Journal of Information Systems Engineering and Business Intelligence

Identifying Messenger Platform Preferences using Multiple Linear Regression and Conjoint Analyses

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Abstract

Background: The rapid development of telecommunication technology has prompted the creation of various messenger applications. The competition among social messengers to gain market share is becoming tighter.
Objective: This study aims to capture user preferences for messenger platforms and inform software development companies to improve their products based on user needs.
Methods: This research uses quantitative methods, i.e., categorical analysis and multiple linear regression analysis, to extend the results from qualitative methods that identify the preferences in past studies. The data were obtained through a questionnaire.
Results: The results show that customers are influenced by accessibility, flexibility, effectiveness and chat history. Meanwhile, users are influenced by responsiveness, user-friendly interface, performance, personal needs, privacy and security, and customer services.
Conclusion: The research can identify the indicators to guide the creation of an ideal messenger platform based on customer and user preferences.

Keywords: Conjoint, Messenger Platform, Multiple Linear Regression, Preference

I. INTRODUCTION

Digital technology development has made communication more convenient, so the number of users continues to increase. Companies are racing to build messenger applications, which has led to tight competition in the market and business environment. This study aims to examine the determinants of user and consumer preferences for messenger applications.

DeLone and McLean created the Information System (IS) success model to explain a unified view of what forms IS success through a complete taxonomy. The design identifies six dimensions: system quality, information quality, information use, user satisfaction, individual impact, and organisational impact, which was later updated with a new version in 2003. The new design includes six interconnected variables or constructs. An IS model can be constructed by considering the system, information, and service qualities. These three variables or constructs will influence intentions to use and user satisfaction [1]. DeLone and McLean in [2], stated that system quality is connected to technical characteristics, performance, and usability. The assessment of an IS quality can be done through a series of system quality questions [3], covering response time, ease of use, flexibility, reliability, and security. Quality of service is a major determinant of satisfaction, with the four indicators used by Bailey and Pearson comprising ease of access, system flexibility, response time, and system integration. System quality is also a concern for stakeholders [4]. O'Brien and Marakas mentioned that users want high-quality information, i.e., actual and reliable [4], because it influences

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decision-making in reaching organisational purposes. Quality information can help task completion more efficiently and effectively [5]. Information quality influences a system's relevance, adequacy, accuracy and timeliness [6], [7], [8], [9]. Meanwhile, service quality includes responsiveness and technicians' perceived competence [2]. Traditionally, it can be associated with the support quality that users receive from the IS department and IT support systems [6][8][9]. According to Kotler and Armstrong [10], quality is attributable to competitive advantages, which include features, quality, style and design. Preference is the process of ranking products or services based on their advantages [11].

Using qualitative analyses, previous studies have analysed customer and user preferences for messenger applications in Indonesia. The results show that preferences can be seen from the customer's and the user's (company) perspectives. The former concerns accessibility, flexibility, effectiveness and chat history systems that benefit companies and customers. The latter consider responsiveness, user-friendly interface, performance to cater for personal needs, privacy and security of personal data, and excellent services that extend to cyberspace [12].

This study aims to corroborate the results of previous qualitative research. Consumer preferences, in this case, are consumer attitudes towards brand choices formed through the evaluation options [13]. With various messenger application characteristics and advantages, customers have the leverage to choose, which leads to the emergence of certain preferences. This study uses multiple regression methods and conjoint analysis to discover the questions' preferences. The findings can benefit application developers in developing products that the market wants.

II. METHODS

In this quantitative research, data were collected from questionnaires distributed to customers and users by a messenger platform builder company. The customer is a company that purchases a messenger platform product from the builder. The platform is used to communicate with the customers to deliver the consumer's services. These customers are called the users in this study. They use the platform to communicate with the company or complain about products or services.

The data were collected online. The respondents were selected by purposive sampling technique using inclusion criteria [14], namely: (1) Aged 17 years and over; (2) Have a login credential to the messenger application; (3) Have used the messenger platform application; and (4) Works in a consumer company or as an end-user of a messenger application. The quantitative data analysis follows the steps in Fig. 1.
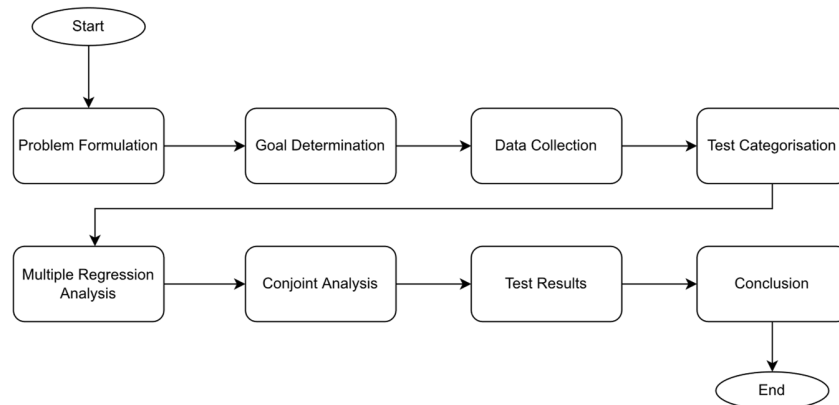

Fig. 1 The quantitative data steps

The results of hypothesis testing in this study are accompanied by inferential statistics and a description of the data. The descriptive statistics contain an overview of the participants' characteristics, such as gender, age, and education. The description of the research data includes the statistics of the variables, the number of subjects (N), mean (M), standard deviation (S), variance (S2), minimum score (Xmin), and maximum score (Xmax). From the descriptive information obtained, we can determine the state of a subject, allowing us to categorize them into a high, medium, or low scale score. The categorisation scores came from measuring scales with SPSS [15].

Before testing the hypothesis with multiple linear regression analysis, several assumptions must be met to ensure its feasibility. The multicollinearity, normality, and heteroscedasticity attempts tested the classical assumption. Meanwhile, for simple linear regression testing, the classical assumption tests cover only normality and heteroscedasticity [16]. The fidelity of the regression function in gauging the proper score can be quantified from its goodness of fit. Statistically, this can be quantified from the determining coefficient, F, and T statistics scores [17].

The multiple regression analysis was conducted using the Statistical Package for Social Science (SPSS 21.0) software to verify the relationship between independent and dependent variables [17].

Fig. 2 shows the multiple regression analysis. The conceptual framework of linear regression is the influences of factors such as flexibility, accessibility, effectiveness and recent chat history on customer preferences. Meanwhile, Fig. 3 shows that linear regression influences responsiveness, user-friendly interface, performance and personalisation, privacy and security, and good customer service on user preferences.
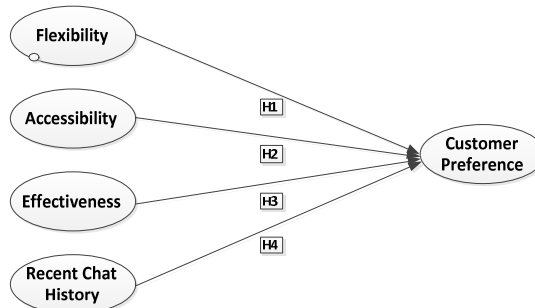

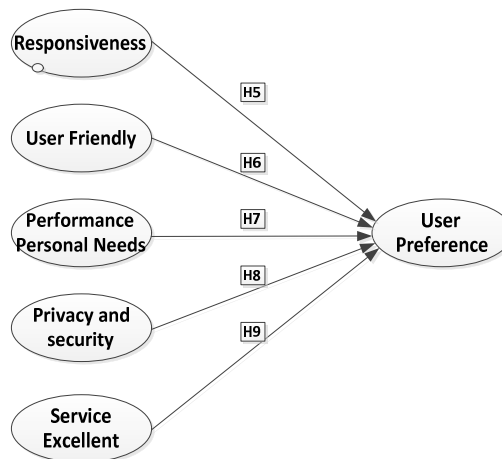Fig. 2 Customer preference conceptual framework

Fig. 3 User preference conceptual framework

Conjoint analysis is used to examine the data in the second round to identify consumer preferences, which could be for a product, service, or idea [18]. In the discussion section, the analyses identify the critical points, the attribute, the utility level of the attribute, the overall ideal profile of the respondent (a combination of attributes and attribute levels) and the accuracy of the model [19].

III.   RESULTS

A. Consumer Preferences

1) Descriptive Statistics & Description of Research Data

Sixty-nine respondents from the consumer group participated in the study, as shown in Fig. 4. Table 1 categorises the four variables: flexibility, accessibility, effectiveness, and recent chat history. Each variable scored high, an important indicator for a messenger platform.
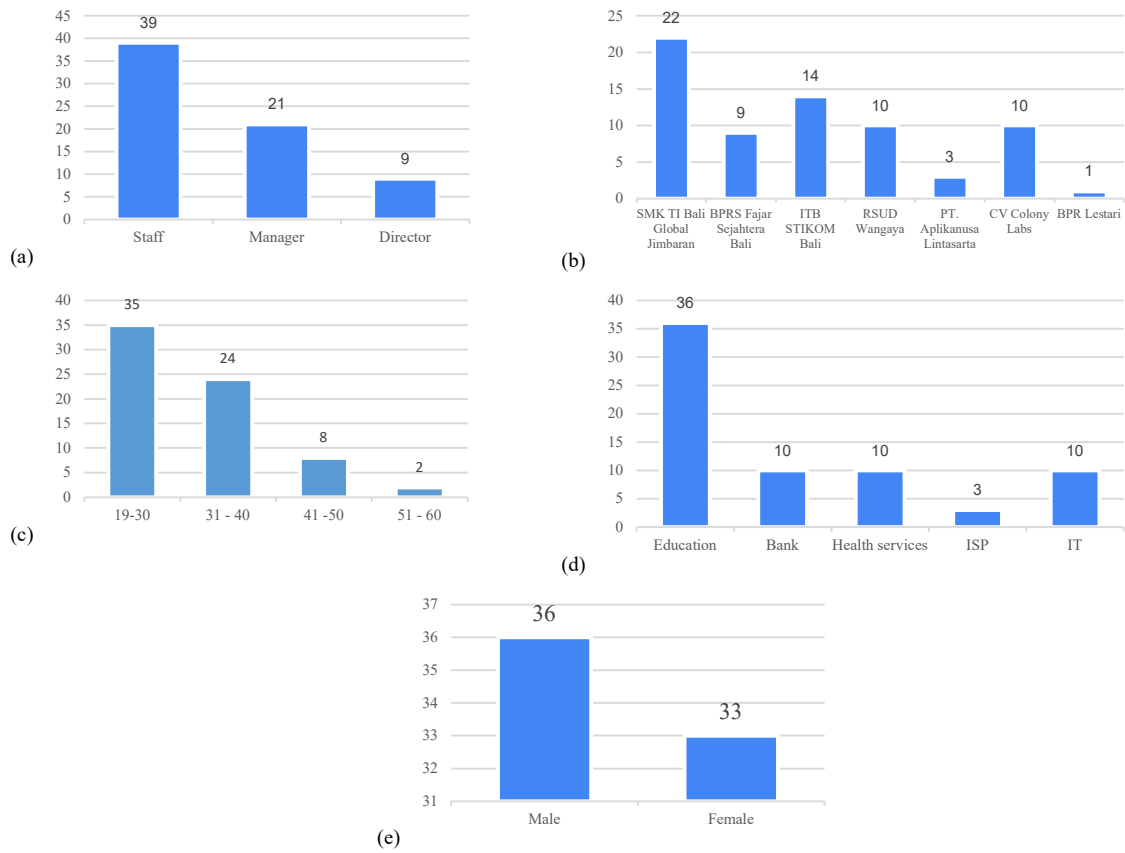
Fig. 4 Description of customer respondents (a) Position; (b) Company name; (c) Age; (c) Business field; (e) Gender

TABLE 1
CUSTOMER CATEGORY TEST RESULTS

Variable	Category	Frequency	Percentage
Flexibility	Very low	1	1.4
	Low	1	1.4
	Moderate	3	4.3
	High	19	27.5
	Very high	45	65.2
	Total	69	100.0
Accessibility	Very low	1	1.4
	Moderate	5	7.2
	High	21	30.4
	Very high	42	60.9
	Total	69	100.0
Effectiveness	Very low	1	1.4
	Low	1	1.4
	moderate	3	4.3
	High	20	29.0
	very high	44	63.8
	Total	69	100.0
Recent Chat History	Very low	1	1.4
	Moderate	4	5.8
	High	23	33.3
	Very high	41	59.4
	Total	69	100.0

2) Multiple Linear Regression Analysis

The classical assumption test, i.e., normality, showed that the Kolmogorov-Smirnov value is 1.315 with a significance level of 0.063. This level is higher than the research significance benchmark, which is 0.05, so the data can be considered usually allocated [20]. The multicollinearity test results showed that all variables have a tolerance value above 0.1 and a VIF below 10 [21], so multicollinearity does not exist among independent variables in the regression model. Meanwhile, the results of the heteroscedasticity test show that the output points in the Fig. 5 scatterplot are spread below and above the Y fuze, with no common form or pattern [22]. Therefore, it can be concluded that the independent variables above are not heteroscedastic but homoscedastic.
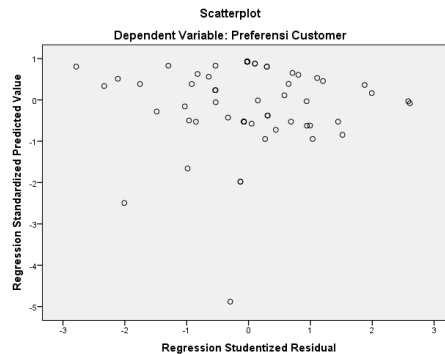

Fig. 5 Scatterplot of heteroscedasticity test from customer respondents

3) Multiple Linear Regression Test

TABLE 2
MULTIPLE LINEAR REGRESSION TEST

Model	R	R Square	Adjusted R Square	F	Sig.
1	.935[a]	.874	.866	111.272	.000[b]

Table 2 shows that the regression model has an adjusted R^2 of 0.866. This implies that the mutability of the dependent variable can be attributed to the mutability of the independent variable at 86.6%. The remaining 13.4% can be attributed to other variables not included in the regression model.

The F value is 111.272 with a significance level of 0.000, which is lower than the research benchmark (0.05). Therefore, it can be concluded that at the 5% significance level [23, 24], flexibility, accessibility, effectiveness and recent chat history simultaneously significantly influence messenger platform preferences.

TABLE 3
PARTIAL TEST

Model	Standardised Coefficients Beta	t	Sig.
(Constant)		.356	.723
Flexibility	.170	1.645	.105
Accessibility	.077	.847	.400
Effectiveness	.605	6.550	.000
Recent Chat History	.134	1.601	.114

Table 3 shows that the partial test results of the independent variable on the dependent variable showed that flexibility, accessibility, effectiveness and recent chat history have a positive impact on messenger platform preferences among customers, as shown by the positive value of the regression coefficient (beta). However, the impact is insignificant because the significance level is greater than 0.05. The impact is positive and significant to the effectiveness variable because the significance level is lower than the 0.05 significance stage, which is 0.000.

4) Conjoint Analysis

The conjoint analysis was done using SPSS v.21. The importance level of every attribute against the value of the global importance was obtained.

TABLE 4.
IMPORTANCE VALUES

Attribute	Importance Values
Quality	49,396
Features	34,918
Display	15,687

Table 4 shows that the quality attribute scored the highest at 49,396, followed by feature with a value of 34,918 and display with a value of 15,687. Therefore, in choosing a messenger platform, respondents pay attention to quality, features, and display the most. Meanwhile, Table 5 shows that the utility value indicates a preference. The attribute level with the highest utility is complex features with a value of 0.98.

TABLE 5.
UTILITIES

		Utility Estimate	Std. Error
Quality	Flexibility: Ease of use	.001	.022
	Quality: Fast response to messages	.043	.022
	Accessibility: High product availability	-.003	.022
	High usefulness	-.041	.022
Features	Chat with human and chatbot features	.018	.047
	Complex features	-.098	.018
	The existence of a chat history feature	.051	.018
Display	Display that evokes comfort	.012	.041
	User friendly	-.041	.012
(Constant)		4,286	.012

From the consumer preferences for the messenger platform, an ideal profile can be created. Customers want a quality messenger platform with fast response, complex features, and a user-friendly display.

The Pearson coefficient shows the model is accurate so that the results of the second study can be accounted for. The individual data of the second questionnaire showed a p-value = .005 (0.000) [25], which shows that the aggregate goodness of fit from this data processing is good and valid for further research.
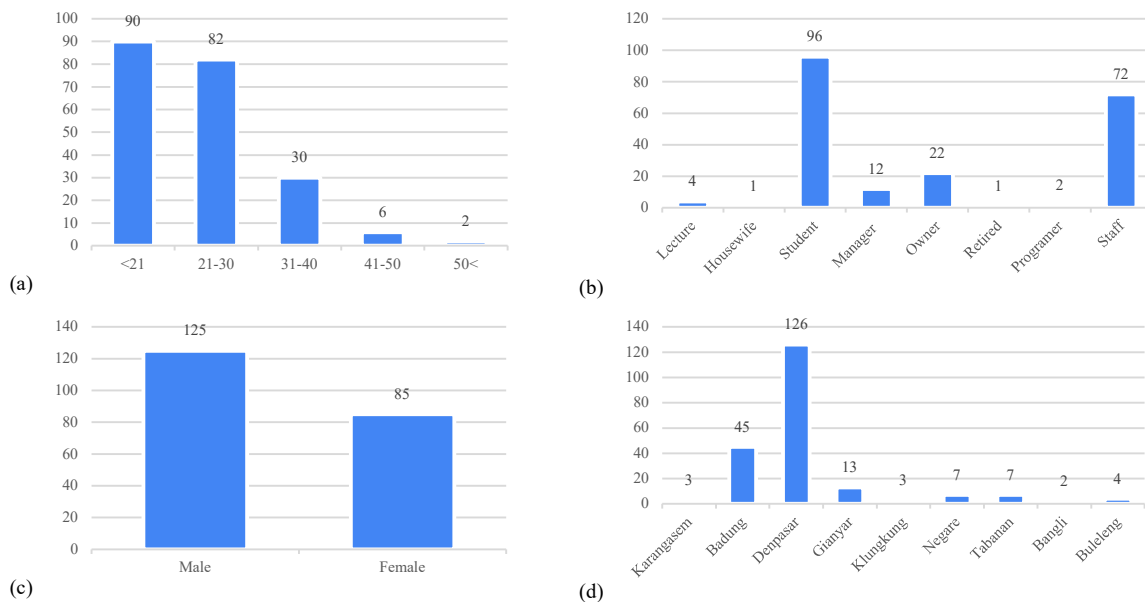

Fig. 6 Users' profiles (a) Age; (b) Occupation; (c) Gender; (d) District

B. User Preferences

1) Descriptive Statistics & Description of Research Data

The 210 respondents' profiles are shown in Fig. 6. Table 6 shows the results of categorising the five variables studied: responsiveness, user-friendly interface, performance and personalisation, privacy and security, and recent

chat history, with a very high level overall. This means that all of the research variables determine messenger platform preferences.

TABLE 6
TEST RESULTS CATEGORY USER

Variable	Category	Frequency	Per cent
Responsiveness	Very low	2	1.0
	Moderate	12	5.7
	High	46	21.9
	Very high	150	71.4
	Total	210	100.0
User Friendly	Very low	2	1.0
	Moderate	11	5.2
	High	57	27.1
	Very high	140	66.7
	Total	210	100.0
Performance and personalisation	Very low	2	1.0
	Low	1	1.5
	Moderate	10	4.8
	High	59	28.1
	Very high	138	65.7
	Total	210	100.0
Privacy and security	Very low	14	6.7
	Low	1	1.5
	Moderate	10	4.8
	High	26	12.4
	Very high	159	75.7
	Total	210	100.0
Service Excellent	Very low	1	1.5
	Moderate	8	3.8
	High	52	24.8
	Very high	149	71.0
	Total	210	100.0

2) Multiple Linear Regression Analysis

The normality test of the 210 user data shows that they are not normally distributed. This may be caused by respondents not answering the questionnaire properly. Outliers with extreme numbers, either extremely superior or extremely poor, can skew the distribution of scores to the left or the right and confuses statistical testing. After the outliers were removed, the outcomes of the normality test show that the Kolmogorov-Smirnov value is 1.218, and the significance level is 0.103, which is higher than the benchmark of 0.05. Therefore, the residual data can be considered normally distributed [20].
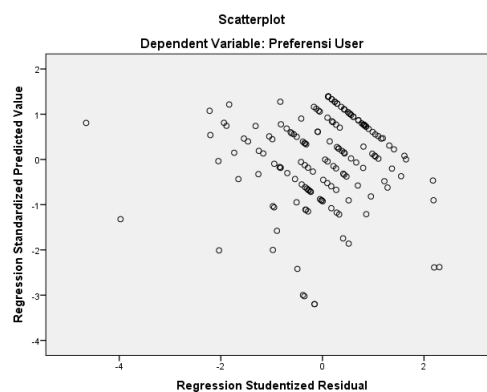

Fig. 7 Scatterplot of heteroscedasticity test from user respondents

Meanwhile, the multicollinearity test outcomes showed that the overall variable has a value tolerance above 0.1 and a VIF stage below 10 [21]. Consequently, multicollinearity between independent variables does not exist in the regression model. The results of the heteroscedasticity test show are shown in Fig. 7, with a non-patterned scatterplot

spread below and above the Y fuze [22]. Therefore, it can be concluded that the independent variable is neither heteroscedastic nor homoscedastic.

3) Multiple Linear Regression Test

Table 7 shows that this regression model has an Adjusted R^2 value of 0.540, implying that the mutability of the dependent variable attributable to the independent variable is 54%. Meanwhile, the remaining 46% is attributable to variables not included in the regression model. Table 7 shows that this regression model has an F value of 38.096 with a significance level of 0.000. Because the significance level is lower than the benchmark of 0.05 [23][24], the responsiveness, user-friendliness, performance and personalisation, privacy & security, and recent chat history simultaneously significantly affect the user's messenger platform preferences

TABLE 7
MULTIPLE LINEAR REGRESSION TEST

Model	R	R Square	Adjusted R Square	F	Sig.
1	.745[a]	.555	.540	38.096	.000

Table 8 shows the partial test results of the independent variable on the dependent. Responsiveness, performance, and personalisation have a positive direction because the regression coefficient (beta) has a positive value. Therefore, there is a direct effect on the preferences of messenger platforms, but it is not significant, as shown by the significance level greater than 0.05. Meanwhile, user-friendliness, services, privacy and security variables have a positive and significant impact on messenger platform preferences, as shown by the significance level lower than the 0.05 significance benchmark at 0.000.

TABLE 8
PARTIAL TEST

Model	Standardised Coefficients Beta	t	Sig.
(Constant)		.674	.501
Responsiveness	.074	.962	.338
User Friendly	.182	2.461	.015
Performance and personalisation	.133	1.786	.076
Privacy and Security	.248	3.201	.002
Services	.272	3.539	.001

4) Conjoint Analysis

The importance level of every attribute is shown by the conjoint analysis results using SPSS v.21. The global importance of every attribute was obtained. Table 9 shows that the quality attribute has the biggest importance value at 52,053, followed by feature at 29,451 and display at18,496. Thus, users pay attention to the quality, features, and appearance of the messenger platform. Table 10 shows that utility determines messenger platform preferences, with the human chat feature scoring the highest at 0.85.

TABLE 9
IMPORTANCE VALUES

Attribute	Importance Values
Quality	52.053
Features	29.451
Display	18.496

Overall, users want a messenger platform with a high-quality level: high security and privacy of personal data, a human chat feature, and a user-friendly display. The Pearson test shows that the model is accurate so that the results of this second study can be accounted for. The Pearson coefficients for the individual data of this second questionnaire are below the p-value = 0.005 (0.000)[25]. This shows that the aggregate goodness of fit model from this data processing is good and valid for further research

IV. DISCUSSION

The research involving customers shows that the dimensions to be developed are accessibility, flexibility, effectiveness and chat history, which can benefit both companies and users [12]. The quantitative analyses in this

study to find categorisation, along with multiple linear regression and conjoint analysis of the four variables, support the past qualitative research. First, categorisation results show that four variables scored very high, implying that the variables of accessibility, flexibility, effectiveness and recent chat history are major determinants. Second, the F test results show that flexibility, accessibility, effectiveness and recent chat history simultaneously significantly influence preferences. Likewise, the results of the partial test also show that the four variables have a positive effect on preferences. These outcomes are in line with past research [3, 4].

TABLE 10
UTILITIES

		Utility Estimate	Std. Error
Quality	Security and privacy of personal data	.071	.013
	Ability to respond to complaints	.008	.013
	Good ability of HR managers	-.039	.013
	Flexibility, ease of use	-.013	.013
	Excellent services	-.029	.013
	Having a communicative service	.001	.013
Features	Having a human chat feature	.085	.010
	Having a chatbot facility	-.064	.010
	Having a mobile application feature	-.020	.010
	Having integrated service features	-.001	.010
Display	Compatibility of display with a typical user	-. 023	006
	Having a user-friendly appearance	. 023	.006
(Constant)		4,253	006

Although some relationships show insignificant values, the results of this analysis can be accepted. The insignificant variables mean that there are factors overlooked by customers, which can be examined in future research. This research also noted that the best algorithm to examine this is multiple linear regression analysis, which can explain the linear connection between independent and dependent variables. However, apart from these advantages, the weakness in this analysis is that there are still many factors that influence preferences outside the factors being studied. This could be an area for development in future research. The two types of quantitative testing are sufficient to corroborate the results of the qualitative tests. The results of the conjoint analysis further strengthen this.

Regarding the research with users, the results show that responsiveness, user-friendliness, performance and personalisation, privacy and security, and excellent service must be met [12]. These results are also supported by the quantitative analysis by categorization, multiple linear regression and conjoint analysis of the five variables. First, the test results found that the five variables were in the very high category. This implies that responsiveness, user-friendliness, performance and personalisation, privacy and security, and services are important factors in choosing a messenger platform. Second, the F test results show that responsiveness, user-friendliness, performance and personalisation, privacy and security of personal data, and services simultaneously significantly influence the messenger platform's preferences for users. The results of the partial test also show that the variables positively affect the messenger platform's preferences. This research's outcomes align with the results obtained by [3, 4]. Similar to the results of the consumer research, the limitation in this analysis is that there are still many factors that influence preferences in addition to the factors studied. This could be an area of future research.

The results from the conjoint analysis, both from the customer and user perspectives, show good results and can reflect the needs of the industry. Customer and user needs are dynamic. To achieve the expected goals, research with conjoint analysis is needed. Regarding testing for categorization, the results show that accessibility, flexibility, effectiveness and recent chat history are in the very high category and become an important factor in choosing messenger platform preferences for customers. The responsiveness, user friendly, performance and personalisation, privacy and security of personal data, and excellent service variables are in the very high category and are important factors in choosing messenger platform preferences for users.

From the partial test results, the multiple linear regression analysis shows all the variables mentioned above have a positive impact. The results of the partial test of the factors that influence customer and user preferences in choosing a messenger platform are closer to the results of the effective system quality indicators in the IS model. This can be used as a comparison and discussion material for future research. Iranmanesh et al. [26] obtained a different result, showing that quality of information and trust is an important factors in shaping students' satisfaction and loyalty to WhatsApp. The quality of the system does not have a significant effect on satisfaction.

The conjoint analysis shows that customers want a messenger platform with fast responses (an indicator of flexibility), complex features (an indicator of effectiveness), and a convenient and user-friendly display (an indicator of accessibility). From the user's perspective, they want a messenger platform with high security and privacy of personal data (which is an indicator of privacy and security), a human chat feature (which is an indicator of variable

performance and personalisation), and a user-friendly display (an indicator variable user-friendliness). In general, the results above are consistent with the research conducted by [27], which states that all services, reliability, security, and interoperability (i.e. switching between devices) are considered important requirements in mobile telecommunication service. This study extends the research conducted by [27], namely showing more detailed attributes and indicators of each variable that affects customer and user preferences for a messenger platform.

V. CONCLUSIONS

This research results provide robust and detailed evidence of the indicators of an ideal messenger platform model according to the preferences of customers and users. Future research can consider using other analytical methods and other factors that influence preferences to obtain better and comparable results.

Author Contributions: *Evi Triandini*: Conceptualisation, Data Curation, Supervision. *I Gusti Ngurah Satria Wijaya*: Conceptualisation, Data Curation Writing - Original Draft, Writing - Review & Editing. *Riza Wulandari*: Data Resources, Data Analysis. *Ni Wayan Cahya Ayu Pratami*: Data Analysis, Data Analysis. *I Ketut Putu Suniantara*: Methodology Concept. *Candra Ahmadi*: Data Resources

Conflicts of Interest: The authors declare no conflict of interest.

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