. Third, human handoff should be treated as an essential part of AI service automation. In personal and trust-based services, customers still need direct access to a human when the inquiry becomes specific, emotional, visual, or complex. Therefore, automation should support the service process, not fully replace human interaction.

6.2 LIMITATIONS AND FUTURE RESEARCH

This study was conducted as a single case study at LenyPW Makeup Artist, so the findings may not fully represent all makeup artist businesses or other service industries. The prototype testing also involved 30 participants in a simulated booking scenario, not full implementation with real customers over a long period. Therefore, future research can test the prototype in actual daily operations and compare business performance before and after implementation.

Future studies may also measure the impact of AI-enabled workflow automation on actual response time, booking conversion rate, lost lead rate, customer satisfaction, and admin workload. Further development can also improve the prototype's ability to handle image references, payment proof recognition, booking changes, context memory, and more personalized customer conversations. the conclusion.

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Declaration of Competing Interest

The author declares no competing interest.

Data Availability

The data used in this study are not publicly available due to business confidentiality and respondent privacy.

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