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Impact of Implementation of Information Security Risk Management and Security Controls on Cyber Security Maturity (A Case Study at Data Management Applications of XYZ Institute)

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Abstract

Information security is an important concern for governments and industry due to the increase in cyber-attacks during Covid-19. The government is obliged to maintain information security in implementing an Electronic-Based Government System following Presidential Regulation of the Republic of Indonesia Number 95 of 2018. To overcome this problem, the XYZ Institute needs an approach to implementing information security risk management and information security controls. This study aims to risk identification, risk analysis, risk evaluation, risk treatment, risk acceptance, risk control, and analysis of cyber security maturity gaps in the domain of governance, identification, protection, detection, and response. ISO/IEC 27005:2018 as guidance for conducting risk assessments. The code of practice for information security control uses the ISO/IEC 27002:2013 standard and assessing maturity using the cyber security maturity model version 1.10 developed by the National Cyber and Crypto Agency of the Republic of Indonesia. The results show that the cyber maturity value increased from 3.19 to 4.06 after implementing 12 new security controls.

Introduction

The Interpol ASEAN Cyberthreat Assessment 2021 report shows that there were incidents of data breaches that occurred in the ASEAN region in 2021. In October 2020 Data Breach on Redmard with a total of 1.1 million accounts had been compromised. September 2020, Ransomware targeted Hospitals and Businesses in Thailand. In June 2020 some 1.5 TB of sensitive data was stolen from a subsidiary of ST Engineering Aerospace. In June 2020 Data Breach on Indonesian e-commerce, namely Tokopedia, as many as 91 million user information was leaked (INTERPOL 2021). XYZ Institute of the Republic of Indonesia has a role to create, collect, and process a large amount of information. The XYZ Institute manages more than 800 electronic systems. One service that is strategic or critical is the application of

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data management from 436,639 XYZ institutional units in the region with 50,901,460 unique data (XYZ Institute 2021). To maintain effective security risk management, it is necessary to identify and implement appropriate security controls (Payette et al. 2015). Information security risk management is required to protect this information and ensure confidentiality, integrity, and availability (Kure and Islam 2019). So that Security Risk Management and control of information security in the case study organization's critical assets are important aspects in providing protection, maintaining business process continuity, and increasing security maturity level (White 2011). Cyber Maturity level aims to assess the suitability of the work process of implementing information security systems in the organization. The cyber maturity model represents the maturity of all information security processes (Plan, Do, Check, and Act) based on the clauses of ISO/IEC 27005. In the Plan Phase, the Organization establishes policies, processes and procedures related to risk management. Do phase, Organization implements and runs. Check Phase, Organizations assess and measure process performance and Act Phase, organizations take action to improve and enhance information security systems (Fauzi et al. 2018). Cyber security maturity level can help institutions measure processes against implemented standards and evaluate how government institutions develop secure information systems (Payette et al. 2015). The information security standards used in this research are ISO/IEC 27005:2018, ISO/IEC 27002:2013, and Cyber Security Maturity Tool version 1.10 which was developed by the National Cyber and Crypto Agency of the Republic of Indonesia. ISO/IEC 27005:2018 is used as a guide for conducting an information security risk assessment (ISO/IEC 27005 2018). ISO/IEC 27002:2013 is used to guide information security control practices (ISO/IEC 27002 2013). Cyber Security Maturity Model is used as an evaluation tool to help organizations to measure the improvement of information security (Karabacak et al. 2016).

Previous research (Patino et al. 2018) discusses the information security design method using the ISO/IEC 27005:2018 standard. Institutions in government entities not only apply information security risk management guidelines but also need to implement steps to conduct risk analysis and evaluation. In various cases of best practice, the evaluation format and scale are presented in detail to identify assets, vulnerabilities, threats, and controls. The impact that is a consequence and the probability of the occurrence of a threat is a risk assessment format that is assessed quantitatively. Based on ISO 27001, the organization must establish and implement an information security risk assessment process. The organization ensures that repeated information security risk assessments will provide consistent, valid and comparable results. ISO 27001 regulates the information security risk management process which includes four stages: Plan, Do, Check, and Act (ISO/IEC 27001 2013) (ISO/IEC 27005 2018).The information security risk management process is based on ISO 27001 and Plan-Do-Check-Act (PDCA) model (Sensuse et al. 2020). The following is alignment between information security risk management processes and management systems; (1) The Plan activity process is in line with the context establishment, risk assessment, develop a risk management plan, risk acceptance stages. (2) The Do activity process is in line with the application of risk assessment stages. (3) The Check process is in line with the periodic monitoring and review of risk. (4) The Act process is in line with the stages of improving and maintaining the information security risk management processes. The author concludes that the achievement of organizational performance in managing information security can have a significant impact on the reliability and availability of a system due to the lack of a security risk management planning process. On research (García-Porras et al. 2018) contains the ISO/IEC 27005 standard with Calculation and risk treatment adopting a model with a quantitative approach. The quantitative approach makes it possible to calculate residual risk. The results of the implementation of the model by the researcher that the risk level is reduced by 53% when the control recommendations are implemented. the results of risk analysis on the most important asset priorities as consideration for decisions about information security in the organization where the research is carried out. Monev (2020) evaluated the maturity level of information security using the information security management system clause in ISO/IEC 27001:2013 and utilizes the information security control guidelines in ISO/IEC 27002:2013. The author concludes is that the final result of the study is metrics and recommendations for improving information security system management. The results of this evaluation can be used by policymakers to make strategic decisions on the performance of security strategies and operations. The assessment team evaluates each requirement in the sub-clauses and controls. The results of the author's evaluation provide control recommendations for improving information security. Recommendations for improvement aim to increase the maturity level. ISO/IEC 27002 is used as the basis for identifying best

practices and selecting improvements. The results of the research from the application of risk assessment and information security control can increase the maturity value of information security maturity.

The reference master data for the XYZ institution's central data management application must be unique and singular. The results of data collection through the Basic Education Data form the basis for the publication of educational statistical data that provides access to information for stakeholders. Therefore, the data management application is a strategic service XYZ Institute's Data and Information Technology Center requires guidelines for implementing information security risk management. The institution will be able to identify, manage and mitigate information security threats. As an implementing institution, an electronic-based government system can provide security protection for confidentiality, integrity, availability, authenticity, and non-repudiation (Presidential Regulation 2018).

From these existing problems, a question arises "*Can the use of security controls following ISO/IEC 27002:2013 increase the level of maturity security?*". The authors carry out an initial security maturity assessment, risk assessment, selection of information security controls and assess the maturity of information security in data management applications in the domain of governance, identification, protection, detection, and response. The gap analysis of the cyber security maturity gap score is to ensure that cyber security management is managed, organized, reviewed regularly, and continuously. and methods for identifying assets, threats, security controls that have been implemented, identifying threats, assessing risks, and evaluating comprehensive information security risks in Data Management applications managed by the XYZ Institution. The information security risk management process based on ISO/IEC 27005:2018 consists of context establishment, risk identification, risk analysis, risk evaluation, risk treatment, and risk acceptance. This research is structured as follows: Part II discusses the literature review on information security risk management, ISO/IEC 27005:2018, ISO/IEC 27002:2013, and Cyber Security Maturity. Part III presents the research methodology. Part IV presents the results. Part V on discussion obtained through the case study. Part VI contains research conclusions.

Literature Review

Information Security Risk Management

Security Risk Management is a processing technique to identify and reduce risks to the company's business continuity to the organization's important information (Bergström et al. 2019). Risk management is a combination of profiling, assessment, evaluation, mitigation, validation, and monitoring activities on assets (Wheeler 2011). Tangible or intangible entities that are needed and have value to the organization are critical need to carry out comprehensive risk management. Assets that have vulnerabilities will be exploited by Threat actors (Kure and Islam 2019). The risk management process flow according to (Wheeler 2011) there are several stages. (1) Resource profiling, namely explaining resources and level of risk sensitivity. (2) Risk Assessment to identify and assess threats, vulnerabilities, and risks. (3) Risk decides to accept, avoid, transfer, or reduce risk. (4) Document stage of information security and business owners, namely documenting risk decisions including exceptions and mitigation plans. (5) Risk Mitigation is the stage for implementing a mitigation plan with specified controls. (6) Validation, namely testing controls to ensure the actual risk exposure is by the desired risk level. (7) The flow of the last stage is Monitoring and Audit, namely continuously tracking changes to the system that can affect the risk profile and conducting routine audits.

ISO/IEC 27005:2018

Standard ISO / IEC 27005:2018 is an International standard that provides guidelines for managing information security risks within an organization, in particular those that support the requirements of an information security management system (ISMS) following the ISO/IEC 27001 standard (Wangen et al. 2018) (Fahrurozi et al. 2020). Information security risk management standards apply to types of for-profit organizations and non-profit organizations (ISO/IEC 27005 2018). The risks that have been found will affect the aspects of the information security management system in the form of asset protection Confidentiality, Integrity, and Availability (CIA) so that information managed by risk owners must be protected and guaranteed. The risk assessment obtained will affect the effectiveness of risk treatment. Risk handling involves a cyclical process starting from assessing risk treatment, determining the acceptable residual risk level if the risk level is not acceptable then a new risk treatment is needed, and

assessing the effectiveness of risk treatment. The information security risk management process uses the ISO/IEC 27005:2018 standard as shown Figure 1.
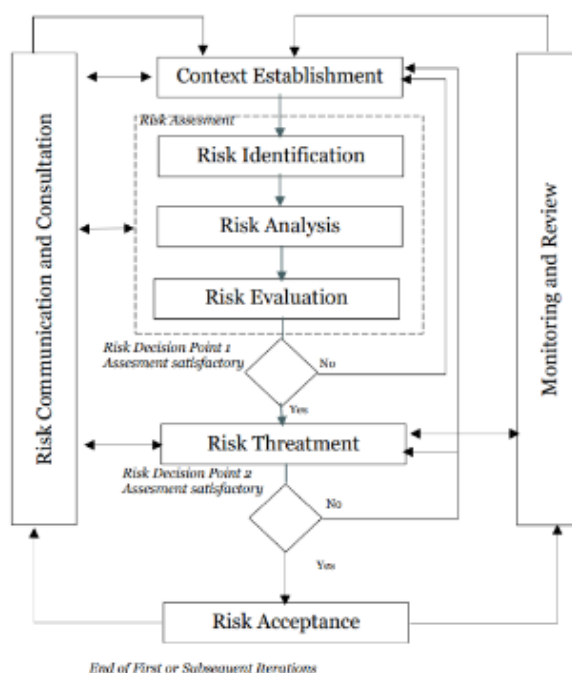
Figure 1. Information security risk management process (ISO/IEC 27005:2018)

ISO/IEC 27002:2013

International information security standard is used as an organizational guide for the selection of information security controls. Organizations can use the guidance in the ISO/IEC 27002:2013 document to reduce unacceptable risks (ISO/IEC 27002 2013). This standard is organized by 14 main security control clauses consisting of 35 major security categories and 114 controls. 114 controls are explained in detail with implementation guidelines and to achieve the fulfillment of the control objectives, suggestions for implementation are included (Gutiérrez-Martínez et al. 2015) (Fenz et al. 2016).

Konten ISO 27002:2013	Detail
Security Clausa	12. Operation Security
Security Category	12.2 Protection from malware
Control Obyective	To ensure that information and information processing facilities are protected against malware
Control	12.2.1 Controls against malware
Control Statement	Detection, prevention and recovery controls to protect against malware should be implemented, combined with appropriate user awareness.
Implementaion Guidance	i) preparing appropriate business continuity plans for recovering from malware attacks, including all necessary data and software backup and recovery arrangements (see 12.3)
Other information	The use of two or more software products protecting against malware …

Figure 2. Sample Of Steps For Implementation Of ISO/IEC 27002:2013 Controls

Figure 2 shows examples of implementation steps for ISO 27002:2013 controls (ISO/IEC 27002 2013). controls to protect against malware by ensuring that information and information processing facilities are protected from malware. Organizations implement controls by preparing appropriate business

continuity plans for recovery from malware attacks, including all necessary data and software backups and recovery settings.

Cyber Security Maturity

Cyber Security Maturity is an institutional tool to measure cyber improvement so that it can improve cyber security management and monitor optimally and thoroughly. A company is judged to have achieved maturity in a particular discipline when a particular process when process is explicitly defined, managed, measured, controlled, and effective (Mayer and Fagundes 2009). The maturity model serves as an evaluation tool to assess the possibility of improving information security management. besides that it can be used as a means to assess and compare performance; a roadmap for model-driven improvement as well as a means to identify gaps and develop improvement plans (Rabii et al. 2020). There are three types of maturity models, namely progression maturity model, Capabilities Maturity Model (CMM) and Hybrid Maturity Model (Putra et al. 2020). The progression model describes a higher level of control, progress, progress, or evolution status. The capability model shows the extent to which certain practices have been established. The Hybrid Matuirty model is Combining the best features of the development model and capability maturity. This model supports the achievements in the progression model and adds to the ability to measure capabilities with the capabilities of the capability maturity model (Proença and Borbinha 2016). Model assesment analysis focuses on the application of the maturity model. To measure the maturity level of a particular reality, there must be a way to calculate the maturity level. This can be done by taking a self-assessment questionnaire or by following the full maturity assessment method. The cyber security maturity version 1.10 tool that has been developed by the National Cyber and Crypto Agency has 5 levels of information maturity categories. Level 1 is an initial implementation with an organizational description that is not measurable, inconsistent and has a high risk. Level 2 indicates that the organization is organized, inconsistent and repetitive. Level 3, the implementation carried out by the organization has been defined, namely being organized, consistent and conducting periodic reviews. Level 4 indicates that the organization has implemented information security in a managed manner, namely organized, periodic and ongoing reviews. Level 5 indicates that the organization has implemented optimally, namely automation, integration and culture of information security.

Research Methodology

This research phase consists of 6 phases, namely (1) the preparation phase, (2) the data collection phase, (3) the risk assessment phase, (4) the risk control phase, (5) the maturity level gap analysis phase. Figure 3 below describes and explains some of the phases of the research carried out.
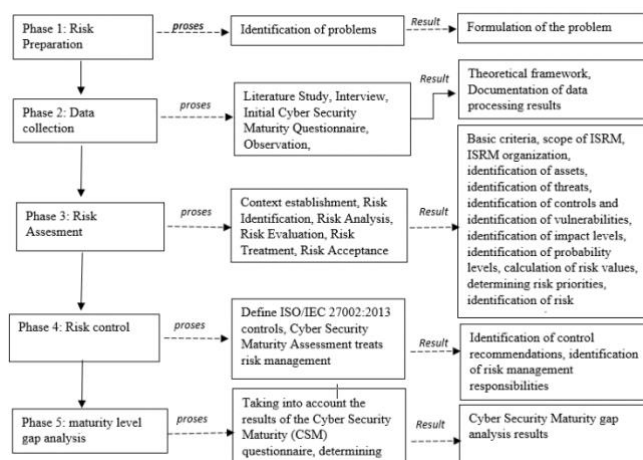

Figure. 3 Research Stages

Phase 1: Preparation Phase

The preparation of this research aims to define the problems that become priority needs in the Research Site. At this stage determine the scope and mapping of the organization as the object of research.

Phase 2: Data Collection Phase

The data collection phase was obtained by conducting online focus group discussions (FGD), online questionnaires, and analysis of existing documents. Respondents for interviews through online questionnaires were the head of the Management and Utilization of Information Technology and the Head of the Data Processing and Statistics Division. Next are two people from the management and utilization of information technolgy division and five people from the data processing and statistics division. First, by conducting a Focus Group Discussion to find out the conditions, goals, and targets that are planned to be achieved. Analysis of data processing application documents is carried out to find out detailed information and procedures in data processing applications. Questionnaires were distributed to seven interviewees from the management and utilization of information technology and the the data processing and statistics division to understand and confirm the types of risks that may occur in the the data processing system. The questionnaire is given using the cyber security maturity level assessment issued by the National Cyber Password Agency of the Republic of Indonesia. Cyber Security Maturity consists of 5 domains, 29 subdomains, and 267 questions, as shown in Table 1 below.

Table 1. Domain Cyber Security Maturity Versi 1.10

Domain	Sub Domain	Number of Questions
Governance	(a) Awareness, (b) Audit, (c) Control, (d) Compliance, (e) Policy and (f) Process	95
Identification	(a) Asset Management, (b) Inventory, (c) Management (d) Risk, (e) Priority, (f) Reporting and (g) Classification	34
Protection	(a) Network, (b) Applications, (c) Users, (d) Management and Assets, (e) Cloud and (f) Data	60
Detection	(a) Change, (b) Monitor, (c) Warning, (d) Notification, (e) Intelligence and (f) Reporting	46
Response	(a) Detention, (b) Countermeasures, (c) Recovery, (d) Post-incident Activities and (e) Reporting	32

Phase 3: Risk Assessment Phase

The Risk Assessment phase based on (ISO/IEC 27005 2018) consists of several domain processes, namely Context establishment, Risk Identification, Risk Analysis, Risk Evaluation, Risk Treatment, Risk Acceptance. Context establishment includes general considerations for determining the objectives of information security risk management as this affects the overall process and context formation in particular (ISO/IEC 27005 2018). The output of these risk management processes is risk evaluation criteria, impact criteria, risk acceptance criteria, and the scope of Information Security Risk Management and Organizational Information Security Risk Management. At this stage, the risk identification process produces several outputs, namely asset identification, threat identification, control identification, and vulnerability identification. Identified assets are assets that are the main source of business process information security (Al Fikri et al. 2019).The results at the stage of the risk analysis process are the identification of the level of impact, the identification of the level of possibility. The stages of the risk evaluation process result in the calculation of risk values and determining risk priorities. Risk treatment includes the identification of risk management plans and identification of control recommendations. Risk acceptance results in the identification of risk management satisfaction, identification of risk management responsibilities.

Phase 4: Risk Control Phase

This risk control stage is to determine the controls contained in ISO/IEC 27002:2013 and design the treatment for risk handling. ISO/IEC 27002 (2013) Define specific control statements to meet the control objectives and then proceed to the substance responsible for the implementation of these controls. The implementation of these controls takes about eight months for the information security maturity assessment to be carried out again.

Phase 5: Analysis Gap Cyber Security Maturity Score Phase

At this stage, the organization reassesses using the same version of the cyber security maturity model. The value of the final assessment result will be compared with the value of the initial assessment result before implementing the information security control recommendations. The result of the gap analysis is obtained from the maturity value of cyber security after a risk assessment, residual risk and information security control have been carried out. This stage aims to ensure that the success factors have been achieved, namely increasing the maturity level of cybersecurity and the effectiveness of security controls based on risk assessment.

Result

The research analysis is based on the gap in the value of the Cyber Security Maturity assessment and focuses on information security risk management planning steps based on the ISO/IEC 27005:2018 standard with information security controls based on the ISO/IEC 27002:2013 standard which will be explained as follows:

Context establishment

Determining the context of information security risk by establishing basic criteria, scope, and boundaries and organizing information security risk management. Includes general considerations for determining the objectives of information security risk management as they affect the whole process and the context in particular (ISO/IEC 27005 2018)(Putra and Mutijarsa 2021).

1. Basic criteria

The basic criteria specifications consist of risk evaluation criteria, impact criteria, and risk acceptance criteria (ISO/IEC 27005 2018). Impact criteria determine the xyz institute's loss rate. The impact criteria have five levels, namely very high, high, medium, low and very low, which are shown in Table 2 below.

Table 2. Basic Criteria

Score	Impact Level	Description
5	Very High	- Main business processes are interrupted and stopped for more than 24 hours - Unauthorized access to confidential data - Organizational data is damaged, lost and there is no backup - It harms the reputation and trust of the organization
4	High	- Main business processes are interrupted and stopped for 21-24 hours - Organizational data is damaged, lost and there is no backup - It harms the reputation and trust of the organization
3	Medium	- The organization's business processes stop for 4-20 hours and the main business processes are not interrupted - Organizational data is damaged or lost - Organizations have a data backup
2	Low	- The organization's business processes stop for 1-3 hours and the main business processes are not interrupted
1	Very Low	- The organization's business processes are not disrupted

2. The likelihood level of a threat even

Threat likelihood The organization determines the threat likelihood level based on the number of attacks and incidents concerning the threats facing the organization (Ghazouani et al. 2017). The likelihood of threat event occurring more than 100 times per year is included in the very high threat

category with a threat level of 5. By using the parameters in Table 3 the organization can determine the frequency level of the threat.

Table 3. Likelihood Criteria Of Threat Event

Level	Threat	Likelihood of threat event	Criteria Description
5	Very High	Very likely	Could happen more than 100 times per year
4	High	Likely	Could happen between 10 and 100 times per year
3	Moderate	Moderate	Could happen between 1 and 100 times per year
2	Low	Unlikely	Could happen within 1 year
1	Very Low	Very Unlikely	Could happen within 5 years

Idenfication of Assets

30 assets have been identified in the data management application, which consists of 7 information assets (A1-A7), 3 software assets (A8-A10), 11 hardware assets (A11-A21), 4 services assets (A22-A25), 4 human assets (A26-A29, and 1 location asset (A30). Refers to Figure 4, each asset has an asset valuation level of 4 (very high), 3 (high), 2 (moderate), 1 (low) and 0 (very low). Determination of asset value based on Confidentiality, Integrity, and Availability (Ghazouani et al. 2017).
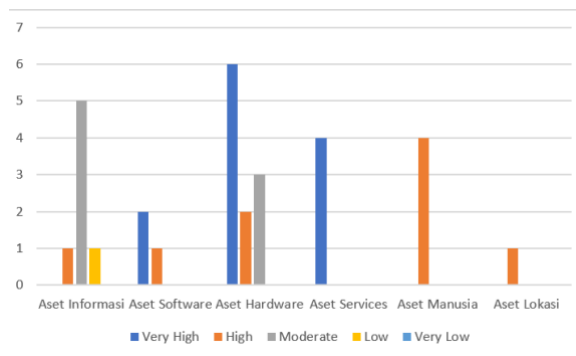
Figure 4. Types of Assets and Asset Valuation

Identification of threats

The results of interviews with informants indicate the types of potential threats to each infrastructure asset of the Student Education Basic Data Processing System and their level, vulnerability, or ease of exploitation and the level and existing controls that have been implemented that there are 87 types of threats in 30 assets, with the number of possible levels the occurrence of 45 very low, 30 low and 12 moderate threats on all assets and types of threats. Threat of 14% (T11), namely the occurrence of damage / loss of the device. One of the threats at 1% (T6) is the application has problems while running (application bug). The composition of threats on all assets can be seen in Figure 5 below. A list of threats to all assets and threat type code can be seen in appendix A.
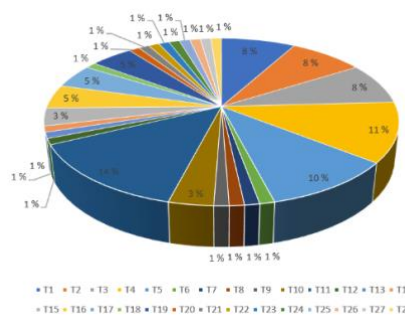
Figure 5. Frequency of each type of threat

Identification of vulnerabilities

Vulnerability is caused because the existing controls cannot reduce the threat, or the threat has no control. The process of identifying the vulnerabilities of 30 assets consists of 87 vulnerability scenarios with vulnerability levels including 78 Low levels and 9 medium levels.

Risk Evaluation

Risk Assessment is assessed quantitatively from Impact x Probability (Patino et al. 2018). The impact is a consequence of the emergence of a threat, while the level of risk shows an estimate of what will happen if the threat does come true. Very high-risk categories are 20 and 25. High risk values are 10,12,15, and 16. Medium-risk values are 5,6,8, and 9. Low-risk values are 3 and 4. Very low-risk values are 1 and 2 with the level of risk and risk mapping shown in the Table 4 and the Table 5.

Table 4. Risk Level (Patino et al. 2018)

Risk Level	Impact x Probability
Very High	20-25
High	10-12-15-16
Medium	5-6-8-9
Low	3-4
Very Low	1-2

Table 5. Risk Matrix (Patino et al. 2018)

Risk Matrix/Map		Likelihood Level				
		1- Very unlikely	2- Unlikely	3-Moderate	4-Likely	5-Very likely
Impact Level	*1-Very Low*	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Medium	3	6	8	10	12
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Table 5 above shows that the results of the assessment or determination of the risk level will be mapped into a risk mapping table according to the category. This mapping will help to see the overall level of risk in data management assets. If the impact level is high and the likelihood is level 3 or moderate, a risk value of 12 will be obtained with a high-risk value category refers to Figure 6.

Figure 6. Risk value mapping

Risk Priority

The results of determining the level of risk found a total of 87 risk scenarios consisting of 23 risk scenarios medium with a risk score of 8. 13 risk scenarios medium with a risk score of 6, 22 risk scenarios medium with a risk score of 5. 3 risk scenarios medium with a risk score of 5. 3 risk scenarios low with a risk score of 4. 23 risk scenarios low with a risk score of 2 and 3 risk scenarios very low with a risk score of 2. The top fifty-eight risk scenarios in Table 6 need to be mitigated to reduce the risk value.

Table 6. Risk Priority

No	Risk Code	Asset Code	Threat Code	Risk Value	Status	No	Risk Code	Asset Code	Threat Code	Risk Value	Status
1	R23	A8	T5	8	Mitigate	45	R45	A16	T4	5	Mitigate
2	R24	A8	T6	8	Mitigate	46	R46	A16	T10	5	Mitigate
3	R25	A9	T7	8	Mitigate	47	R50	A18	T4	5	Mitigate
4	R26	A9	T8	8	Mitigate	48	R54	A19	T4	5	Mitigate
5	R29	A11	T10	8	Mitigate	49	R57	A20	T4	5	Mitigate
6	R37	A13	T5	8	Mitigate	50	R66	A26	T16	5	Mitigate
7	R40	A14	T5	8	Mitigate	51	R71	A27	T16	5	Mitigate
8	R43	A15	T5	8	Mitigate	52	R74	A28	T16	5	Mitigate
9	R49	A17	T12	8	Mitigate	53	R79	A29	T16	5	Mitigate
10	R61	A22	T11	8	Mitigate	54	R81	A30	T22	5	Mitigate
11	R62	A23	T11	8	Mitigate	55	R83	A30	T24	5	Mitigate
12	R65	A26	T15	8	Mitigate	56	R85	A30	T26	5	Mitigate
13	R67	A26	T17	8	Mitigate	57	R86	A30	T27	5	Mitigate
14	R68	A27	T15	8	Mitigate	58	R87	A30	T28	5	Mitigate
15	R69	A27	T18	8	Mitigate	59	R22	A8	T4	4	Accept
16	R70	A27	T19	8	Mitigate	60	R78	A29	T19	4	Accept
17	R72	A27	T17	8	Mitigate	61	R82	A30	T23	4	Accept
18	R73	A28	T15	8	Mitigate	62	R1	A1	T1	3	Accept
19	R75	A28	T20	8	Mitigate	63	R2	A1	T2	3	Accept
20	R76	A28	T17	8	Mitigate	64	R3	A1	T3	3	Accept
21	R77	A29	T17	8	Mitigate	65	R4	A2	T1	3	Accept
22	R80	A30	T21	8	Mitigate	66	R5	A2	T2	3	Accept
23	R84	A30	T25	8	Mitigate	67	R6	A2	T3	3	Accept
24	R27	A10	T9	6	Mitigate	68	R7	A3	T1	3	Accept
25	R30	A11	T5	6	Mitigate	69	R8	A3	T2	3	Accept
26	R34	A12	T5	6	Mitigate	70	R9	A3	T3	3	Accept
27	R38	A13	T11	6	Mitigate	71	R10	A4	T1	3	Accept
28	R41	A14	T11	6	Mitigate	72	R11	A4	T2	3	Accept
29	R44	A15	T11	6	Mitigate	73	R12	A4	T3	3	Accept
30	R47	A16	T5	6	Mitigate	74	R13	A5	T1	3	Accept
31	R48	A16	T11	6	Mitigate	75	R14	A5	T2	3	Accept
32	R55	A19	T5	6	Mitigate	76	R15	A5	T3	3	Accept
33	R56	A19	T11	6	Mitigate	77	R16	A6	T1	3	Accept
34	R58	A20	T5	6	Mitigate	78	R17	A6	T2	3	Accept
35	R59	A20	T11	6	Mitigate	79	R18	A6	T3	3	Accept
36	R60	A21	T11	6	Mitigate	80	R19	A7	T1	3	Accept
37	R28	A11	T4	5	Mitigate	81	R20	A7	T2	3	Accept
38	R31	A11	T11	5	Mitigate	82	R21	A7	T3	3	Accept
39	R32	A12	T4	5	Mitigate	83	R51	A18	T13	3	Accept
40	R33	A12	T10	5	Mitigate	84	R52	A18	T14	3	Accept
41	R35	A12	T11	5	Mitigate	85	R53	A18	T11	2	Accept
42	R36	A13	T4	5	Mitigate	86	R63	A24	T19	2	Accept
43	R39	A14	T4	5	Mitigate	87	R64	A25	T19	2	Accept
44	R42	A15	T4	5	Mitigate						

Risk Acceptance

Risk mitigation is carried out on 58 risk scenarios that have a medium value. The medium-risk value is reduced through the selection of security controls so that the residual risk can be assessed as an acceptable risk as shown in the Table 7. The information security control used is based on ISO/IEC

27002:2013 and the implementation details are adjusted to the control statement on the Cyber Security Maturity Tool used. Controls can provide several types of protection in aspects of awareness, policy, asset identification management, network protection, application protection, cyber-attack detection, post-incident response, and recovery.

Table 7. Risk Acceptance Analysis

Asset-Threat	Control Security	Maturity Model organizational indicators	Responsible Area
A8-T5	14.1.5 Business continuity management	- Implementing the Business Continuity Plan (BCP) - Determine the Recovery Time Objective (RTO) and Recovery Point Objective (RPO) in the Business Continuity Plan (BCP) document	Data Processing and Statistics Division
A8-T6	18.2.3 Technical compliance review	- The Institutions form Red Teams and Blue Teams and conduct periodic testing at least once a year	Data Processing and Statistics Division
A9-T7	16.1.3 Reporting information security weaknesses	- Mitigation of minor incidents as soon as possible in coordination with related parties for the anticipation of larger follow-up incidents - Records of incidents and violations in the Institutions are kept and reported based on 6 months trend.	Data Processing and Statistics Division
A13-T5, A14-T5, A15-T5, A17-T12, A22-T11, A23-T11, A11-T5, A12-T5, A16-T5, A19-T5, A20-T5, A21-T11, T12-T11	17.2.1 Availability of information processing facilities	- The institution provides sufficient redundancy to recover from device failure and must be tested to ensure failover from one component to another is functioning as intended.	- Data Processing and Statistics Division - Management and Utilization of Information Technology Division
A25-T15,A27-T15, A27-T18, A27-T19, A26-T16, A28-T15	7.2.1 Management responsibilities (Human resource security)	- The institution cultivates awareness of information security - The institution makes a gap analysis to understand the skills and behaviors that employees do not have and uses this information to create a roadmap related to education baselines and training related to information security - The institution makes an information security awareness understanding program on an ongoing basis at least once a year to ensure an understanding of information security in the institution - The Institution provides awareness of personnel needs regarding terms and conditions of work that must be fulfilled by their responsibilities	- Data Processing and Statistics Division - Management and Utilization of Information Technology Division
A26-T17, A27-T17, A28-17, A29-17, A28-T20, A27-T16, A29-T16	7.2.2 Information security awareness,	- The Institution provides training on how to identify various forms of social engineering attacks - The Institution conducts phishing simulation at least annually	- Data Processing and Statistics Division

Asset-Threat	Control Security	Maturity Model organizational indicators	Responsible Area
	education and training	- The Institution provides training in making good secure code in software/application development - The Institution provides training on how to protect sensitive data, use restrictions, and document the processes that employees must follow - The Institution provides training for employees on how to properly identify and store, transmit, archive, and destroy sensitive information.	- Management and Utilization of Information Technology Division
A30-T21, A30-T25, A30-T22, A30-T24, A30-T26, A30-T27, A30-T28	11.1.4 Protecting against external and environmental threats	- Physical protection against natural disasters, dangerous attacks, or accidents should be designed and implemented. - The Institution has BCP and DRP documents.	- Data Processing and Statistics Division - Management and Utilization of Information Technology Division
A10-T9, A9-T8, A11-T10, A12-T10	12.2.1 Controls against malware (Protection from malware)	- The Institution has an incident handling policy and is in line with the policy of managing organizational continuity or business continuity planning - The Institution can detect information from cyber attacks in the form of tools/malware used - The Institution has systems in place to perform malicious code detection to detect, remove, and protect against malicious code - All endpoints including servers using antivirus	- Data Processing and Statistics Division - Management and Utilization of Information Technology Division
A13-T11, A14-T11, A15-T11, A16-T11, A19-T11, A20-T11, A11-T11	8.1.1 Inventory of assets	- The Institution conducts and maintains identification and inventory of Assets related to information and information processing facilities - The Institution compiles the identification of all assets based on the classification of criticality and has assigned a person responsible for each asset	-Data Processing and Statistics Division
A11-T4, A12-T4, A13-T4, A16-T4	10.1.1 Policy on the use of cryptographic controls 18.1.3 Protection of records	- The Institution establishes a policy on the use of cryptographic controls for the protection of information. - The Institution melindungi Data dengan persyaratan legislatif, peraturan, kontrak dan bisnis. - Backup data is encrypted and stored in a secure location both physically and non-physically	-Data Processing and Statistics Division
A14-T4, A15-T4, A16-T10, A18-T4, A19-T4, A20-T4	9.1.1 Access control policy	- The Institution ensures the use of complex passwords for all logins even manually access - The Institution ensures that passwords are changed regularly even if manually	-Data Processing and Statistics Division

Asset-Threat	Control Security	Maturity Model organizational indicators	Responsible Area
		- Information security policies and procedures are developed following the ISO 27001 framework and standards	

Maturity Gap Level Analysis

The maturity value obtained from strengthening information security in the areas of governance, identification, protection, detection, and response is 4.06. Level 4 indicates that the organization implements information security in an organized manner, implementing self-information security on a regular and ongoing basis. The result of the maturity value applied following the initial questionnaire before the information security risk assessment and information security control compliance with the risk value is 3.19. A comparison of the maturity values of each of the 5 domains and 29 subdomains before and after the implementation of control recommendations for information security risk mitigation is as in Table 8 below.

Table 8. Gap Analysis

Domain	Sub Domain	Pre	Post	Gap
Governance	Awareness	1.82	4.47	2.65
	Audit	2.92	3.83	0.91
	Control	3.48	3.91	0.43
	Compliance	2.26	3.79	1.53
	Policy	2.10	4.00	1.19
	Process	3.64	4.14	0.50
Identification	Asset Management	3.75	3.75	0.00
	Inventory	3.20	4.20	1.00
	Risk management	2.08	4.15	2.07
	Priority	4.20	4.20	0.00
	Reporting	3.33	4.00	0.67
	Classification	2.29	4.25	1.96
Protection	Network	3.86	4.00	0.14
	Application	2.80	4.00	1.20
	User	1.89	3.89	2.00
	Identity and Asset Management	3.00	3.85	0.85
	Cloud	4.00	4.29	0.29
	Data	2.71	4.29	1.58
Detection	Change	4.33	4.33	0.00
	Monitor	4.21	4.43	0.22
	Warning	3.38	4.13	0.75
	Notification	2.60	3.80	1.20
	Intelligence	3.45	3.82	0.37
	Reporting	3.80	3.80	0.00
Response	Detention	2.08	3.92	1.84
	Countermeasures	3.60	4.00	0.40
	Recovery	4.25	4.25	0.00
	Post-incident Activities	3.75	4.00	0.25
	Reporting	3.43	4.14	0.71
Maturity Level		**3.19**	**4.06**	**0.87**

Discussion

Results Based on the literature study that has been carried out and previous studies related to information security risk management ISO 27005:2018, code of practice for information security controls ISO 27002:2013, and cyber security maturity version 1.10 developed by the National Cyber and Crypto Agency that the implementation of information security controls ISO/IEC 27902 can increase the maturity level of cybersecurity. ISO/IEC 27002:2013 provides guidance for an organization's information security standards and information security management practices including the selection, implementation and management of controls taking into account the organization's information security risk environment (ISO/IEC 27005 2018) (ISO/IEC 27002 2013).

We conclude that with the research results found from 30 assets, 28 types of threats such as in Appendix A with 87 risk scenarios and the implementation of 12 new security controls for 58 medium-level risk scenarios, there is an increase in cybersecurity maturity of 0.87. The top three maturity subdomains with large gaps are Awareness 2.65, Risk Management 2.07, and User 2.00.

Our research can help XYZ Institute as a risk unit owner to improve the conditions for developing information security management by implementing a risk assessment process based on the ISO/IEC 27005:2018 standard as well as risk management and mitigation using the ISO/IEC 27002:2013 standard. we recommend that organizations increase the maturity level to be optimal. In subdomian compliance, organizations can sandbox all email attachments to prevent and analyze more security against malicious behavior. In the Intelligence subdomain, it is necessary to configure automatic threat intelligence feeds for preventive controls, such as IPS signature fixes, rule updates and other configurations. Organizations can run vulnerability scanning tolls automatically to detect cyber vulnerabilities. In the user subdomain, the organization must perform all encryption on all external storage media, the organization applies access settings (read/write) to USB devices/external storage media, and all endpoint devices used by users including servers must use antivirus.

Conclusion

This research focuses on the application of the information security risk management standard ISO/IEC 27005:2018, the code of practice for information security control ISO/IEC 27002:2013, and the cyber security maturity assessment version 1.10 developed by National Cyber and Crypto Agency of the Republic of Indonesia. Limitation of research on one of the strategic applications of government at the XYZ Institute of the Republic of Indonesia with the stages of identification, risk analysis, risk evaluation, risk treatment, risk acceptance, risk control, and gap analysis of Cyber security maturity. From this research, it can be concluded that risk control with a code of practice for information security control ISO 27002:2013 can increase the cyber maturity value of an organization from a maturity value of 3.19 to 4.06. At maturity level 4 the organization ensures that cyber security management is managed, organized, reviewed regularly and continuously.

This research resulted in 87 scenarios of medium risk, low risk, and very low risk. 29 risk scenarios are still in the category of institutional risk acceptance. 58 of the 87 risk scenarios obtained from the assessment have a medium risk level with a risk value of 5, 6, and 8. The institution mitigates risk at a medium level by implementing 12 new controls consisting of 30 implementation instructions.

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Appendix A – Threat Types

Threat Type Code	Statement
T1	Abuse of Rights (Modify stored files, retrieve files without permission, access by unauthorized parties)
T2	Damage/loss of data (Physical document)
T3	Stored data (physical document) is read by unauthorized parties
T4	Abuse of Rights (Modifying apps, infiltrating malware, stealing account passwords, attacks to get passwords)
T5	Application cannot be used (app error, application cannot be accessed, application is dead, network connection is lost)
T6	Application problems when running (application bug)
T7	Unusable Operating System (OS Crash)
T8	Operaing System not running normally caused by malware
T9	Antivirus function is not running / Out of Date
T10	The occurrence of damage / loss of data
T11	Device damage/loss occurs
T12	UPS does not work when the power goes out
T13	Infected with malware
T14	Laptop can't be used/error
T15	vailability of personnel
T16	Abuse of authority
T17	Data leaks (eg caused by Social engineering)
T18	Team assignment
T19	Trouble using/operating the application system
T20	Imperfect system development
T21	Flood
T22	Earthquake
T23	Thunderstorm
T24	Fire
T25	Pandemic
T26	Terrorism
T27	Theft
T28	Labor Dispute

The Acceptance of Digital Health: What about Telepsychology and Telepsychiatry?

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Abstract

Technology is a solution to many issues, particularly in healthcare settings. Thus, using it in mental health is gaining greater prominence in clinical practice and is being provided by many institutions. The outbreak of the COVID-19 epidemic increased its adoption. There is an apparent disparity between the availability and uptake of e-mental health interventions in real-world uptake. Although this issue has largely been ignored in studies, evaluating the acceptability and perceptions of telepsychology and telepsychiatry to the individual is crucial. This study aimed to examine people's acceptance and use of telepsychology by adopting a technology acceptance model (TAM) that integrates perceived usefulness and perceived easiness. It is also to determine the advantages of this electronic health care based on the individual's perceptions and identify the most common mental disorders. The researchers carried out a cross-sectional study. This study aimed to examine the individuals' acceptance and use of telepsychology by adopting TAM that integrates perceived usefulness and perceived easiness. It also investigates the advantages of this type of care based on the individual's perceptions and identifies the most common mental disorders. The researchers carried out a cross-sectional study. The researchers performed a cross-sectional study. Multiple social media applications used, including Twitter and Telegram, distributed the survey among the respondents by (n = 444). Our findings supported the TAM model for predicting and explaining participants' acceptance and use of telepsychology. The result indicates that only 13.3% of respondents visited a psychiatrist or psychologist. Two hundred twenty-three respondents believe they have a psychological problem. Most view telepsychiatry and telepsychology services as useful, effective, and accessible. Moreover, according to the respondents' responses, telepsychology and telepsychiatry offer better privacy than the traditional method. Only four respondents lack access to electronic devices and the Internet. The security and privacy of patient's information should be investigated further when utilising telepsychology and telepsychiatry services. A longitudinal study is necessary for an accurate understanding of the TAM model's causal effects and stability over time.

Keywords: telehealth, telepsychology, telepsychiatry, online therapy, attitudes.

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Introduction

Human health has never been less critical throughout history. The survival of any society is dependent on the health of its individuals. Numerous initiatives are being undertaken worldwide to improve the population's health, particularly mental health. Increasingly, technology surrounds us and is used in a variety of ways. Electronic health (eHealth) capabilities are an excellent example of how technology can benefit individuals. By utilizing information and communication technology capabilities, individuals and communities can benefit from e-health by improving their quality of life and well-being. E-health, called telehealth, refers to providing health services remotely via technology and the internet. Technology refers to various technologies, from the simplest, such as email, to the most advanced. The overall level of satisfaction with telehealth services have been high among patients, providers, and health college students (Gros et al. 2018).

Nevertheless, healthcare workers and people outside the healthcare industry are unfamiliar with telehealth. Improved care delivery, reduced costs, and improved health outcomes can be achieved through telehealth (Totten et al. 2016). In Saudi Arabia, telehealth services can provide healthcare professionals with the ability to consult with caregivers in rural areas and provide behavioural interventions and other forms of support (Alkhalifah and Aldhalaan, 2018). Telehealth's ability to coordinate and deliver care was demonstrated in Saudi Arabia during the COVID-19 pandemic (Muzafar and Jhanjhi 2020; Rahman and Al-Borie 2021)

Mental health disorders are prevalent worldwide; many people suffering from mental disorders remain untreated or receive inadequate treatment (Kao et al. 2006). It is difficult for many people to access mental health services. However, some people can receive treatment and services as needed. South Asia has a substantial burden of depression among the region's populations (Ogbo et al. 2018). About one in five individuals in post-conflict settings have psychological disorders (Charlson et al. 2019). Depression is associated with a higher suicide rate among mental disorders (Moitra et al. 2021). Among the many documented consequences of not treating mental health problems are suicide, divorce, substance abuse, child neglect and abuse, and delinquency (Kim et al. 2001). Therefore, allowing individuals to have multiple methods for improving their general health, particularly their mental health, is an obvious requirement for achieving better population health.

It is common for college students to suffer from pre-matriculation disorders, which contribute to college attrition and are often untreated. It may reduce attrition and improve academic and psychosocial functioning during college years by detecting and treating these disorders early (Auerbach et al. 2016). Covid-19 has a negative impact on people's mental health on a global scale and locally; for instance, Saudi university students experienced depression, anxiety, and stress during the COVID-19 pandemic. Saudi Arabian university students should access psychological counselling and support (Mohammed et al. 2021). A study found that Saudi medical students are frequently stressed and sleep poorly (Almojali et al. 2017). Technological advancements have been tremendous in the past century, so this is a perfect time to utilize this technology to facilitate services that improve human health. Therefore, implementing and operating online healthcare is vital to address various individuals with different needs and locations. One valuable solution to treating and improving people's mental health is telepsychology and telepsychiatry methods.

Telepsychology refers to psychological services delivered via communication technology, such as mobile phones, email, messages, video conferencing, smartphone applications, and Internet-based software (for the Development, 2013). Many countries have implemented video-therapy services to assist those who require mental health care (Liu et al. 2020). The onset of the COVID-19 pandemic has resulted in a substantial change in the delivery of digital psychiatric services in the Arab MENA region, with many clinics and hospitals converting to digital mental health systems. There are also non-governmental organizations that provide remote counselling and support. There were three obstacles to

using telepsychiatry related to the patient, the healthcare system, and the system itself (El Hayek et al. 2020).

We found significant evidence supporting the use of telepsychology; for instance, patients with anxiety and depression showed clinical improvement and symptom reduction after six to eight weekly online web Cognitive behavioural therapy (Poletti et al. 2021). According to a group of therapists, a key advantage of telepsychology is its ability to reach geographically distant patients (Gordon et al. 2016). A growing body of research signalling a low willingness to engage in e-mental health interventions, either because people fail to use them or because they are not accepted, emphasizing the need to investigate these cases in greater depth (Eichenberg et al. 2013; Kaltenthaler et al. 2008)**.** The acceptance of such services has been largely overlooked in previous studies. Additionally, Hailey et al. (2008) indicated inadequate evidence regarding the long-term viability and benefits of telepsychiatric services as an integrated component of existing mental health systems (Hailey et al. 2008)**.** Moreover, examining the strengths and weaknesses of telepsychology applications for providing individual and group mental health care deserves more research attention (Egede et al. 2009). The socio-cultural factors that prevent individuals from embracing digital mental health also require further examination (El Hayek et al. 2020)**.**

This study examines respondents' perceptions of telepsychology and telepsychiatry services. Furthermore, to determine the most common mental disorders among the participants.   As part of this study, recommendations will be offered to improve telepsychology and telepsychiatry practice utilization. The main research questions are:

1- What are the individuals' perceptions of the usefulness of telepsychology and telepsychiatry services?

2- What are the individuals' perceptions of the ease of use of telepsychology and telepsychiatry services?

3- What are the most common mental disorders among the respondents?

The perceptions will be determined by applying the technology acceptance model (TAM) based on the survey responses.

Literature Review
Telepsychology and Telepsychiatry

Literature regarding telepsychology (particularly video conferencing) has grown exponentially in recent years (Simpson 2009). However, to our knowledge, no studies have specifically examined people's acceptance of telepsychology and telepsychiatry in Saudi Arabia. Using a telecommunication device for diagnosing and treating patients who are geographically distant from their physicians is known as telemedicine (Kuo et al. 2011). Telemedicine allows hard-to-reach patients to be diagnosed, referred, constantly monitored, and directly intervened (Hill et al. 2010).

Conducting a carefully planned evaluation of needs is an essential first step in implementing telemedicine services(AlDossary et al. 2017). The same applies to all telehealth services. The same applies to all electronic mental health services. The method of electronic mental health services was developed in psychiatry and has been widely used for many years, beginning in 1959 at the Nebraska Psychiatric Institute (Hyler and Gangure, 2002). Patients, therapists, and society can benefit from telepsychology through reduced healthcare costs (Morland et al. 2015). In recent years, mental illness patients have accessed a rising number of computer-based services (Walker 2006). Some evidence suggests that therapists found video conferencing to be an efficient means of communicating with children and teenagers (Himle et al., 2012) .In online therapy, the therapist and consumer quickly adapt to this type of communication. Online telepsychology is anonymous, and only relevant personnel will be aware that a patient has requested the service (Bauman and Rivers 2015).

Moreover, a therapeutic relationship can be strengthened through online communication, and online psychotherapy is often regarded as equal to or superior to in-person therapy (Mishna et al. 2017). Patients benefit from online psychotherapy by being flexible to change therapists at any time (Finfgeld 1999). Another advantage of online psychotherapy is its ease of maintaining records and making transcripts available to all authorized parties, decreasing the risk of malpractice and litigation. (Norman 2006; Li et al. 2013).

During the COVID-19 pandemic, patients highly rated telepsychiatry services as part of the university's online mental health services. Participants were satisfied with the structure, process, and outcome, and 94.3 % were pleased with the overall experience. Online psychotherapy may be a suitable treatment option in the event of psychiatric conditions that prevent traditional in-person services, such as agoraphobia, social anxiety, or other illnesses that preclude physical contact. (Fitzgerald et al. 2010). In patients with schizophrenia, it appears possible to utilize phone, internet, and videoconferencing modalities. According to preliminary evidence, these modalities improve patient outcomes (Kasckow et al. 2014). Online psychotherapy can also be used with in-person therapy or as an alternative solution (Johnson 2014). Research and program development in telepsychology will develop specialized mental health services for outpatient clinics through videoconferencing technology with an empirical demonstration of its superiority and cost-effectiveness (Egede et al. 2009). It has been demonstrated that online psychotherapy is less expensive (Barnett and Scheetz 2003). There is no discernible difference between telephone, videoconference, or face-to-face sessions regarding empathy or therapeutic (Reese et al. 2016).

Most consumers indicated that the telehealth models are valuable and should be maintained. A videoconferencing technology was not an obstacle; however, electronic health record documentation did pose a challenge (Howland et al. 2021). Telepsychology providers may work when they are unavailable during the usual working hours. Due to telehealth, healthcare workers can work on weekends, evenings, and holidays. Access to healthcare providers can be helpful for consumers in times of need, but it can also be cumbersome for healthcare providers (Drum and Littleton 2014). Traditional health care organizations may improve therapeutic relationships, reinforce appropriate therapeutic boundaries, and provide their patients a sense of security and safety (Knapp and Slattery 2004). A telepsychology service is not always provided in a proper professional setting; there is a potential for some healthcare providers to work in not an adequate environment.

Some critiques of this electronic mode have been, including concerns about privacy, HIPAA compliance, and legal implications (Sampaio et al. 2021). Gordon et al. (2015) and Schulze et al. (2019) pointed out that psychotherapists' attitudes toward telepsychology were surveyed, and videoconferencing treatments were seen as less effective than face-to-face therapies (Gordon et al. 2015; Schulze et al. 2019). Research does not support a sustained adoption of behaviour therapy online or in a blended method (van Leeuwen et al., 2021). Often, people with mental health issues, including the elderly, lack the necessary knowledge of technology (Robotham et al. 2016).

Moreover, the lack of nonverbal cues during therapeutic interactions is undoubtedly one of the most frequently discussed disadvantages, mainly when text-based media or telephones. It can lead to misunderstandings and miscommunications (Bauman and Rivers, 2015). Non-verbal communication, particularly body language, can convey powerful messages. A message is influenced by more than just the tone, pitch, volume, quality, and speed of the voice. Body language can contradict the message conveyed with words, substitute for the verbal message, or contribute to its meaning.

Postdoctoral students performing telepsychology faced technical difficulties and inadequate connectivity. They also had difficulty deciding whether to provide services to a client unsuitable for outpatient telepsychology, but they had few other options (Dopp et al. 2021). Telepsychology group training was not without its challenges, and mainly family interruptions were more common than in-person training. Distracted caregivers only listen to parts of the group discussion and respond off-topic,

disruptively, or disorganized. Furthermore, caregivers may have difficulty distributing handouts and other materials to clients (Fogler et al. 2020). The uncertainty surrounding ethical and legal issues is a significant barrier to expanding online psychotherapy (Chakrabarti 2015). Recent obstacles impeded COVID-19's transition to telepsychology, including insufficient healthcare organizations' capacity, scheduling conflicts, technological limitations, and accessibility issues (Perrin et al. 2020). In light of the COVID-19 pandemic, specific population segments have received little attention, despite well-documented health disparities and mental illness risks (Pankey et al. 2021).

Ethical and Legal considerations

Numerous patients seek psychotherapy online, and therapists must consider the ethical implications (Cipolletta and Mocellin 2018). Thus, due to the differences between online and in-person therapy, online therapy requires a different type of informed consent than in-person therapy (Maheu et al. 2013). Online psychotherapy can pose privacy, confidentiality, and security concerns if conducted using unencrypted, unsecured websites or commercially available software that can easily be hacked (Childress and Asamen 1998; Fantus and Mishna 2013; Heinlen et al. 2003). Besides being well versed in ethical principles and standards, therapists should also be familiar with legal and regulatory requirements (Johnson 2014). There are inadequate or no telepsychology regulations and standards in some parts. Online psychotherapy is not guided by explicit ethical guidelines, leading to many ethical concerns (Finfgeld 1999). Saudi Arabia's regulations governing the implementation of telepsychology services exist and indicate that to practice this healthcare method, multiple processes and procedures must be implemented, including all legal and ethical requirements applicable to psychologists practicing the traditional method. Ensure that telepsychology service organizations adhere to all applicable legal requirements. Telepsychology in Saudi Arabia must be video based. A synchronization process is not necessary. Telepsychology practices must abide by Saudi Arabia's policy for exchanging health information, including all applicable security and privacy requirements. Telepsychology training is mandatory for all psychologists before they can practice telemedicine (Alqahtani et al. 2021).

Technology Acceptance Model (TAM)

TAM is a model proposed by Davis (1989) that explains or predicts the factors that affect a user's decision to accept or reject information technology. Many models, including the TAM, examine people's attitudes, behaviours, and social intentions. Furthermore, the intention to use a particular system influences people's behaviour toward adopting information systems (Aldosari et al. 2018; Durodolu, 2016). Specifically, Davis (1989) identifies two primary beliefs that affect how people use information technologies: the perception of their usefulness and the perception of their ease of use. An individual's perception of a system's usefulness is defined as the degree to which he or she believes the system will improve his or her performance at work (Davis 1989). A person's perception of ease of use refers to the degree to which he or she believes using a particular system would be effortless (Davis 1989). Figure 1 describes the TAM by (Davis 1989). Figure 2 shows the conceptual model of this study.
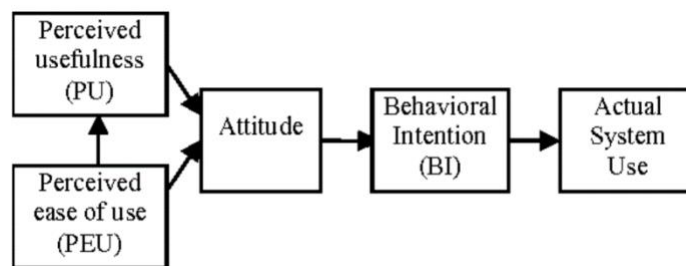
Figure 1. Technology Acceptance Model (TAM) (Davis, 1989)
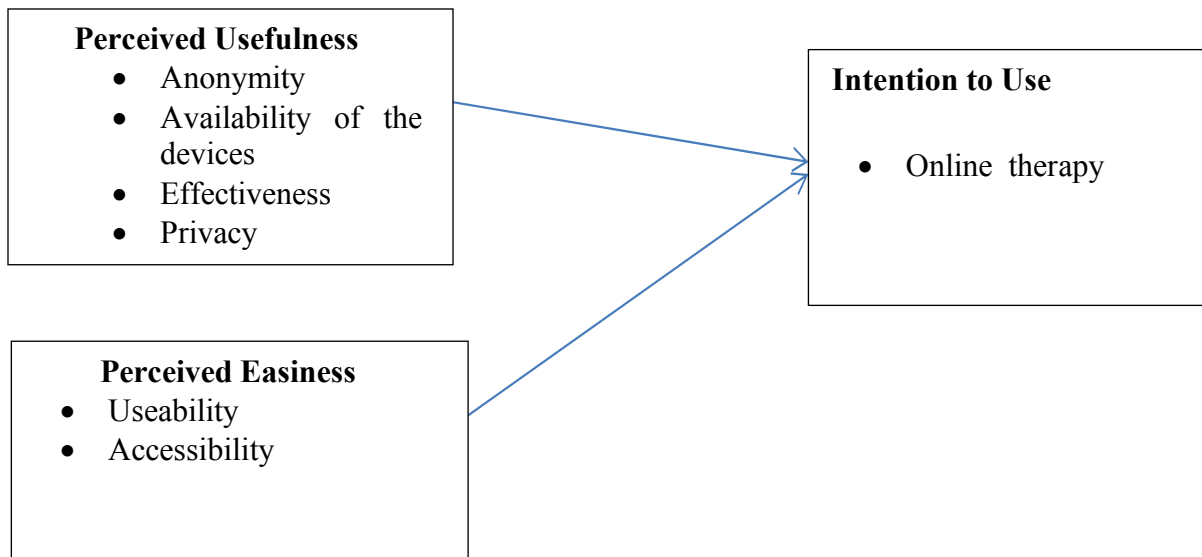
Figure 2. Source: Developed by the author based on literature review (2022)

Methodology

Research Design, Data Collection Procedures, Population and Sample

In this study, the researchers performed a cross-sectional study. *Multiple social media applications, including Twitter and Telegram, distributed the survey among the respondents. The questionnaire was assessed and evaluated by a group of experts at the University of Hail before being disseminated to the population. A random distribution method was used for the distribution of the survey.* The survey included fifteen items and the results aligned with the study objectives. Participants in the survey were asked demographic questions to provide essential study information, including their age and location. The second part was centred on obtaining telepsychology and telepsychiatry data in Saudi Arabia. The researchers applied the TAM by Davis (1989). Four indicators determine the perceived usefulness and the perceived easiness by two.

Additionally, the study seeks to determine respondents' general perceptions of their mental health. An expert in educational psychology and school counselling, assisted in developing and evaluating the questionnaire questions. Before the survey's release, necessary adjustments and interpretations were made to clarify the survey. On November 23, 2021, the survey was distributed to the population, and individuals with varying characteristics attempted to acquire reliable evidence (Figure 3).

Figure 3. Research Study Approach

Data Analysis

In order to verify the accuracy and validity of the survey results, we have tested the data several times. An examination of the perceptions of the sample has been undertaken through descriptive analysis. The statistical software package SPSS was employed to analyze the data in this study. Measurements were evaluated for their reliability and construct validity. It was necessary to conduct the reliability analysis to ensure the internal validity and consistency of the items used in each variable. Cronbach alpha values of 0.6 to 0.7 are deemed acceptable by Hair et al. (1992). Alpha values of 0.7 and greater represent homogeneity, and the same constant is being measured. The measurement scales are shown in Table 1.

Demographics of Respondent
Table 1 indicated 115(25.9%) males and 329 (71.1%) females. Most of the respondents are under the age of 30, and there are only two respondents over the age of 48. The mean age was 31.52 (SD 10.29) years. 30% of the respondents live in the country's north, while 29.5% live in the centre. Twenty-two per cent of the area is in the West, fourteen per cent is in the South, and only four per cent is in Estren.

Table 1. Respondent Demographics

Demographics		Number of Respondents	Percentage
Gender	Males	115	25.9%
	Females	329	71.1%
Age	From 18 to 23	222	50%
	From 23 to 28	101	22.7%
	From 28 to 33	46	10.4%
	From 33 to 38	39	8.8%
	From 38 to 43	25	5.6%
	More than 43	9	2%
The location of the city in Saudi Arabia	In the centre of Saudi Arabia	131	29.5%
	West of Saudi Arabia	94	21.2%
	North of Saudi Arabia	133	30%
	South of Saudi Arabia	66	14.9%
	Eastern of Saudi Arabia	20	4.5%

Results
The researchers developed the second section of the questionnaire to obtain information about individuals' mental health perceptions and attitudes toward telepsychology and telepsychiatry. On the first item of the questionnaire, we inquired whether the participants had ever visited a psychiatrist or

received psychological counselling. Figure 4 shows that most respondents (86.7%) (385) had not sought mental or psychological support during their lives, while only 13.3% (59) had. In general, women are more likely to participate in surveys and fill them out than men. Furthermore, when distributing the survey on social media applications, researchers observed that most users on social media were women.
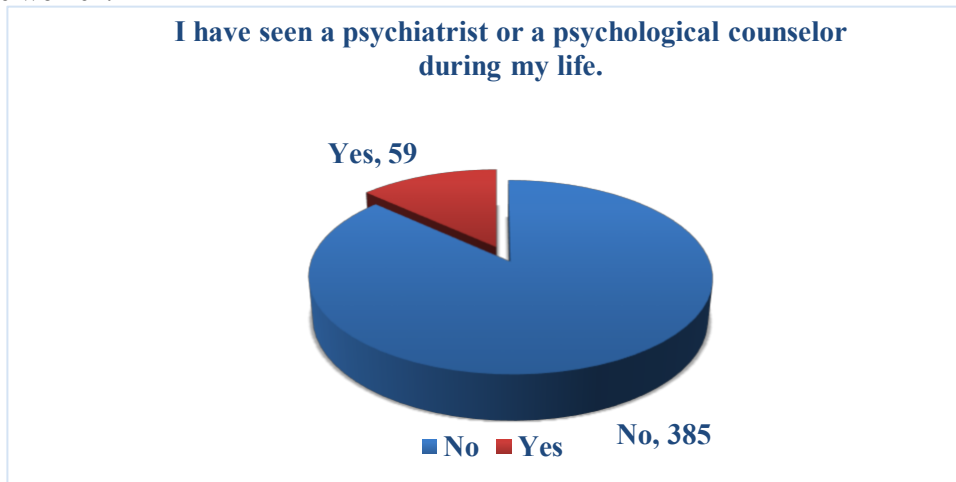
Figure 4. The visit of a psychologist and psychiatrist.

From the data in Table 2 regarding the first item, most of those surveyed indicated agreement in believing that they have a psychological problem, with 223 respondents. More than half the participants, 65.3%, do not consider embarrassment and fear of public opinion the significant factors for not seeking mental health support. Three hundred five people consider online psychological counselling a valuable tool, whereas 48 disagree. Furthermore, 294 respondents reported that remote psychological counselling would provide greater privacy than face-to-face counselling, and only 72 disagreed with the statement. Item 4 below aimed to assess the availability of electronic devices and the internet; 419 out of 444 participants agreed to have the required technology to access the electronic services. Moreover, 411 claimed they are familiar with using the technology. Most of them indicated that they would not require transportation when using these electronic health services by 414 respondents, and only nine claimed otherwise. Table 3 describes the Cronbach Alpha values.

Table 2. Participants' perceptions of their mental health and telepsychology and telepsychiatry services.

No.	Item	Scale					Mode	Mean	Std. Deviation
		1(f)	2(f)	3(f)	4(f)	5(f)			
1	Embarrassment and fear of society are two main reasons preventing going to a therapist/counsellor.	151	139	57	50	47	1	1.331081	1.328903
2	I Feel that remote psychological counselling is an effective way to avoid and treat many problems.	177	128	91	36	12	1	2.840090	1.018615
3	Using technology such as electronic devices in psychological treatment/counselling instead of going to the concerned centres will provide much higher privacy than the traditional method.	136	158	78	47	25	2	2.750000	1.16306
4	I have the electronic devices and internet needed to access telepsychology and telepsychiatry services	403	16	5	2	11	1	1 1.213964	0.764142
5	I am familiar with using technology and mobile application	408	3	0	9	10	1	1 1.491984	0.9104142
6	By adopting the telepsychology and telepsychiatry services, I do not need transportation to reach a therapist, a psychological counsellor/ psychiatric	414	4	15	1	8	1	2 1.411964	0.964142

Note: 1: total disagree, 2: disagree, 3: neutral, 4: agree, 5: total agree, f=frequency

Table 3. Cronbach's alpha

Scale	Cronbach's alpha	Items
Perceived Usefulness	0.806	4
Perceived Easiness	0.859	2

The result below is analysed and interpreted based on the items above from the questionnaire. Table 4 provides insights into the participants' perspectives on the six determinants for the advantages of telepsychology and telepsychiatry services: anonymity, availability, effectiveness, privacy, useability and accessibility. The perceived usefulness accounted for the availability by solid agreement, while the perceived easiness was the accessibility higher than ease of use by 69% and 66.3%, respectively.

Table 4. Perceived Usefulness and Perceived Easiness

Perceived Usefulness	Anonymity	Availability	Effectiveness	Privacy
Mean	1.3311	1.213964	2.9101	2.7500
Mode	4 (agree)	5 (strongly agree)	4 (agree)	4 (agree)
Median	1.0000	1.0000	3.0000	3.0000
Std. Deviation	1.32890	0.764142	1.01861	1.16306
Perceived Easiness	Useability		Accessibility	
Mean	2.8401		1.411964	
Mode	4 (agree)		5 (strongly agree)	
Median	2.0000		1.0000	
Std. Deviation	1.01861		0.964142	

Table 5 indicates the prevalence of conditions among respondents. General anxiety was the most prevalent condition (41.4%), followed by social anxiety (26.3%) and depression (23%).24.3% of respondents reported that they did not have psychological or behavioural problems, and 11.7% had other disorders than what was given in the survey. Only 14 out of 404 participants reported dealing with aggression, a minor disorder.

Table 5. The distribution of disorders

No	Distribution of Disorders Among Respondents	Frequency	Percentage
1	Depression	102	23%
2	General anxiety	184	41.4%
3	Social anxiety	119	26.8%
4	Aggression	14	3.2%
5	Daydream	45	10.1%
6	Sleeping *disorders*	106	23.9%
7	Eating disorders	68	15.3%
8	Obsessive-compulsive disorder (OCD)	44	9.9%
9	I do not have any psychological or behavioural problems	108	24.3%
10	Others	52	11.7%
▪ Mean		4.631579	
▪ Std. Error of Mean		0.108213	
▪ Median		3.000000	
▪ Std. Deviation		3.056902	

The researchers included a statement intended to assess the perceptions of the family regarding the acceptance of mental health services in general. Interestingly, most respondents (64%) believe their families do not refuse and accept assistance from mental health professionals when needed. Only 12% disagree, as demonstrated in Figure 5.

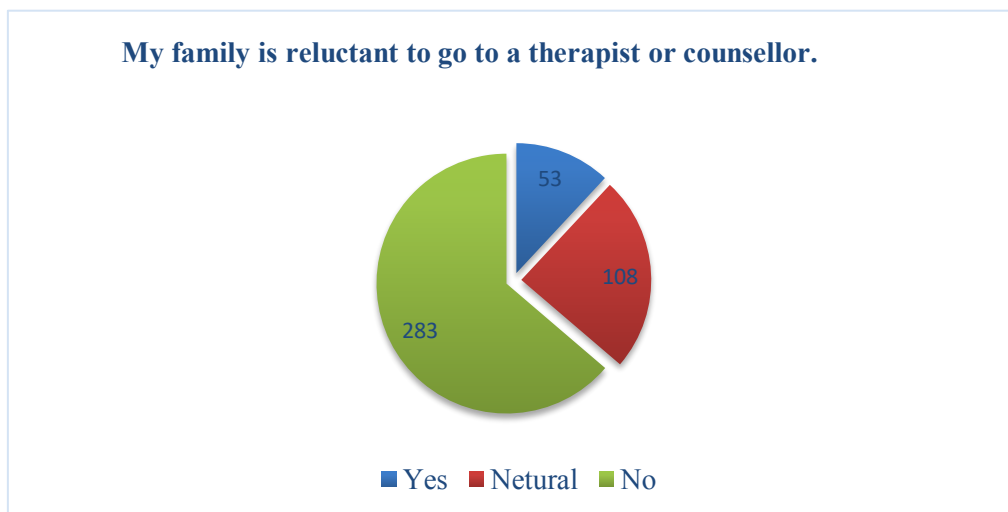**My family is reluctant to go to a therapist or counsellor.**

■ Yes ■ Netural ■ No

Figure 5. Family acceptance of the mental and psychological services

Table 6 is about the availability of devices and internet access. To identify the rate of participants who have independent, smart devices and access to online services, we have asked the following question in

the survey: Do you have your smart electronic device (mobile, iPad, or laptop) with an internet connection? As expected, only a fraction of them did not have access to their own electronic devices and did not have access to the internet, which is relatively consistent with a recent study in the country (Alhur 2021). Of 440 respondents, merely four were without such devices and internet connectivity.

Table 6. Smart devices and internet availability

Do you have an internet connection with your smart electronic device (mobile, iPad, laptop)?		
Yes, I do	440	99.1%
No, I do not	4	0.9%
Mean		222.000000
Std. Error of Mean		218.000000
Std. Deviation		308.298557

Considering that the analysis is based on respondents' opinions, we can conclude that one of the primary motivations for using remote mental health services is higher privacy than physical attendance. Moreover, since online mental and psychological services do not require transportation, individuals can access them whenever and wherever they want, followed by the ability to use and access the electronic mental services even if the family or guardian does not approve or believe in them.

Discussion

As far as we know, no study has investigated the individuals' attitudes toward telepsychology or telepsychiatry in Saudi Arabia. According to this study, only 59 out of 444 respondents visited mental and physical health providers; multiple factors may lead the individuals not to ask for mental or psychological assistance, including religion; according to several researchers, significant religious factors prevented religious individuals from receiving this type of support (Nakash et al. 2019). Moreover, young adults are unaware of mental health problems and treatment options, contributing to mental care barriers (Vanheusden et al. 2008). According to a recent study, the stigma associated with mental illness is one of the significant obstacles to seeking mental or psychological support (Martinez et al. 2020). Researchers found that COVID-19 negatively impacted friendships and loneliness, contributing to anxiety and psychological distress among Australian adolescents. The pandemic affected the work of half of those surveyed, and the remaining majority indicated that societal fear was not a significant obstacle (Li et al. 2021).In contrast, Martinez et al. (2020) discovered that stigma associated with mental illness prevents many individuals from seeking treatment (Martinez et al. 2020).

A closer inspection of table 2, item 3 reveals that remote psychological counselling and support effectively avoids and treats many problems. It is revealed that 68.7% fall between strongly agree and agree while only 10.7% fall between strongly disagree and disagree. Our results share many agreements on the effectiveness of online mental support findings. Additionally, 2020 in that even the use of ICT in school counselling does not cause any negative feelings or anxiety among counsellors, which indicates it is practical and an effective endorsement for employing this practice. Regarding privacy and security concerns with providing health care by using technology, researchers concluded that telehealth systems might not improve healthcare access, quality, and effectiveness when privacy and security concerns are not addressed. In our findings, various respondents reported that telepsychology and telepsychiatry have more privacy than face-to-face visits. Therefore, it is wise to consider consumers' privacy as one of the critical aspects of using this type of support. Watzlaf (2017) suggested that health care providers must implement standard best practices for all types of telehealth services to address privacy and security concerns. Prior to using a telehealth system, a privacy and security evaluation must be conducted to

ensure the privacy and security of the patient's health information (Watzlaf et al. 2017).

There is a high rate of anxiety, and alcohol-related problems among Italian adults, while in our analysis, we found that the highest percentages were general anxiety, social anxiety, and sleeping disorders, respectively (de Girolamo et al. 2006). Mental disorders may adversely affect young people's ability to obtain an education, start a family, and enter the workforce (Gustavson et al. 2018). Thus, multiple necessary actions need to be taken to ensure that the young individuals and all the population, in general, have a superb mental health condition; one conceivable way is utilizing the available and affordable technology. Based on the results, we found a much higher level of family acceptance and understanding of mental health issues than those reported by Vicente et al. (2013); it appears to be hard for a family to accept a patient with a mental illness at home. Families should cope with and assist any family members dealing with any mental issue (Vicente et al., 2013).

Conclusion

Through this study, we examined participants' perceptions of telepsychology and telepsychiatry. We use the TAM model to describe why people accept technology use (telepsychology), which considers TAM factors (usefulness), and the other factor is perceived benefits. Besides assessing device availability and internet access, the researchers also assessed the prevalence of mental health disorders among respondents. These results confirm the validity of the TAM model in measuring telepsychology and telepsychiatry acceptance and use. The current study indicates that the usefulness and ease of use predict the acceptance of telepsychology and telepsychiatry. Research findings on telepsychology and telepsychiatry are in accordance with the extensive literature on the acceptance and use of new technology, particularly eHealth acceptance and use (Hennemann et al., 2017; Mattila et al., 2017)

The availability of electronic devices and the internet and its perceived advantages also played a relevant role in increasing telepsychology and telepsychiatry acceptance and use. These factors determined participants' perceptions of telepsychology's usefulness, which affected their acceptance of using it. Our study focuses on increasing understanding of the factors influencing consumers' eHealth technology acceptance instead of focusing on the acceptance of health care professionals. However, further research should be carried out to understand specific barriers and perceived usefulness when the intervention involves minimal or nonexistent contact with professionals.

There are several limitations to the current study, including the fact that all the measures were completed by participants, making it likely that differences between measures would occur. It would be beneficial to use other measures in future studies. Furthermore, this study used a cross-sectional research design. Therefore, causality could not be inferred. A longitudinal study is required to determine the causal effects and stability of the TAM model over time.

The third limit is that we collected data using convenience sampling, restricting our findings' extrapolation, particularly in clinical settings. Moreover, 71.1% of the sample was female. The composition of our sample could have affected our results, making generalizing them to a male population difficult. Nevertheless, psychotherapy services are also more prevalent among women than men. Replication and validation of our findings will be needed.

It is crucial to conduct more research on telepsychology and telepsychiatry, particularly from the users' perspectives. In order to provide interventions that meet consumers' needs and minimize perceived barriers, consumers are a vital part of the improvement of tools and platforms. Optimizing the engagement of participants in interventions is a key aspect of achieving successful treatment outcomes. A significant component of successful treatment outcomes is optimizing participant engagement during interventions. As a result of the pandemic crisis, consumers and professionals may have begun to

perceive online psychotherapy differently. Our study found that telepsychology requires a positive perception focusing on its benefits. Most of the participants reported positively regarding telepsychology and telepsychiatry. Van Voorhees et al. (2013) demonstrated that clinicians' attention to consumers-centred information aimed at intrinsic motivation led to greater adoption of an e-mental health intervention in this area.

These results emphasize the importance of investigating consumer needs to achieve a higher rate of adoption. We recommend that healthcare providers carefully consider a wide range of aspects before implementing remote health services, especially in mental health, which includes ensuring the appropriateness of the online sessions of both parties are proper and do not contain any distractions. Furthermore, during the implementation of this method of mental health care, the providers must ensure the privacy of the individuals' health information by some vital measures such as avoiding using public Wi-Fi networks to protect consumers' health information from unauthorized individuals.

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The Influence of Business Models, Use of Information Technology on the Quality of Accounting Information Systems Digitizing MSMEs Post-COVID-19

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Abstract

Many organizations realize the importance of building information systems based on the formulation of business models and implementing them into company activities. The survival of an organization is determined by its ability to compete in the market. In modern systems, there are dependencies between enterprise information systems, business models and enterprise business processes. There is an equally strong influence between business models and information systems. The goal achieved between business models and information systems is to maintain a balance between the three dimensions of sustainable development, namely: environmental, social, and economic. The research method used is qualitative with a field approach, an institutional approach, and a library approach. The types of data used in this research are primary data and secondary data. The data collection technique used is observation and literature study both nationally and internationally, while secondary data comes from journals, proceedings, government regulations, and statutory regulations. The output target achieved is obtaining business models, information technology on the quality of MSME accounting information systems after Covid-19.

Keywords: MSMEs, business models, information technology, quality of accounting information systems, Post COVID-19

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Introduction

The development of information technology is used by various business actors to develop the business world through information systems in every daily business activity that almost touches all levels of world society. In this fourth-generation industrial era, the size of the company is not a guarantee, but the agility of the company is the key to achieving achievements quickly. The COVID-19 pandemic that has occurred since March 2020 also has a significant impact on the Indonesian economy. In the early days of the pandemic, we could see that almost all business sectors were affected by COVID-19, hampering economic activity, and putting pressure on future world economic growth, including Indonesia's economic growth. Micro, Small and Medium Enterprises (MSMEs) are one of the keys to economic growth in Indonesia. The Central Statistics Agency stated that the number of MSMEs reached 64 million or 99.9 percent of all businesses operating in Indonesia. More than 60% of GDP comes from MSMEs and more than 90% of the workforce is absorbed by MSMEs (Tim Komunikasi Panitia Penanganan COVID-19 dan Pemulihan Ekonomi Nasional 2021). This makes the movement of MSMEs very influential on the national economy (Tim Komunikasi Panitia Penanganan COVID-19 dan Pemulihan Ekonomi Nasional 2021). However, as in almost all countries, the MSME sector in Indonesia is experiencing the impact of the COVID-19 pandemic. These impacts are decreased sales, capital difficulties, product distribution barriers, and raw material difficulties (Sugiri 2020). The current global economic slowdown has had a major impact on Indonesia's economic growth. This can be seen in the sensitivity analysis of the Indonesian economy. Based on the sensitivity analysis, it was found that when China's economy slowed by 1% it would affect and have an impact on Indonesia's economic growth rate of -0.09%. This is also in line with further sensitivity analysis where every 1% economic slowdown in the European Union will have an impact on the rate of economic growth in Indonesia, namely -0.07%, India (-0.02%), Japan (-0.05%) and the United States (-0.06%) (Nasution et al. 2020). The same picture also occurs in most commodities, namely every 10% decrease in crude palm oil (CPO) prices will have an impact on the Indonesian economy by 0.08%, positive oil by 0.02%, and coal by -0.07% (Nasution et al. 2020). While companies must prepare themselves to be able to keep up with the development of information technology in the era of the industrial revolution 4.0, they must also be able to survive in pandemic conditions. This makes the challenge even tougher for all companies, but it can also force companies to take the digital leap. Challenges in the industrial revolution 4.0 including 1) Information technology security issues 2) Reliability and stability of production machinery, 3) Lack of adequate skills, 4) Reluctance to change by stakeholders, 5) Loss of many jobs due to changing into automation (Supriyati 2019).

The COVID-19 pandemic has been almost 2 years since the first case in Indonesia, during which time many companies looked bankrupt. Chairman of the Indonesian MSME Association, Ikhsan Ingratubun said, throughout 2020 there were around 30 million MSMEs that went out of business due to Covid-19 (Sembiring 2021). However, not all MSME actors have been affected by the Covid-19 pandemic, MSMEs doing business using digital technology have actually grown significantly. Minister of Cooperatives and SMEs Teten Masduki said: "The ones affected by MSMEs are related to office, school, industrial activities, because WFH (work from home) has stopped their business, mostly in the food and beverage sector. There are MSMEs that can still sell but their turnover is down. Beyond that, there is growth, namely MSMEs that are connected to digital platforms" (mediaindonesia.com 2021). Globalization and economic changes from an industry-based economy to an information-based economy require businesses to operate more effectively, efficiently, and in control by prioritizing competitive advantages at both local and global levels, through improving the quality of human resources/goods, services and increasing the use of information technology (Susanto 2017). Airlangga Hartarto as the Minister of Industry stated that currently the government has set 10 national priority steps to implement the Making Indonesia 4.0 roadmap (Kementerian Perindustrian Republik Indonesia 2018). This strategy is believed to be able to accelerate the development of the national manufacturing industry to be more globally competitive in the current digital era (Kementerian Perindustrian Republik Indonesia 2018). The survival of an organization is largely determined by its ability to compete in the market (Green 2007).

Technology is constantly evolving new ways to present information, it remains important for AIS research to identify the factors associated with presentation format that affect information use in order

to inform standard setters and designers and users of accounting information systems (Kelton et al. 2010). Most of the research currently conducted in the accounting information systems (AIS) and information systems (IS) areas focuses on understanding phenomena and finding new truths: why things work the way they do. To discuss accounting expert systems from a design science perspective. A key issue addressed in their paper is how much developing expert systems can advance knowledge and, therefore, can be considered as research (Kallunki et al. 2011). There is a growing dependence between enterprise information systems and business models in modern systems (Laudon 2018). An accounting information system is a collection of integrated physical and non-physical components to process financial data into financial information that is needed in decision making by managers and external parties (Supriyati 2020). The process of implementing an adequate accounting information system can assist MSME owners in determining the right business strategy in the Covid-19 pandemic. Therefore, there is a reasonable belief that the accounting information system plays a sufficient role in supporting success in determining strategies in terms of achieving business goals and objectives (Rahmadani 2020). Brenner stated that the problem in developing MSMEs not only rests on increasing their number significantly and providing the widest possible business opportunities for the community, but also on increasing the competitiveness of MSMEs at the local, national and international levels to enjoy the benefits of trade and investment liberalization (Brenner 2020). It was mentioned that being part of the debate in the SME forum about cooperation with the Asia Pacific Economic Council (APEC) on the need for a new business unit to ensure broad participation for members of the APEC community. In addition, views on the need for economic and technical cooperation proposals (ECOTECH) by developing countries to increase the competitiveness of in APEC member industries global competition. In today's global business industry, digitalization of companies is important. Many businesses mutual funds die because they are unable to keep up with technological developments. One of the companies that had suspended animation was Toys R Us, this toy retail company has more than 700 outlets in America and the UK which in 2017 had to close hundreds of outlets because it was badly beaten by e-commerce in America such as Amazon and Walmart and had to laid off about 33 thousand employees without severance pay. Toys R Us was eliminated due to losing to the online shopping trend in e-commerce which directed consumer shopping behavior in a more practical direction and Toys R Us was unable to keep up with technological developments (AsiaQuest Indonesia 2020). Based on the above phenomena, this study intends to conduct basic research with an in-depth study of the use of good business models and optimal use of information technology on the quality of accounting information systems as a support for the digitization of MSMEs echoed by the government, especially in post-Covid-19 conditions. The right development model is expected to create an increase in the income and welfare of MSME business actors.

Research Question

1) How does the business model influence the Quality of Digital-Based MSME Accounting Information Systems?
2) How is the influence of information technology on the Quality of Digital-Based MSME Accounting Information Systems?

Research purposes

1) Knowing the influence of the business model on the Quality of Digital-Based MSME Accounting Information Systems.
2) Knowing the influence of information technology on the Quality of Digital-Based MSME Accounting Information Systems.

Literature Review

Business Model

Research in Accounting Information Systems (AIS) has long recognized the importance of information representation. Business process representation plays an important role in this context, as auditors have

a choice between different types of textual and visual representations. Regarding search, recognition and partly for inference tasks, visual business process models seem to be more suitable than textual models (in terms of efficiency and effectiveness, both for experts and beginners). Regarding the memorization task (both for experts and beginners), and partly for the problem-solving task (for experts only), the textual model gave better results than the visual model. This finding supports the concept of theoretical affinity (Ritchi 2019). Whereas different approaches describe business models, most of the current literature agrees on a central aspect: creating and capturing value by delivering a value proposition to customers (Fielt, E. 2013).

According to Demil & Lecocq (2010) a business model is defined as the interaction between three dimensions, namely the value proposition, value network, and resources and competencies. The value proposition describes what the company offers to the market. The value network is related to the company's internal organization and especially to transactions with external partners. Finally, competencies and resources must be utilized to create value for customers (Demil & Lecocq 2010). Indicators of business model success are seen from its ability to overcome competitor threats which include: (1) replication, (2) reading the strength of the company model, (3) not focusing on the market, and (4) substitutes; the ability of competitors' products to seize the market for the company's products. These three things characterize a good business model (Raharjo 2018). Figure 1 illustrates one of the tools that can be used to develop a business model, namely using the Business Model Canvas. The Business Model Canvas is used to explain the various business activities of the company, the company's income & expenses, the value of a company, the segmentation of the company and the way the company is received by its customers.
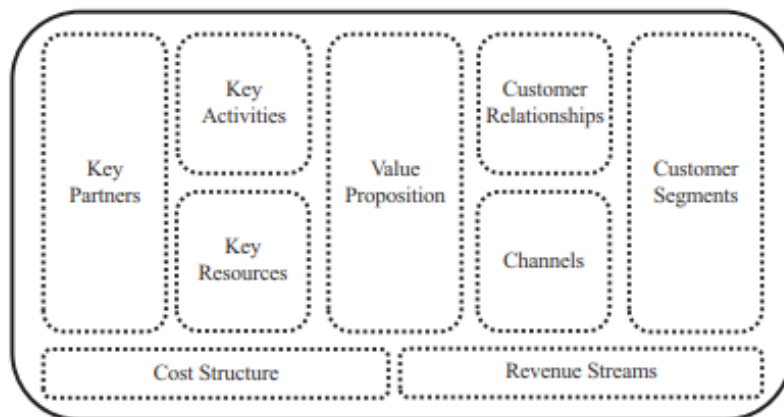

Figure 1. Business Model Innovation (Business Model Canvas)

Use of Information Technology

New ways of presenting information remain important for AIS research to identify factors related to presentation formats that affect the use of information to inform standard setters, designers, and users of accounting information systems (Kelton 2010). Most of the research currently carried out in the fields of accounting information systems (AIS) and information systems (IS) focuses on understanding phenomena in order to discover new truths: why things work the way they do. Talking about accounting expert systems from the perspective of design science, the main issue discussed is how much the development of expert systems can advance knowledge and can be considered as research. The system is expected to have the following three criteria: (1) database orientation, meaning that data needs to be stored at the most primitive level; (2) semantic orientation; and (3) structuring orientation (Geerts 2011). IT enables aid workers, affected communities, volunteers to create, collect, share and use information during an emergency response. IT is used to assess response progress (eg number of people rescued from floods), coordinate activities between aid agencies, government agencies, companies, volunteers, provide direction and appeal to donors (Fernandes 2021).

Quality of Accounting Information System

The system can be interpreted as a collection of subsystems, components or elements that work together with the same goal to produce a predetermined output ([Mulyani 2016](#)). Information is data that has been processed that is intended for a person, organization or anyone who needs it ([Mulyani 2016](#)). In the decision-making process, a person needs information related to the decision to be taken. Information is often defined simply as processed data, moreover information is data that has been organized and processed to give meaning, improve decision-making processes ([Hall 2010](#)) ([Romney and Steinbart 2012](#)) ([Bodnar 2010](#)) ([Gelinas 2008](#)). Regarding the quality of accounting information systems, quality accounting information is needed. Accounting information is one of the types of quantitative information and is the output of AIS and is financially oriented ([Gelinas 2008](#)) ([Wilkinson, 1999](#)).

In the context of AIS development, the method used in the system cycle is the SDLC (System Development Life Cycle) method. SDLC is a method used to develop a system. The SDLC is also used by systems analysts to develop information systems involving requirements, validation, training, and system owners. SDLC is identical to the waterfall system development technique because the stages decrease from top to bottom ([Mulyani 2016](#)). The Accounting Information System records, reports business transactions, the flow of funds within the organization and then produces financial reports ([Mulyani et al. 2019](#)).

Based on the opinion above, it can be concluded that accounting information is financial data that has been processed into financial information that is useful for decision making. Regardless of physical form, useful information has the following characteristics: relevance, timeliness, accuracy, completeness, and summary ([Hall 2010](#)) ([Anthony 2000](#)). Remember that quality information is accurate, reliable, current, complete, and presented in an appropriate format ([Stair 2010](#)).

Based on the explanation above, the quality of the information system can be concluded that the quality of accounting information includes relevant, reliable, accurate, timeliness, conciseness clarity, complete, timely, understandable, verifiable, and accessible. Information must also be open and transparent. Transparency is an information that is given accurately, clearly, and overall to the information user so that the information provided can be understood properly and does not cause misunderstanding between the party providing information and the wearer ([Ladewi, Y., Et. al 2022](#)).

MSMEs

In modern systems, growing interdependence between enterprise information systems, business models in the form of business models and enterprise business processes. Stating that being part of the debate in the MSME forum on cooperation with the Asia Pacific Economic Council (APEC) on the need for a new business unit to ensure broad participation for members of the APEC community, as well as views on the need for proposals for economic and technical cooperation (ECOTECH) by developing countries to improve the competitiveness of APEC member industries in global competition. Various references mention various concepts that can be used to measure the business model in an organization. According to Mutegi, Njeru, & Ongesa the performance of MSMEs is the result or evaluation of the company's work achieved by a person or group with the division of activities in the form of tasks and roles in a certain period with the standards of the company ([Mutegi et al. 2015](#)). According to Ali, MSME performance is analyzed with three approach assumptions, namely it is difficult to measure MSME performance due to limited resources, measuring MSME performance is only complex financial indicators that are identified so that they do not show actual business results, and MSME performance measurement is often used by large-scale companies and structured management. ([Ali 2003](#)). MSME performance is a function of various factors such as financial services and government support, these factors can be suppressed or driven by other mediating variables ([Esubalew & Raghurama 2020](#)).

To compete in the global arena, MSMEs must be responsive in dealing with environmental changes due to the technology and information revolution ([Bardan 2020](#)). Adaptation to a rapidly changing environment requires precision and accuracy for decision making. MSME owners who are also

managers are faced with many alternative choices related to efficiency, such as material selection, product design, market, distribution, and service to customers. Therefore, accurate calculations are needed in every decision-making and action. Many MSMEs use AIS with the aim of gathering more information to help owners make decisions. Ultimately, this leads to increased efficiency, profitability, and performance of MSMEs. In this backdrop, the use of information communication technology (ICT) will certainly provide timely and valuable information, knowledge, knowledge for SMEs, better relationships with suppliers, customers, better collaboration, increased productivity, and efficiency (Cuevas-Vargas et al. 2016).

Framework of thinking

The Influence of Business Strategy Models on the Quality of Accounting Information Systems

Ishak Ramli and Denny Iskandar in their research explain that: "business strategy has a significant and positive effect on the characteristics of Management Accounting Information Systems" (Ramli & Iskandar 2014). Research by Lestari and a also explains that:

> "Business strategy affects the quality of management accounting information systems. Where the management accounting information system is the heart of the company to achieve competitive advantage. The use of accounting information systems (finance and management) can effectively reduce the costs incurred to carry out back-office functions within the company (accounting and payroll functions, procurement of goods, inventory tracking, and asset management management)" (Lestari, R,, and Hertati 2020).

Another study by Lilis Puspitawati and Azhar Susanto explains:

> "Improving the quality of management accounting information, company managers must be able to improve the effectiveness of management accounting information systems. The effectiveness of the management accounting information system can be increased if the implementation of business strategies also increases" (Puspitawati & Susanto 2018).

Research by Maya Sari explains that: "Business Strategy affects the Quality of Accounting Information Systems by 9.14%" (Sari 2018). According to Ishak Ramli and Denny Iskandar in their research:

> "Business strategy has a significant and positive effect on the characteristics of the Management Accounting Information System. In developing a Management Accounting Information System, business strategy is the most important factor to consider, then informal authority, and the least is the formal structure of authority control" (Ramli & Iskandar 2014).

Based on the results of the studies above, the authors conclude that the business strategy model affects the quality of the accounting information system, where the better the business strategy in the digital approach, the better the quality of the accounting information system.

The Influence of the Use of Information Technology on the Quality of Accounting Information Systems

Research by Meiryani and Azhar Susanto explains that: "the quality of accounting information systems is influenced by the use of information technology" (Meiryani & Susanto 2018). Sacer et al. in his research, explains that: "IT significantly contributes to the accuracy and timeliness of accounting information and the quality of Accounting Information Systems" (Sačer and Oluić 2013).

Dwirandra and Astika in their research explain that: "the behavior of using AIS that is increasingly intensive increases individual performance and the perceived environmental uncertainty encourages the use of AIS to be more intensive and massive, thus encouraging an increase in individual performance" (Dwirandra and Astika 2020). To measure the use of information technology was through the dimensions of quality Hardware, Application Software, and Telecommunication and Network used by the enterprise (Supriadi, et al. 2019a). So that the transaction processing system consists of hardware

and software that together have the ability to carry out corporate transactions (Supriadi, et al. 2019a) (Supriadi, et al. 2019b).

Based on the results of the studies above, the authors conclude that the use of information technology affects the quality of accounting information systems, where the better the use of information technology, the better the quality of accounting information systems. So, every company should not ignore the use and development of information technology. The development cannot be denied because every application of this technology facilitates service to the consumen (Tangkilisan, et. al. 2021).

Based on previous research, the authors describe the framework used as follows:
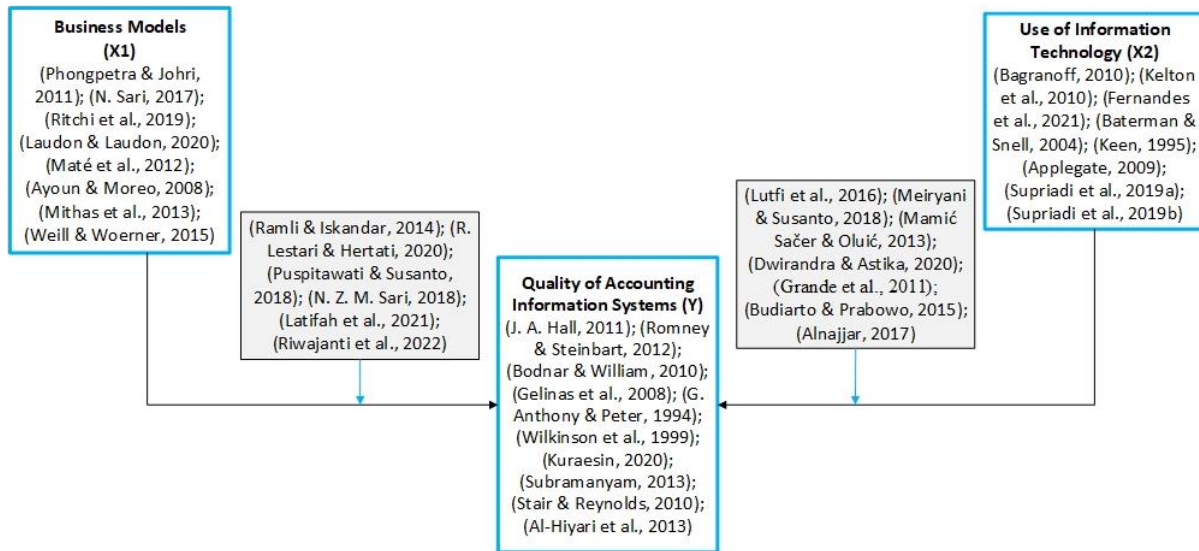

Figure 2. Framework of thinking

Based on the literature review and the framework of thinking above, the hypotheses in this study are:

H1: The business strategy model has an effect on the Quality of Accounting Information Systems.

H2: Use of Information Technology affects the Quality of Accounting Information Systems.

Research Method

The research method used in this study is a quantitative research method. Data collection techniques used were interviews with the Office of Cooperatives and Small Businesses of West Java Province and literature studies. The types of data used are primary and secondary data. The population used in this study was 6,257,390 MSME units spread across all regencies/cities in West Java. While the sample used was 135 MSME units in West Java with various business categories, namely accessories, batik, borders, crafts, fashion, convection, culinary, food, drinks, services, and others. When validating the data in the field, the researcher compares it with supporting documents. The data analysis technique used in this study uses an interactive data analysis model by Miles and Huberman (Bodnar 2010), including data reduction, data presentation, and drawing conclusions/verification. The object of research used in this study is the digitization of SMEs in West Java. While secondary data comes from open journal systems, proceedings, government regulations, and laws and regulations.
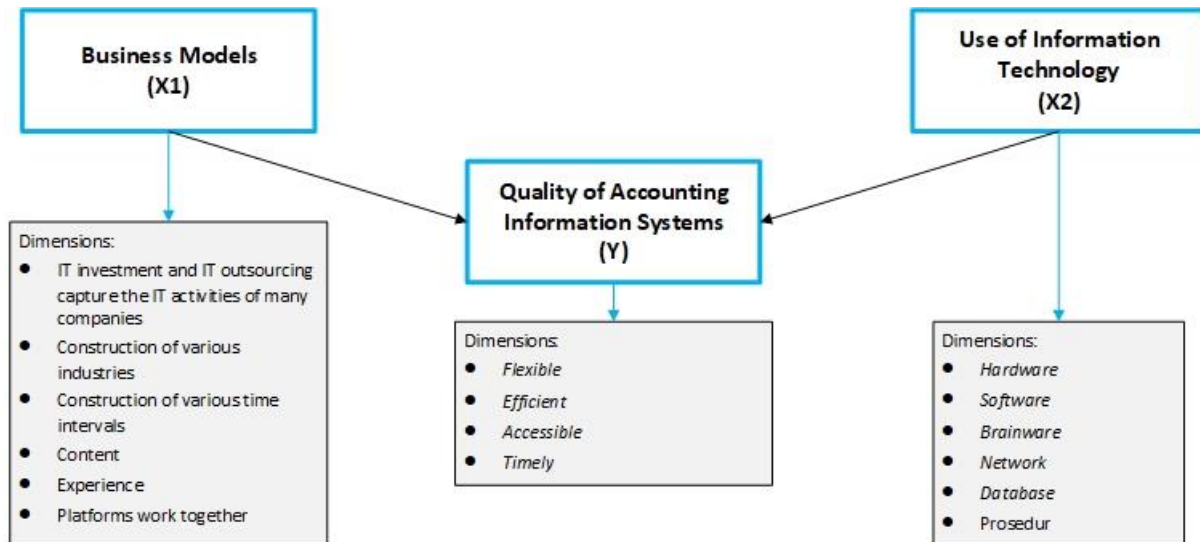
Figure 3. Operationalization of Research Variables

From Figure 3 it is explained the operationalization of the variables, namely:

1. Digital business strategy emerges as a result of the interaction between the company's digital strategic posture and the industrial environment (Mithas et al. 2013).
2. Technology continues to develop new ways of presenting information, it remains important for AIS research to identify the factors that influence the use of information to inform standard setters, designers and users of accounting information systems (Kelton et al. 2010).
3. The quality of the accounting information system is a technical subsystem with indicators of hardware, software, databases, procedures and social subsystems with brainware indicators and management must pay attention to the application of AIS (Rapina 2014).

Results and Discussion

Based on data obtained from the Office of Cooperatives and Small and Medium Enterprises of West Java Province, currently there are 6,257,390 MSME units spread across all regencies/cities in West Java which have high potential but are still managed manually and simply (Dinas Koperasi dan Usaha Kecil Provinsi Jawa Barat 2021). Figure 4 depicts a graph of the distribution of MSMEs by business category throughout West Java. The potential of MSMEs is predicted to increase rapidly if MSME business actors modernize their business processes by optimally utilizing information technology so that the products/services produced can compete with the products/services produced by other companies.
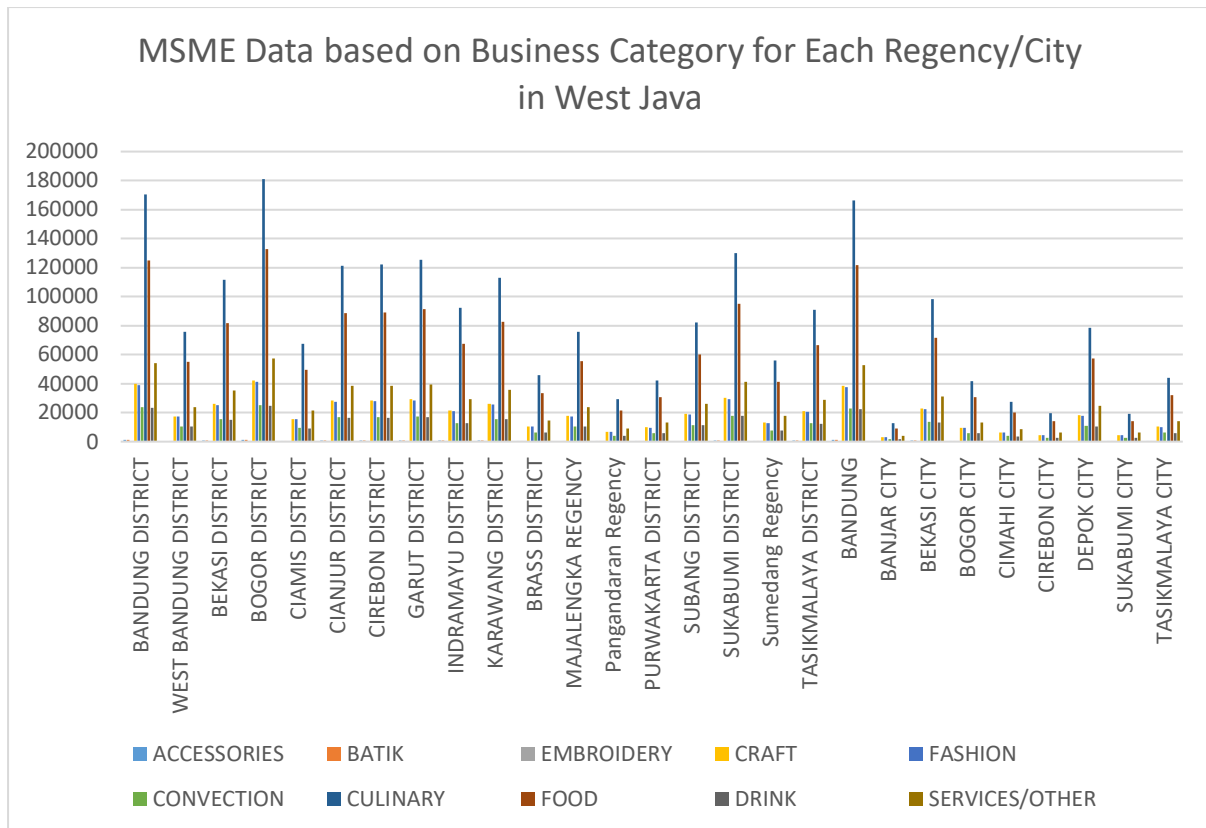
Source: West Java KUKM Service Data Management (Dinas Koperasi dan Usaha Kecil Provinsi Jawa Barat 2021)

Figure 4. MSME data by business category for each Regency/City in West Java

Business organizations in Indonesia do not yet have a good business model, marked by the absence of adequate product innovation, as well as the presence of monotonous and less varied products, especially in terms of business model dimensions and indicators consisting of replication, MSME potential, weak market share and substitution inadequate, causing MSMEs to be unable to survive in the industrial revolution 4.0. Research by Sari explains that business strategy affects the Quality of Accounting Information Systems by 9.14%" (Sari 2018). Business strategy affects the quality of management accounting information systems, where management accounting information systems are the heart of the company to achieve competitive advantage. The use of accounting information systems (finance and management) can effectively reduce the costs incurred to carry out back-office functions within the company (accounting and payroll functions, procurement of goods, inventory tracking, and asset management management) (Lestari, R., and Hertati 2020). Another study by Lilis Puspitawati and Azhar Susanto explained that: Improving the quality of management accounting information, company managers must be able to increase the effectiveness of management accounting information systems. The effectiveness of the management accounting information system can be increased if the implementation of business strategies also increases (Puspitawati & Susanto 2018).

Based on the facts found in the real world, the implementation of the business model in Indonesia is still far from the expected condition. Research by Marketing Research Indonesia (MRI) in 2005 showed a weakening trend in the domestic aviation business market because several airlines were not good at determining market segments and positioning. Another thing that is no less interesting was stated by the President Director of PT. Astra International Tbk, Prijono Sugiarto, in 2015 that Overall, the weakening of product demand during the first quarter was caused by PT. Astra does not diversify its products, which is indicated by the lack of new products being launched.

Another problem is that Indonesia is still far behind in innovation and needs to urgently accelerate strategic innovation (Habibie 2015). Based on these various problems, it can be said that business organizations in Indonesia have not been able to have a good business model, which is characterized by the absence of adequate product innovation, weak market share, and the existence of products that seem monotonous and less varied.

Information systems experts claim that user competence affects an effective accounting information system (Bollen 2006). The user-oriented design philosophy demonstrates the importance of attitudes and approaches to systems development that consciously consider the entire organizational context. Users need to be involved in application design (Bollen 2006). More on this source text is required for additional translation information. Send Side Panel feedback. System users (accountants) will work effectively depending on how they have adequate knowledge of Accounting Information Systems and the technology used to implement accounting information systems (Bodnar 2014). According to Gelinas, the knowledge that system users must possess is knowledge in the fields of computer literacy, information literacy, business fundamentals, systems theory, systems development, and system modeling, while the skills/expertise that must be possessed are communication skills, analytical skills, creativity, and leadership. (Gelinas 2008). Furthermore, according to (Fauzi 2021), the knowledge that must be possessed by competent users in designing accounting information systems is knowledge in terms of accounting principles, auditing, information system technology, and system development methods. Various other facts found in the field include the condition of incompetent human resources within the local government (Hall 2011).

Companies will not succeed in designing new systems or understanding existing systems without understanding the organization's ongoing business activities, because information systems and organizations influence each other with a very complex relationship, influenced by many mediating factors such as organizational structure, business processes, politics, organizational culture, environment and management policies (Laudon 2018). Understanding the flow patterns of responsibility, authority and accountability is important in assessing the information needed by users (Hall 2011). Every manager at various levels and parts of the organization has a different role from one another. Therefore, managing an organization at various levels and sections will require different information. The accounting information system is built to flow information in accordance with the information needed by users at each hierarchical level in their organizational structure to help them make decisions in carrying out their duties (Susanto 2017). Leadership behavior affects the quality of accounting information systems. The low quality of accounting information systems at accredited universities in Java, Indonesia is characterized by an inflexible system, an unreliable system and an unintegrated system caused by leaders who have not fully done what they should have done (Fitrios 2018).

The Indonesian government is still focused on the development of digital technology. This can be seen from the efforts of the President of the Republic of Indonesia, Joko Widodo, who launched a vision to make Indonesia "The Digital Energy of Asia in Silicon Valley" in mid-February 2017. In line with the Ministry of Communication and Informatics, the Informatics Program together with KIBAR, initiated the National 1000 Startup Digital Movement to create quality and positive impact by solving big problems in Indonesia. This movement is targeted to create 1,000 new companies with a total business valuation of USD 10 billion by 2020. According to the Ministry of Communication and Information, the potential of the digital industry in Indonesia cannot be underestimated. There are around 93.4 million internet users and 71 million smartphone users in Indonesia today. This condition is a big capital for Indonesia to develop e-commerce business and implement digital technology. The volume of e-commerce business in Indonesia is estimated at USD 130 billion, with an annual growth rate of around 50 percent. This is in line with what Telekomunikasi Indonesia or Telkom has done again to launch the Digital UKM Village program in Bandung Regency this year. In addition to seeking inspiration in producing goods and marketing products, Wahyuddin said that cellphones can also be used to make sales, withdraw money, and make payments electronically. The Regent of Bandung, Dadang M. Naser accompanied by the Head of the Department of Cooperatives, MSMEs, Industry and Trade, Bandung Regency Popi Hopipah welcomed the SME Digital Village program held by PT Telkom. "This is a

breakthrough for MSMEs in producing or marketing their products. So that MSMEs in Bandung Regency can compete with other entrepreneurs in ASEAN and abroad," he said.

According to Romney and Steinbart, AIS collects, records, stores, processes accounting and other data to produce information for decision makers. The right decision can only be made based on the quality of the information generated by the accounting information system. But in reality, the existing accounting information is not in accordance with the needs of users, so that the resulting information is not of high quality (Romney and Steinbart 2012). System Quality, Information Quality, and Service Quality have increased so that User Satisfaction also increases so that it has an impact on increasing SIPKD Net Benefits at the Sumedang Regency Satker, meaning that the better the system is determined by the quality of the system, the quality of the information produced, and the quality of services provided by the provider application, the greater the satisfaction of system users, with user satisfaction resulting in the benefits obtained from system users (Kuraesin 2021). A good Accounting Information System has a sustainable standard of assurance (Mulyani 2019).

In the study by Sari, it is stated that the low quality of accounting information is indicated by the inaccuracy of the information conveyed to users, and it is also supported by research by Komala (2012) which shows that the quality of accounting information systems affects the quality of accounting information (Sari 2015).

Conclusion

The limitation of this research, the sample used is Small Business which is included in the development of MSME Champion from the West Java DISKUK program and which has implemented digitization in its business processes from various business categories. From these samples were analyzed and the results obtained that the business model has a positive effect on the quality of accounting information systems. MSMEs are digital-based, and their performance will be seen in the context of each MSME. Information technology has a positive effect on the quality of digital MSME accounting information systems. Business models and information technology will affect the quality of accounting information systems and performance in the context of each MSME. If viewed simultaneously business model and company performance is a process of interaction between environmental factors and organizational factors. Environmental factors are used as industrial uncertainty for each MSME, while organizational factors are measured from the process of formulating their business model. Company performance, such as market share growth, gross profit margin, and return on investment. The observed business model is a financial and non-financial based strategy from MSMEs. This research can still be developed by optimizing the capacity of MSMEs in accordance with the needs and investment capabilities of MSMEs in the IT sector, as well as establishing research collaborations with the government for the implementation of facilities for MSMEs.

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Multichannel Retailing in Beauty Product: Understanding Customer Purchase Decisions between Offline Stores, Websites, and Augmented Reality

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Abstract

The multichannel retail environment has gained attention for online retailers by utilizing and deploying different touchpoints, starting from offline stores, websites, and augmented reality (AR). Those different touchpoints offer enjoyment and trigger customer hedonic motivation simultaneously. By utilizing the hedonic motivation and technology acceptance model (TAM) framework, this study provides insightful research on how those three touchpoints differ in customer purchase behavior. Using within-subject research on Sephora multichannel environments, this study tries to compare offline stores, websites, and Sephora Virtual Artist in shaping customer purchase behavior. A survey was conducted on 200 female respondents. This study used partial least squares (PLS) to find that product information and telepresence on AR can positively affect customer purchase decisions. Surprisingly, no significant difference in purchase decisions compared to two other purchase channels, i.e., traditional websites and offline stores. This study highlights that female customer tend to focus more on the products they want to purchase rather than the technology and channel of buying.

Keywords: Augmented Reality, Experience Marketing, Multichannel Retailing, Purchase Decision, Technology Acceptance Model, Virtual Artist

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Introduction

Online retail is increasing worldwide due to internet usage to deliver data, information, goods, and services. However, although internet usage is growing, there are some questions on how to purchase and repurchase decisions during online shopping associated with product characteristics (Saragih and Ramdhany 2012; Singh and Srivastava 2019). As a result, customers may feel uncomfortable buying decisions in online commerce due to a lack of physical interactions that lead to product quality uncertainty (Jiang et al. 2020). Furthermore, customers need to interact with the intact service technology to evaluate the product remotely (Lee et al. 2020).

Advances in technology have created new opportunities and challenges for retailers, such as how it establishes seamless customer experiences (Piotrowicz and Cuthbertson 2014). Online retailers create an omnichannel retail environment where customers can experience seamless shopping experiences and to close the gap between online and offline channels. The multichannel environment online retailers provide creates more flexibility for customers to evaluate the product based on perceived quality and situational benefit. Consequently, a multichannel environment can affect the customer journey and satisfy various needs by utilizing different touchpoints (Santulli 2019; Wagner et al. 2020). Synergies between channels to synchronize customer interaction are required and should appear in different stages starting from pre-transaction, on-sale, and post-transaction.

The multichannel environment creates a different customer experience that might affect purchase decisions due to various technology implementations (Mishra et al. 2021). In addition, some multichannel online retailers have recently used further technology advancements to support offline stores and traditional e-Commerce sites by utilizing websites, Augmented Reality (AR) Virtual Try-On (Han et al. 2018; Kühn and Petzer 2018). The development of multichannel customer touchpoint in e-Commerce started with the web application. Using web applications, customer purchase intention can be fostered by providing an attractive visual appeal and perceived usability of the e-Commerce website (Kühn and Petzer 2018). Based on the report of the beauty retail market by Deloitte (2018), the contribution of e-commerce and digital channels is indeed relatively much lower compared to offline stores. However, it is undeniable that the sales growth is increasing by 70-80% annually and e-commerce trends are heading towards digital tools and advice (Deloitte 2018).

Due to the fast development of technology, retail companies also provide another customer touchpoint with contemporary technology, such as AR. The utilization of AR in online retail is an emerging topic to understand the underlying mechanism of technology used to enhance customer experience. AR is an application-based technology that can integrate virtual information and reality worlds and give customers novel experiences in online shopping (Poushneh and Vasquez-Parraga 2017). In addition, AR can help to boost digital sales and has been applied in different leading industries, such as IKEA, Wayfair, and Sephora (Rauschnabel et al. 2019). AR applications can be utilized to make an immersive customer experience with the increasingly ubiquitous computing in retail. In addition, AR can give customers embedded virtual information in online shopping.

AR can also benefit the interactivity level (Meily et al. 2021) and the amount of online shopping information that customers can get. Nonetheless, AR will consequently affect customer behavior and purchase intentions (Park and Yoo 2020). AR has five elements: sense, feel, think, act, and relate, indirectly impacting customer experience, especially for the makeup product (Schmitt 1999). Therefore, it leads to interactive technology, defined as the market's potential to adjust one's inclination of presence. Furthermore, telepresence allows users to perform operations on a given system by showing the effects in real-time (Kim and Hyun 2016).

Other retail touchpoints, such as websites and offline stores, are less interactive than AR applications. Recently, in the multichannel environment, people interact with those different technologies, increasing the adoption of these touchpoints. Due to the implementation of multi-touchpoint is emerging in the retail industry, how it will affect customer purchase decisions. We identify prior research gaps in understanding these different touchpoints can affect customer purchase decisions. Earlier studies relied on the research on single customer touchpoints. Therefore, this study wants to know how different touchpoints influence customer purchase decisions in retail. Furthermore, we identify a lack of

understanding of how AR can differ from other purchase channels, such as online stores using traditional websites and offline stores (Watson et al. 2018).

This study aims to analyze the use of AR applied to online retail compared to the traditional website and offline stores, particularly in affecting customer purchase decisions. To understand the implementation of multichannel customer touchpoint, we study Sephora online retail. Sephora provides an enormous variety of mainstream and boutique skincare and online beauty retailers with multichannel touchpoints. For Sephora, AR helps the consumer with the "Virtual Artist" feature to apply virtual makeup to the customer's face before purchase. Therefore, this study seeks to understand the effect of multichannel on purchase decisions by answering the following research questions: (1) What antecedents influence customer purchase intention using AR application? (2) How does AR touchpoint affect customer purchase decisions compared to two different channels, i.e., traditional websites and offline stores

The paper is structured as follows. The first section discusses experiential retailing in the experience economy by examining AR usage and AR technology usage. Next, we discuss how hypotheses are developed and followed by the methodology used in this research. The presentation of the research finding is shown in the next section and elaborated deeply in the following section. Lastly, we address the conclusion, study limitation, and theoretical and practical contribution.

Literature Review

Hedonic Motivations across Multichannel Customer Touchpoints

The store environment can affect customer behavior. Customers' motivation occurs when they have the needs, either hedonic or utilitarian (Holbrook and Hirschman 1982). Customers with a higher hedonic reason in their shopping behavior tend to involve multisensory, fantasy, and emotional experiences (Chang et al. 2011). Hedonic motivations are related to fun and enjoyment in the shopping experience (Childers et al. 2001). Consumers with higher hedonic motivation are more willing to involve and engage in the interactive aspect of shopping (Chang et al. 2011) since they tend to seek acceptance and affection during the shopping experience. Therefore, retailers create an environment in the offline store that accentuates some characteristics, such as ambient, design, and social (Chang et al. 2011).

The advancement of information and communication technology (ICT) allows retailers to implement other touchpoints besides offline stores. As a result, retailers adapt and create a multi-touchpoints environment to enhance customer experiences, either offline or online. Furthermore, the online environment can be provided by integrating technology with the current environment, bridging the gap between offline and online environments (Singh and Srivastava 2019). Multi-touchpoint can generate positive cognitive, affective, emotional, social, and physical responses on the customer journey (Wagner et al. 2020). For customers, a sense of authenticity and realism arises when the interaction between customers and touchpoints leads to purchase decisions on products or services. Recently, there has been a challenge to combine and merge offline and online settings and explain how people can naturally engage in information processing, preference formation, and decision making (Semin and Smith 2013). Therefore, it can be realistic and compelling to customers to get an embedded, embodied, and vast experience with the product (Hilken et al. 2018).

As an earlier touchpoint technology, retail websites offer a novel way of shopping. Websites enable convenience, information, customization, and interaction (Ghosh 1998). Customers also can have time efficiency while they do shopping online. Moreover, websites also trigger intrinsic experiential value such as enjoyment and aesthetic experience when customers interact with the websites (Mathwick et al. 2001). This experiential value should be regarded as a hedonic value. The company's message will be delivered without distractions through live, memorable, and experiential campaigns (Watson et al. 2018). Yuan and Wu (2008) defined experiential marketing as a marketing strategy for developing customer recognition and creating a real-life experience that will be remembered after they experience activities and perceived stimulations. Customer experiences will lead the customer to rational, emotional, sensorial, physical, and spiritual (Verhoef et al. 2009). Experiential marketing is a strategy that engages consumers using branded experiences. Sometimes referred to as "live marketing" or "event

marketing experience," the thought is to make a significant yet memorable effect on the consumers (Schmitt 1999).

ICT development has created a new approach and opportunity for retailers to deploy other interactive technologies, such as AR. AR can improve customer shopping behavior efficiency since it can improve the availability of product information (Scholz and Duffy 2018). Therefore, it can enrich the multichannel shopping environment. AR as an emerging technology can create an immersive customer experience in the current technology development by providing a natural application for a situated cognitive perception. AR can help to reduce the gap between online and offline environments through embedded, embodied, and ample experience (Hilken et al. 2018). Therefore, AR as an emerging technology can be seen as a tool to fulfill customer needs in this experience economy, where customers are more concerned with experience (Yuan and Wu 2008). Nevertheless, the company sells products and offers excellent authentic experiences and memories through different touchpoints.

AR provides myriad opportunities to enable multichannel experiences by integrating different elements in the online environment that traditionally have been reserved for in-store experiences. For example, in online retail, the implementation of AR through Virtual Try-On brings customer empowerment to try out products as if they try products in the offline store (Hilken et al. 2018). Furthermore, as an authentic technology, AR can provide customers with an embedded experience by presenting relevant information and closing the offline-online environment gap (Meily et al. 2021). Meanwhile, AR can give embodiment experience by providing a natural interaction and simulation of physical control over virtual offerings. As a result, AR sometimes provides futuristic and beyond customer expectations that cannot appear on offline or traditional websites (Poushneh and Vasquez-Parraga 2017). On the other hand, AR also can provide vast experience by sharing their experience with other customers. For example, customers can give iterative feedback through AR, becoming active contributors through different communication channels (Scholz and Smith 2016).

The deployment of technology such as websites and AR in the retail industry can affect the combined effects of customer experience at multiple touchpoints and customer behavior. Hedonic motivation created from the authentic and pleasurable experience can be crucial for purchasing decisions in various customer channels (Tyrväinen et al. 2020). Consequently, it might improve customer shopping behavior and affect customers' cognitive and affective viewpoints.

Technology Acceptance Model for Multichannel Environment

Customers expect different customer experiences (Juaneda-Ayensa et al. 2016) between channels – offline stores, websites, and AR – depending on their preferences, product category, technology affordances, and shopping time. A multichannel environment lets customers access the information by performing product information searches, comparing products, and even "try before you buy." Therefore, customers can benefit from the experience of the multichannel environment. Technology Acceptance Model (TAM) has been considered a reliable framework for determining the users' behavioral intentions across different technologies (Herrero-Crespo et al. 2022). Users have different motivations for adopting recent technologies, from intrinsic and extrinsic. Prior research found that perceived ease of use and usefulness are relevant predictors for users' behavioral intention toward technology adoption (Davis 1989).

A positive interaction between users and technology can provide a sense of enjoyment and pleasure. As a result, system developers tend to create a system that can be easy to use to speed up the adoption rate of the systems by offering a fun and pleasurable human-system interaction. In addition, customers' shopping behavior has dramatically changed in the multichannel environment, asking for more interactive technology by providing a multisensory experience. A multichannel retail environment can provide better information for prospective customers and help in shaping customer purchase decisions. TAM model postulates the perceived ease of use exerts a positive effect on perceived usefulness (Herrero-Crespo et al. 2022).

Several researchers have conducted studies on retail websites by relying upon TAM as a theoretical framework (Ha and Stoel 2009; Tong 2010). Website developers must provide customers with enjoyment since it can lead to an attitude toward customer e-shopping (Ha and Stoel 2009).

Furthermore, it can also determine the customers' intention to adopt the technology. "Since e-shopping is a retail format innovation and makes use of innovative technology systems and e-shopping behavior (e.g., browsing, transaction, etc.) is a type of consumer usage system, TAM provides a useful foundation for research investigating consumer acceptance of online shopping" (Ha and Stoel 2009). Furthermore, Tong (2010) found that perceived ease of use of online shopping can negatively affect the perceived risks across the two countries in the study.

Meanwhile, TAM is also used for AR applications in the retail industry (Huang and Liao 2015). Using AR applications in the retail sector also affects emotional and behavioral responses (Huang and Liao 2015). However, this relationship is moderated by hedonic motivation. For example, AR can provide enjoyment and playfulness to the simulated shopping environment (Watson et al. 2018). In addition, Javornik (2016) emphasizes that AR provides more hedonic value rather than utilitarian value. Therefore, customers who utilize more hedonic motivation must fulfill their needs of the fun experience, fantasy, and sensory experience. On the other hand, using virtual try-on as one of the AR applications in the clothing and garment online retail can provide an integrative view of its utilitarian value, hedonic value, and risk toward customer purchase decisions across different ages and genders (Zhang et al. 2019).

Although the adoption of AR in the shopping environment can provide a sense of fun, enjoyment, and authentic experience, users are willing to use AR due to perceived ease of use (Yavuz et al. 2021). According to the TAM, perceived ease of use also plays an essential role in adopting the technology. In addition, the quick learning process of the AR application will attract people to use it, and people can feel immersed in the technology (Chiang et al. 2021). Therefore, using AR applications brings fun and enjoyment into the shopping experience. In addition, a similar effect of perceived ease of using retail websites stimulates customer purchase decisions (Chang et al. 2019; Khanna and Wahi 2014).

Hypothesis Development

Product features are significant decision variables used by online retailers to influence customer evaluation of a specific product. Product information can provide the customer with the necessary knowledge (Grandi et al. 2021). In addition, product information leads to customer-perceived informativeness of the product, which can be seen as a subjective evaluation of how much information the product presentation offers. Finally, providing the product information can lead to customer behavioral intentions (Hillenbrand et al. 2020) across a multichannel retail environment, such as the offline store, Sephora website, and Sephora Virtual Artist. Customers can touch, feel, or smell the product's detailed information in the offline environment. As a result, customers can feel more vivid mental images of the product, and more sensory engagement, enabling customers to judge better the quality of the experience's attributes (Yaoyuneyong et al. 2016).

Meanwhile, an online environment cannot offer customers much information about the products. Customers can not touch, feel, and sense the product experience and detailed product information. On the other hand, retailer websites can provide richer product information (Kühn and Petzer 2018). Meanwhile, as a 3D virtual online store, Sephora Virtual Artist is expected to be perceived as the most informative feature in online shopping. Multisensory and vivid experience from AR enables consumers to visually examine specific experience characteristics of the product (Yaoyuneyong et al. 2016). Thus, a similar effect of product information on customer purchase decisions will happen on Sephora websites and Virtual Artist by embedding necessary information on the product display. Therefore, we hypothesize:

Hypothesis 1 (H1): Product information positively affects the product purchase intention

Presence is the experience established in a representational climate via media (Steuer 1992); the individual has sensations of being present in the background (Biocca and Delaney 1995). The virtual experience in the online environment can develop the presence of product presentations in a computer-mediated environment. In addition, the virtual experience of AR can bring telepresence to the customer, which is defined as the sense of being present in a virtual store where one can browse and shop as in a brick and mortar store (Kim and Hyun 2016). Telepresence is affected by the sensory information about

the product quality and quantity of stimulated sensory information. Therefore, customers can interact with the product through telepresence

AR characteristics, such as interactivity and its provision of virtual information, are associated with telepresence, which refers to an environment's mediated perception (Kim and Hyun 2016). With interactivity and 3D presentation, customers can have a series of communication exchanges. Reichheld and Schefter (2000) show that customers tend to increase repetitive usage of functions or services provided by interactivity. Meanwhile, a prior study found that product experience can affect consumers' beliefs and attitudes more intensely, persistently, clearly, and confidently (Fazio and Zanna 1981). In addition, an increase in product purchase intention can be stimulated through product presentations (Jasper and Ouellette 1994) due to the enhancement of being present.

AR can bring a higher level of telepresence (Kim and Hyun 2016). A higher level of telepresence through customer involvement in the product experience is expected to have a similar effect on increasing customer attitudes to purchasing the products. Therefore, we synthesize H2 as follows:

Hypothesis 2 (H2): *Telepresence positively affects the product purchase intention using Sephora Virtual Artist*

Hedonic can be connected with feelings of pleasure (Seo et al. 2017). Holbrook and Hirschman (1982) outlined that the consumption of the experience can be an intrinsically satisfying customer by providing customers pleasure to the senses, fun, feelings, and fantasies. In addition, customer pleasure experiences are related to experiential (hedonic) value (Kim and Forsythe 2008). Telepresence sensations have a commonality in which it is felt when a user is absorbed in an activity or surroundings (Seo et al. 2017). Therefore, customer interactive and subjective experience with the Sephora Virtual Artist through telepresence can result in a fun and pleasurable experience. We hypothesize our third hypothesis as follows:

Hypothesis 3 (H3): *Telepresence positively affects hedonic motivation on Sephora Virtual Artist*

Hedonic motivation requires fun, enjoyment, pleasure, and fantasy (Holbrook and Hirschman 1982). In the offline store, retailers enhance hedonic motivation through store ambient, design, and sociable (Chang et al. 2011). Meanwhile, in the technology-mediated retail environment, such as websites and augmented reality, pleasure and hedonic factors are essential in using new technologies (Venkatesh 2015). Customers with a hedonic motivation in purchasing a product are primarily concerned with hedonic fulfillment such as fun, amusement, fantasy, and sensory stimulation (Watson et al. 2018).

In addition to the positive relationship between hedonic motivation and exploratory information seeking, researchers have found that hedonic consumers are more likely to engage in impulse buying (Arnold and Reynolds 2003). Impulsive consumption refers to unplanned or spontaneous purchases. Impulse buying engages consumers' hedonic or affective values (Rook and Fisher 1995). Hedonic Web consumers might easily surrender to unplanned purchases while shopping online. The Web is not constrained, as are traditional retailers, by opening and closing times, physical locations, or, to a large extent, product availability. Such opportunities may lead to uncontrolled or impulsive purchases (LaRose et al. 2001). Furthermore, we synthesize our hypothesis 4 as follows:

Hypothesis 4 (H4): *Hedonic motivation positively affects the product purchase intention*

Perceived ease of use is defined as how far someone can view the use of a technology system as free of effort (Davis 1989). Perceived ease of use also can be defined as the customers' subjective perception regarding the amount of effort to learn and use a particular website (Ling et al. 2011). Furthermore, technology systems that are considered easy to use can help the user complete a task, increase productivity, and improve the performance and efficiency of that person. Nevertheless, a technological application perceived to be easy to use has a higher chance of being accepted by users (Miladinovic et al. 2018).

Childers et al. (2001) found that a clear and understandable online shopping website that does not require much effort can increase purchase intentions. Meanwhile, emerging technology such as AR is not many adopted by many retailers. We assume that users need to learn this new technology, and technology's ease of use influences the learning process of this technology. Since virtual try-on is also

one of the touchpoints in online retail, it is expected to gain a similar result on perceived ease of use to customer purchase intention. Consequently, perceived ease of use jointly influences behavioral intention (Davis 1989). Therefore, we synthesize our hypothesis as follows:

Hypothesis 5 (H5): *Perceived ease of use positively affects the product purchase intention*

Mortazavi et al. (2014) found that the perceived ease of use can attract more customers, including the potential ones. In addition, perceived ease of use has been outlined as influencing consumers to access the website (Ling et al. 2011). Customers prefer to trust online retail when their websites can be accessed easily. Moreover, perceived ease of use is highly relevant to clients' online shopping experience according to internet applications (Mortazavi et al. 2014). The online shopping experience can lead to perceived enjoyment and pleasure, which is seen as customer hedonic motivation in online shopping (Watson et al. 2018). Meanwhile, AR, as one of the customer touchpoints for online shopping, can provide experiential customer value as a hedonic experience (Kim and Hyun 2016). Therefore, we propose our hypothesis as follows:

Hypothesis 6 (H6): *Perceived ease of use positively affects customer hedonic motivation*

Research Methodology

Population and Sample

We conducted a study by collecting responses from people aged 16-35 years old in Indonesia classified as z-generation and millennials as the primary target market of the service. We choose these two generations that are considered more open-minded to new technology adoption and want different online buying experiences. Furthermore, we limit the respondents only to female respondents since males are more rarely buying and using makeup and cosmetics. These sample criteria are deemed appropriate since they reflect beauty products' target segment. We selected 200 participants for this study. The element of PLS requires the sample size must be at least 100 or 150 because of the sensitivity of the $\chi2$ statistic to sample size and be a good starting point (Gefen et al. 2000).

In this study, the sample used as the research object is the user who has used the three different platforms from Sephora to consider that the samples have different shopping experiences on the three different touchpoints. The participant should experience or try to use Sephora Virtual Artist in-store by installing it on their mobile phone, followed by a traditional website and offline store. This study design aims to let the respondents share their information about their experience and perception of shopping through different Sephora channels. In this study, we used a purposive sampling technique. This technique is used for group selection based on traits or traits of a well-known population.

Data Collection

To collect data using survey methodology, we did an onsite survey in a Sephora offline store to visitors of Paris Van Java shopping mall, Bandung, Indonesia. Data collection period from May – June 2020. Due to the onsite survey approach, we collected a 100 percent response rate from the respondents, with 200 people ranging from 18-35 participating in this study. In addition, we did participant screening procedures which are: (1) participants consent to participate in this survey voluntarily; (2) checked if they only filled in the questionnaire once; (3) participants should be fluent in using English to communicate.

We adopted questions for prior research for different constructs, adjusted a little bit with our research context, and used English. This survey also collected demographic and behavioral data such as respondent domicile, spending per month (in IDR), makeup purchase frequency for the last six months, and makeup product usage time. These are the survey procedures: (1) The participant visit Sephora offline store in Paris Van Java shopping mall; (2) The participant opens and tries the Sephora AR application; (3) The participant answers a questionnaire; (4) The participant experiences or tries the Sephora traditional website; (5) The participant answer questionnaire for the traditional store; (6) The participant answer questionnaire for the offline store.

Data Analysis

As mentioned in the survey procedure section, we employ a within-subjects design in this research. Therefore, the participant should try three different types of Sephora touchpoints and fill out the questionnaire for each touchpoint. We use the exact measurement and construct for each touchpoint from prior literature. However, we adjusted the sentence a little bit to adapt to the context of different touchpoints. Since telepresence only affects AR due to device characteristics (Kim and Hyun 2016), we do not measure telepresence for traditional websites. Therefore, we did not test H2 and H3 for traditional websites and offline stores, as shown in Figure 1. After finishing the data collection, we analyzed the data using PLS-SEM to examine the measurement and structural model and compared the significant result for each touchpoint. Analyzing data using PLS-SEM can help authors understand the underlying relationship between measurement variables.

Furthermore, using PLS-SEM can help authors understand the measurement's reliability and validity. Specifically, Average Variance Extracted (AVE) was conducted with a cut-off value over 0.5, and the assessment of composite reliability was undertaken to measure the internal consistency. Finally, we study the finding and provide a discussion based on the theoretical framework.
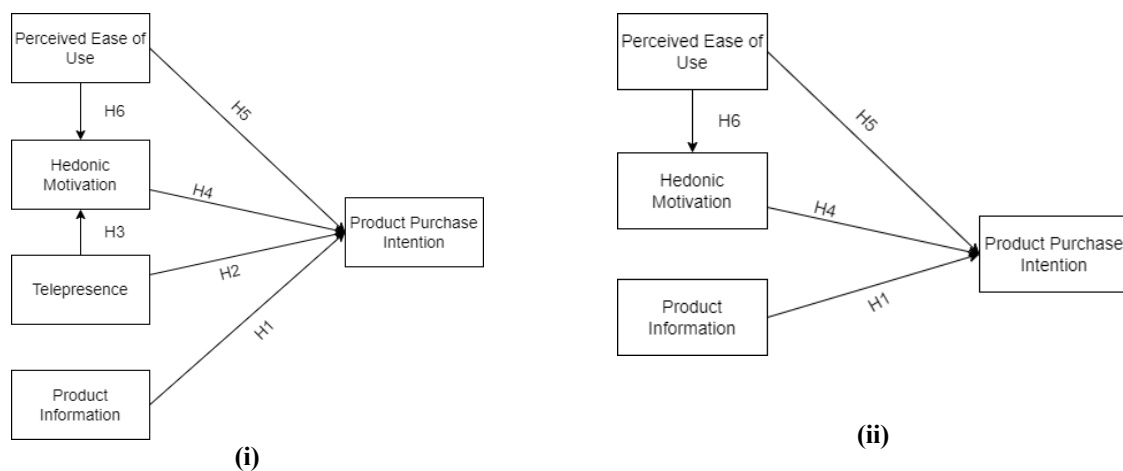
Figure 1. Research Model for (i) Sephora AR application; (ii) Sephora Traditional Website and Offline Stores

Findings

Demographic Data

Table 1 shows our demographic data for this study. The diversity of participant origin regions leads that the buyer of Sephora could represent Indonesian consumers in general. In terms of makeup purchase spending for the last six months, most respondents answered that they spend between IDR 1,000,000 to 2,999,000 with around 54.3 percent with the average purchase frequency between 1-3 times. The respondents also responded that they had already used Sephora for more than one year, ranging from 1 to 3 years, showing that our participants are not first-time buyers of Sephora.

Table 1. Respondent Demographics Data

Variables	Responses	Number of Response	Percentage
Domicile	Bandung	70	35
	Jakarta	69	34.5
	Yogyakarta	20	10
	Surabaya	11	5.5
	Surakarta	7	3.5
	Others	23	11.5
Spending per Month	Less than IDR 1,000,000	43	20.6
	IDR 1.000.000 – 2.999.000	109	54.3
	IDR 3.000.000 – 5.999.000	41	21.6
Makeup Purchase for the last six months	1-3 times	99	49.5
	4-6 times	82	41
	7-9 times	16	8
	More than nine times	3	1.5
Makeup Product Usage Time	Less than one year	17	8.5
	1-3 years	95	47.5
	More than three years	88	44

Descriptive Statistics

The descriptive analysis explained the overall condition result, as shown in Table 2. If the mean variable is higher than 3, the respondents generally agree with the statement. Conversely, if the respondent answers a comment lower than 3, the respondents generally disagree. Table 2 also shows that the respondents have a positive attitude toward the shopping experience in three different channels of Sephora since the mean score is greater than 4.

Measurement Model

Before we conducted the structural model, we employed a measurement model to validate some constructs in this study. We ran reliability and validity for the measurement model. In addition, we also conducted a measurement model for two other tests using the Sephora website and Sephora offline stores. First, reliability measures the underlying factors that have been established as one of the essential prerequisites for construct validity (Mentzer and Kahn 1995). To understand the reliability, Garver and Mentzer (1999) recommended Cronbach's alpha should be greater than 0.70. As shown in Table 3, none of the measurement models has Cronbach's alpha less than 0.70. Therefore, internal consistency was achieved from all constructs.

Discriminant validity refers to the dissimilarity between the targeted and other constructs. Prior studies suggested comparing the square root of average variance extracted (AVE) for any two constructs with the correlation estimates between the two constructs (Fornell and Larcker 1981). As shown in Table 3, each indicator in each variable has an AVE score higher than 0.5 to determine the discriminant validity. Thus, we can see that discriminant validity is achieved through this measurement model.

Next, we calculate the convergent validity to understand the construct validity of the questions and answers from the questionnaire (Siah et al. 2018). As we can see from Table 3 below, all variables are valid since they have an AVE value higher than 0.5. Therefore, the convergent validity of each construct can be measured to ensure that each measurement item can effectively reflect its corresponding constructs. This research shows that convergent validity is established in our model, led by composite reliability higher than 0.7.

Table 2. Descriptive Statistics for each variable

Variables	Indicator	Mean	SD	Min	Max
Hedonic Motivation on Sephora Virtual Artist (HM)	HM1	4.215	0.776	2.00	5.00
	HM2	4.160	0.773	2.00	5.00
	HM3	4.320	0.749	2.00	5.00
Product Information Sephora Traditional Website (PI)	PI1	3.880	0.883	1.00	5.00
	PI2	3.925	0.902	2.00	5.00
	PI3	3.805	0.866	2.00	5.00
	PI4	4.040	0.832	1.00	5.00
	PI5	4.165	0.849	1.00	5.00
Product Information Sephora Offline Stores (PI)	PI1	4.280	0.828	1.00	5.00
	PI2	4.140	0.914	1.00	5.00
	PI3	4.140	0.835	2.00	5.00
	PI4	4.170	0.869	1.00	5.00
	PI5	4.415	0.752	2.00	5.00
Product Purchase Intention Sephora Virtual Artist (PPI)	PPI1	4.145	0.753	2.00	5.00
	PPI2	4.160	0.792	1.00	5.00
	PPI3	4.175	0.847	1.00	5.00
Product Purchase Intention Sephora Traditional Website (PPI)	PPI1	3.950	0.895	1.00	5.00
	PPI2	3.860	0.919	1.00	5.00
	PPI3	3.775	0.915	1.00	5.00
Product Purchase Intention Sephora Offline Store (PPI)	PPI1	4.340	0.823	1.00	5.00
	PPI2	4.385	0.755	2.00	5.00
	PPI3	4.380	0.774	2.00	5.00
Telepresence Sephora Virtual Artist (T)	T1	3.785	0.929	2.00	5.00
	T2	3.625	0.953	1.00	5.00
	T3	3.695	0.993	1.00	5.00

In addition to our measurement model, we conducted a collinearity test. Multicollinearity affects the result of a structural model when there is a high correlation (R>0.80) among the exogenous constructs (Reisinger and Turner 1999). The collinearity test is to verify strong correlations between variables, which can be done by calculating the Variance Inflation Factor (VIF). VIF is counted as "1/Tolerance" with its preferred value of 5 or lower to avoid collinearity problems. As a result of this calculation, we get that all variables' VIF is lower than 5. Therefore, it indicates no collinearity problem in this measurement model.

Table 3: Reliability Measurement for Three Different Cases

Case	Variable	Cronbach's Alpha	Composite Reliability	AVE
Sephora Virtual Artist	Hedonic Motivation	0.969	0.980	0.942
	Perceived Ease of Use	0.925	0.945	0.776
	Product Information	0.962	0.969	0.841
	Product Purchase Intention	0.740	0.884	0.792
	Telepresence	0.933	0.957	0.881
Sephora Website	Hedonic Motivation	0.983	0.989	0.967
	Perceived Ease of Use	0.990	0.992	0.961
	Product Information	0.988	0.990	0.942
	Product Purchase Intention	0.984	0.989	0.969
Sephora Offline Stores	Hedonic Motivation	0.986	0.991	0.973
	Perceived Ease of Use	0.968	0.975	0.886
	Product Information	0.979	0.983	0.905
	Product Purchase Intention	0.964	0.977	0.934

Hypothesis Testing for Sephora Virtual Artist

To answer the hypotheses for Sephora Virtual Artist, we employ the Structural Equation Model (SEM) technique to analyze the structural model. The result of our structural model can be seen in Figure 2. H1 is supported since Product Information (PI) on Sephora Virtual Artist shows a positive relationship with Product Purchase Intention (PPI) ($\beta = 0.519$) and is significant with a confidence interval of 95 percent. Similarly, Telepresence (T) on Sephora Virtual Artist affects PPI positively ($\beta = 0.248$) and is significant with a confidence interval of 95 percent. Furthermore, both Telepresence (T) and Perceived Ease of Use (PEOU) indicate a significant positive impact on Hedonic Motivation (HM) with $\beta = 0.409$ and $\beta = 0.465$, respectively. At the same time, Hedonic Motivation significantly positively affects Product Purchase Intention (PPI) ($\beta = 0.276$), with a confidence interval of 95 percent. However, perceived Ease of Use (PEOU) does not positively influence Product Purchase Intention (PPI). Our study found that H1, H2, H3, H4, and H6 are supported, but H5 is not supported.
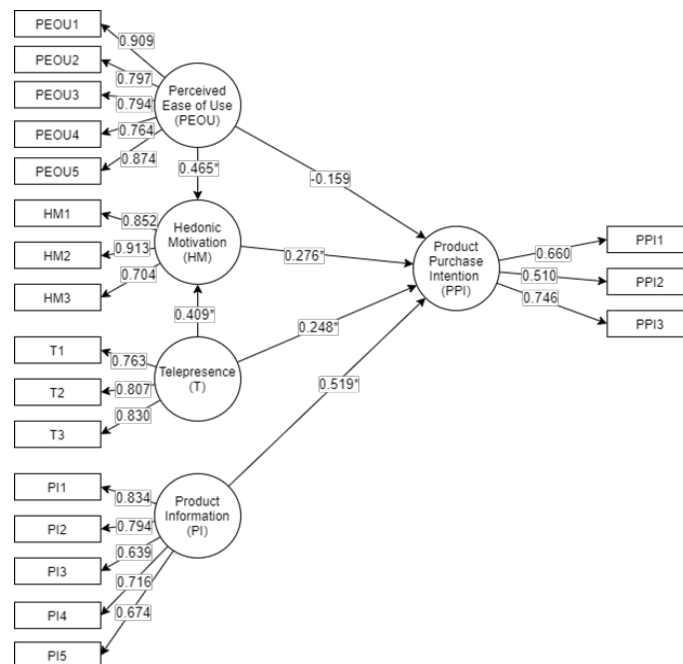

Figure 2. Structural Model of Sephora Virtual Artist

Hypothesis Testing for Sephora traditional websites and offline stores

We conducted the structural model to compare the effect proposed model on two different Sephora Purchase channels (Traditional Websites and Offline stores). After data analysis, we found that product information significantly affects purchase information ($\beta = 0.524$). It also has the same effect on offline stores ($\beta = 0.670$). Therefore, it is supported for H1 on both traditional websites and offline stores. In comparison, hedonic motivation is also found to significantly affect product purchase intention for both touchpoints (Traditional websites $\beta = 0.314$; Offline stores $\beta = 0.464$), and H4 for both touchpoints is supported. However, we found that perceived ease of use does not affect product purchase intention for both touchpoints (traditional websites $\beta = 0.083$; offline stores $\beta = -0.131$) and rejected H5. On the contrary, perceived ease of use significantly affects hedonic motivation for traditional websites ($\beta = 0.750$) or offline stores ($\beta = 0.825$). Consequently, H6 for both touchpoints is supported. The complete summary of our hypothesis testing is shown in Table 4 below.

Table 4: Structural Model for Sephora Virtual Artist (AR), Traditional Websites, and Offline Stores

Case	Variable	Path Coefficient	Result
Sephora Virtual Artist	H1: Product Information → Product Purchase Intention	0.519	Supported
	H2: Telepresence → Product Purchase Intention	0.248	Supported
	H3: Telepresence → Hedonic Motivation	0.409	Supported
	H4: Hedonic Motivation → Product Purchase Intention	0.276	Supported
	H5: Perceived Ease of Use → Product Purchase Intention	-0.159	Rejected
	H6: Perceived Ease of Use → Hedonic Motivation	0.465	Supported
Sephora Website	H1: Product Information → Product Purchase Intention	0.524	Supported
	H4: Hedonic Motivation → Product Purchase Intention	0.314	Supported
	H5: Perceived Ease of Use → Product Purchase Intention	0.083	Rejected
	H6: Perceived Ease of Use → Hedonic Motivation	0.750	Supported
Sephora Offline Stores	H1: Product Information → Product Purchase Intention	0.670	Supported
	H4: Hedonic Motivation → Product Purchase Intention	0.464	Supported
	H5: Perceived Ease of Use → Product Purchase Intention	-0.131	Rejected
	H6: Perceived Ease of Use → Hedonic Motivation	0.825	Supported

Table 5. Bootstrapping Result of the Proposed Model for Three Different Purchase Channels

Case	Structural Path	Path Coefficient	T-statistic	R^2	Q^2
Sephora Virtual Artist	H1: Product Information → Product Purchase Intention	0.519	4.489	0.671	0.235
	H2: Telepresence → Product Purchase Intention	0.248	2.367	0.671	0.235
	H2: Telepresence → Hedonic Motivation	0.409	5.024	0.606	0.378
	H4: Hedonic Motivation → Product Purchase Intention	0.276	2.515	0.671	0.235
	H5: Perceived Ease of Use → Product Purchase Intention	-0.159	0.484	0.671	0.235
	H6: Perceived Ease of Use → Hedonic Motivation	0.465	5.797	0.606	0.378
Sephora Website	H1: Product Information → Product Purchase Intention	0.524	5.328	0.697	0.453
	H4: Hedonic Motivation → Product Purchase Intention	0.314	3.140	0.697	0.453
	H5: Perceived Ease of Use → Product Purchase Intention	0.083	1.614	0.697	0.453
	H6: Perceived Ease of Use → Hedonic Motivation	0.750	13.969	0.563	0.371
Sephora Offline Stores	H1: Product Information → Product Purchase Intention	0.670	5.543	0.881	0.485
	H4: Hedonic Motivation → Product Purchase Intention	0.464	4.468	0.881	0.485
	H5: Perceived Ease of Use → Product Purchase Intention	-0.131	1.008	0.881	0.485
	H6: Perceived Ease of Use → Hedonic Motivation	0.825	15.713	0.881	0.413

To support our analysis, we conducted bootstrapping for our proposed model in three different Sephora purchase channels. Bootstrapping is when subsamples are randomly generated from the original data set to test the hypotheses. According to Wong (2013), to verify the hypothesis, SmartPLS can generate T-statistics for testing the significance of inner and outer models. In bootstrapping many subsamples, estimate the T-value to test structural path significance. The path coefficient will be significant in this bootstrapping test if the t-statistics is higher than 1.96 (two-tailed t-test, confidence interval of 95 percent). We employ 500 subsamples generated automatically. As a result, we found none of the t-statistics of all measurements lower than 1.96. Thus, we can conclude that our hypotheses strongly correlate between two variables. The result of bootstrapping can be found in Table 5.

Discussion

Telepresence Effect on Customer Purchase Decision for Sephora Virtual Artist

In identifying the factors that make customers willing to purchase using Sephora virtual artist app, the finding shows that telepresence builds a firm decision to purchase. Therefore, the telepresence factor significantly impacts the customer purchase decision to use Sephora virtual artist app. Furthermore, using Sephora Virtual Artist can bring customers a higher level of telepresence and better understand the product knowledge and product information. Customers can have experience with objects as two-dimensional images, and they can resemble real objects through telepresence. In addition, Sephora Virtual Artist also enables complex data to interface with the real world. It allows customers to absorb more information than the other two channels: traditional websites and Sephora offline stores.

Sephora virtual artist as an AR channel can give the customers the ability to control the content and form a 3D product presentation. In addition, Sephora virtual artist goes beyond the traditional websites and offline stores by giving customers virtual try-on cosmetics products anywhere for a virtual makeover. By giving customers this kind of experience, customers can be more engaged with online shopping. Prior studies found that telepresence can lead to customer engagement (Algharabat 2018). Customers get a sense of being trans-ported mentally, and they can feel as if they are shopping in the offline context.

Giving customers a novel experience, Sephora Virtual Artist enables behavioral responses to stimuli provided by this application, such as purchase intention. Purchase intention as a measurement for conative customer dimensions is believed to be increased with these stimuli (Algharabat 2018). Customers also get more powerful illusions of trying out the products due to a higher telepresence level, leading to higher purchase intention (Kim and Biocca 1997). As a result, customers have a more authentic experience and more realistic expectations towards a specific makeup product that they want to buy

Purchase Decision over Sephora three different channels

Firstly, product information towards purchase intention concluded that product purchase intention certainly does lead to a positive intent to purchase Sephora makeup products. For makeup, product information was interpreted as the completeness of product information, consisting of product size, color, composition, shape, texture, and fit (Smink et al. 2019). Our finding shows that customers perceive that Sephora provides complete product information on its three channels, leading to customer product purchase intention. Furthermore, as a creative direction to overlay the product information, AR resembles the most direct product experience with its interactive and real-time features rather than shopping through the Sephora website itself. Using Sephora Virtual Artist, customers can indirectly try a particular makeup product based on their preferences.

Secondly, telepresence exhibited a significant positive effect on willingness to purchase. Telepresence is one of the predictors of purchase intention when using AR technology in online shopping. Telepresence means the user can apply makeup directly to their face using the Sephora virtual artist application. According to Santulli (2019), using makeup virtually triggered the user to purchase a particular product because telepresence created an interactive system directly with the customers. Miladinovic et al. (2018) find that telepresence uses AR technology in online shopping to indicate

Purchase Intention. Therefore, this study supports the prior studies and suggests that telepresence positively impacts customer purchase intention. However, telepresence only happens on the Sephora Virtual Artist.

The indicators of telepresence are directly related to hedonic motivation. The result of this study also indicated that Telepresence positively affected hedonic motivation. The AR technology could approximate a real-life try-on experience, making it more fun, feel, and act as stated on telepresence variables. Thus, it affects hedonic motivation, wherein, in this case, Sephora customers are primarily women. Women make purchase decisions more emotionally than men (Plabdaeng 2010). Prior studies also found that customer enjoyment is significantly affected by the ability of AR technology to create a real-life experience (Miladinovic et al. 2018).

Based on the previous result explanation where telepresence affected hedonic motivation, it also shows in this study that in all three Sephora channels, hedonic motivation positively affects product purchase intention. Hedonic motivation is interpreted as the perceived enjoyment and pleasure provided by the shopping experience to consumers. When we enjoy the shopping experience purchasing journey, that experience triggers customer purchase intentions. Whom in the first place had no choice to buy yet, with that fun and enjoyable experience of shopping customers will choose to buy. It is related to Plabdaeng's (2010) findings that women are primarily hedonic shoppers (Plabdaeng 2010). They tend to shop when they create emotional shopping experiences that resonate with them and how they will make them feel. Hedonic motivation is a significant factor in user acceptance of technology.

On the other hand, in this study, perceived ease of use was found to have failed to explain the variations in purchase intention. The same result was found on Sephora's three channels. Thus, customers' shaping decision was not affected by the perceived ease of use. Whenever the customer wanted to purchase a specific Sephora item, how complex or straightforward the application was, the purchase decision remained the same regarding the particular thing they wanted to buy. The participants tend to focus on the item rather than which channel is easier to use in building purchasing decisions.

Lastly, the study found that perceived ease of use positively affects hedonic motivation. Even perceived ease of use did not directly impact the purchase intention. It affects hedonic motivation. Therefore, the more accessible a specific channel (AR, website, and stores), the more enjoyment users would experience. For example, the user feels more relief when the Sephora channel provides a more accessible customer shopping experience. Hence, according to these findings, perceived ease of use indirectly positively affected product purchase intention, but not a direct one

Conclusion

Three Sephora shopping channels show that virtual artist apps positively affect purchase intention, similar to traditional websites and offline stores. However, AR-based virtual apps do not create any difference in women's purchasing intention. AR-based virtual apps affect customer purchase intention merely due to telepresence. With the AR feature offered to customers, they can interactively with certain products. Telepresence provides a combined experience of both offline and online stores. From offline, customers can physically try their makeup, and online customers need to come to stores to shop, do online shopping from where they are, yet feel a similar experience when they shop offline.

The perceived ease of use was found not to significantly drive purchase intention in the three models (AR, traditional websites, and offline stores). Rather than focus on the particular channel of Sephora, the customer probably put their focus on the specific product that they wanted to purchase, despite what channel the customer will buy it. The buying decision remains the same regarding the particular item they intend to buy. Customers prefer to rely on the specific item rather than which platform is easier to navigate to create purchasing decisions. Through the three channels of Sephora, perceived ease of use shows that the AR feature is just another promoting channel for Sephora, apart from offline stores and websites.

The telepresence variable shows a significant predictor of purchase intention. Customers feel enjoyment and engagement when using the AR feature. Customers have a sense of connection with AREM, known as customer engagement, because customers are bound more interactively when using AR. With

telepresence, customers gain AREM, where the makeup product will bind the user because of the sense of enjoyment felt when virtually utilizing the product. Those factors lead to consumer purchase intention dominated by an enjoyment feeling from both telepresence and hedonic motivation, making AR features enjoyable to use.

Theoretical Contribution

Our study contributes to the literature by explicitly examining the impact of AR compared to other sales channels on female purchase intention. The finding is crucial since it is known that there is different technology used behavior between males and females (Windasari and Albashrawi 2020). These differences impact this AR feature, which was found in this research that most women are not as excited about developing new technology in shaping their purchase decisions. Their behavior does not differ across different channels. Women have a thicker corpus callosum, the bridge of nerve tissue that connects the brain's left and right sides. Corpus callosum helps women use both sides of their brains to solve problems quicker (Lin and Windasari 2019). A distinct brain structure contributes to women being more likely to be discovery-oriented shoppers who readily change their initial objectives if this results in a more satisfying outcome. In addition, women tend to be more analytical and consider both personal information, such as customer reviews, and objective information. Women would like to know the reasons and motivate others to purchase the item (Lin and Windasari 2019). Unlike men, women are not influenced by a website's interactivity, and therefore it is shown by our findings that the use of AR does not affect women's purchase behavior. Rather than focusing on the purchase channel, women customers tend to emphasize the products more.

Practical Contribution

Creating digital and cutting-edge channels does not automatically lead to purchase intention. The most important thing is shaping the customer's decision: how interested they are in buying a product. Instead of promoting the new AR technology provided by Sephora, the customer market segment, primarily women, are more interested in purchasing a specific product they want. Consequently, they care less about the channel that they want to buy. It shows that a woman's purchase intention is not influenced by new and sophisticated technology. Moreover, the customer purchase in the cosmetic industry for women was more affected by word of mouth, beauty vloggers, and family and friends' recommendations rather than the AR technology. Thus, Sephora virtual artists could be promoted as a new trend in shopping rather than merely as an alternative buying channel.

Limitation and Future Work

The first limitation is that Sephora is a makeup product wherein women still dominate Indonesia. Thus, because Sephora is gender-centric, not gender-neutral, Sephora's virtual artists were skewed to women. Future research suggests examining the effects of gender because it is already identical to women in makeup, so it is more for companies that use gender-neutral AR features such as retail or household furniture. In that study, we sought whether the effect would be the same or not across industries. We also acknowledge some variables to be added for future research, especially for individual measurements, such as technology readiness and AR media characteristics.

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Comparison of User Experience between Goal-directed and Experiential Users on Customer Satisfaction in Tourism Marketplace

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Abstract

This research aimed to examine the effect of user experience on Pigijo's website www.pigijo.com on Pigijo customer satisfaction by using an experimental study and comparing between two different groups of user behavior, namely goal-directed and experiential. The experiment was conducted using an accidental purposive sampling technique on 60 respondents divided into two groups based on user behavior. The data collection of this experiment used a questionnaire that had been tested for validity and reliability, then carried out various tests and analyses such as descriptive analysis, t-test, and regression tests. As a result of the research. It was found that the user experience on the www.pigijo.com website has a positive relationship and influence on Pigijo customer satisfaction, where the goal-directed group has a higher average rating (69.40%) and affects customer satisfaction more positively compared to the experiential group (65.50%).

Introduction

The internet has had a significant impact on business since the mid-1990s (Xiang et al. 2015). In Indonesia, the total number of internet users as of January 2022 reached 202.7 million, an increase of 29.3 million (+17%) since 2020 (Hootsuite 2022). The increase in the use of the internet or the World Wide Web (www) has also dramatically affected business behavior in various industries (Pradana 2015). The travel and tourism sector was one of the first industries affected by the internet. The emergence can be seen in airlines that offer tickets directly to consumers via the web and travel agencies that reach out to tourists worldwide using technology, especially mobile applications and web technologies (Camilleri 2017). Currently, travel services not only support transactions between tour operators in the travel industry. However, the website also provides online travel services that help

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tourists find and organize trips, especially making accommodation reservations, transportation, tour packages, and tour guides (Guttentag et al. 2017). This innovation has driven the emergence of online platforms that allow more interaction between tourists and providers of tourism products/services, better known as the marketplace. According to Ariandi (2022), the marketplace is an intermediary between sellers and buyers in the virtual world; the marketplace acts as a third party of the transaction that provides two needs, namely the place of sale and payment. This travel intermediary or marketplace has become a recognized force in the tourism industry and objective in embracing the internet for promotion and marketing.

From a demand perspective, the number of tourists who use the internet to search for information and make online reservations provides clear evidence of the marketplace's popularity among tourists (Fernández-Cavia et al. 2014). As a result, consumers now have greater access to information, prices, superb choice, and overall convenience (Jiang et al. 2013). That is why marketers need to influence the users' minds and hearts (Išoraitė 2018). In order to be relevant, differentiating, and thus ultimately successful, digital products and services also need to connect with their users on an emotional level. Such approach can leverage the users' experience on online social platforms (Photiadis and Papa 2022). Users not only have experience when using them, but the services around the website and the entire product system also affect the user experiences (Sand et al. 2020). Today, a good user experience is the goal of most product and service businesses, targeted at consumers. Kaasinen et al. (2015) define user experience (UX) as the perception, or way users feel about using a product, service, or work system, and how this shapes the organization's image as a professional. The goal of a good user experience (UX) is to design an interface that is useful, easy to use and to align user goals with business goals. A good user experience will likely result in users returning to the service and recommending it, increasing website traffic (CareerFoundry 2022).

To achieve a complete understanding of user experience interactions, studying pragmatic and hedonic qualities also plays a prominent role. Pragmatic quality is defined as the extent to which a system enables the effective and efficient achievement of goals and is closely related to the idea of usability. Hedonic quality is how a system allows stimulation with its challenging and new character or identification by communicating critical personal values (Følstad and Brandtzaeg 2020). It indicates that the user will choose the appropriate source based on the user's goals. Therefore, the system needs to provide different benefits depending on whether the search is goal-directed or experiential (Shin et al. 2019). The search results for the desired information determine which website elements are considered satisfactory and beneficial by tourists. According to Hill and Brierley (2017), customer satisfaction measures an organization's "total product" performance in meeting a series of customer needs/desires. Satisfaction itself is the level of pleasure or disappointment of customers arising from comparing the product's perceived performance (or result) against their expectations (Chaffey and Ellis-Chadwick 2016). If the performance fails to meet expectations, the customer will be dissatisfied. On the other hand, customers will be satisfied if the performance matches expectations. Moreover, if the performance exceeds expectations, the customer will be very satisfied or happy.

Considering that customer satisfaction is not an absolute concept but is relative or depends on what customers expect, customer satisfaction can be achieved by providing a good user experience (Wiwesa 2021). User experience (UX) is an essential factor of a quality website. It is responsible for a sustainable strategic advantage for the business, especially new businesses that launch new products similar to competitors' products in the same industry/market. One of the new businesses in this field is Pigijo. Pigijo is an Indonesian tourism-based startup engaged in the marketplace, which in 2018 launched the website www.pigijo.com as a channel for marketing activities to reach consumers (Pigijo 2020). This research is a modification of previous research by Badran and Al-Haddad (2018) and Hutabarat and Harsono (2014), which also discussed the influence of user experience on customer satisfaction. Previous research recommends that future research examine the experiences of different subjects so that the study results can be generalized. This research contributes by measuring the influence of user experience based on user behavior in terms of pragmatic quality (goal-directed) and hedonic quality (experiential). Besides that, according to the information technology department of Pigijo, they recently updated their website interface and appearance where only internal employees performed the user acceptance test (UAT), not the general public. So, it becomes the paramount urgency of researchers to

contribute to expanding previous research by choosing travel industry websites, especially PT. Tourindo Guide Indonesia or Pigijo. This research is expected to show the importance of appearance and design of a website in generating perceptions of customer satisfaction, in order to increase company associations.

Literature Review

Literature review illustrates our structure of research variables. The model was also developed to test the hypotheses between the effect of user experience on customer satisfaction and how the results compare between goal-directed and experiential users. Details of the literature review and hypotheses are provided in the following sections.

User Experience (UX)

User experience (UX) is the perception and response of users as a reaction to using a product, system, or service. User experience is not about how the inside of a product or service works but how the product or service works from the outside when the user is interacting with the product or service. (Park et al. 2013). Online marketers can influence the decision-making process of virtual customers by creating and delivering appropriate online experiences, web experiences: a combination of online functions, information, emotions, cues, stimuli, and products/services, or in other words, combining various elements that are complex compared to traditional marketing (Mosescu et al. 2019). Factors that affect user experience can be subjective and objective.

The subjective factors in user experience can be divided based on the user's online search behavior, namely goal-directed and experiential (Ozkara et al. 2016). Goal-directed search behavior is driven by profits and benefits, which involve external motives for using the internet as a source of problem-solving. Experiential or non-directed search behavior is driven by hedonic benefits and involves internal motives. In other words, users use the internet for entertainment, pleasure, and emotional satisfaction (Pöyry et al. 2013). Han (2021) revealed that describing the difference between goal-directed and experiential user behavior is very important in an online or worldwide web environment to study consumer behavior issues such as involvement, search, decision making, consumer benefit, and motivation.

The objective factors in user experience are divided into two: pragmatic quality, which means the product's ability to provide user needs and goals (usability); and hedonic quality, which means the product's ability to provide user needs that are not related to tasks/goals (identification and stimulation abilities) (Hassan and Galal-Edeen 2017). Based on research from Hinderks et al. (2019), user experience is divided into two, namely Perceived Value Aesthetic (PVA) to measure hedonic quality and Interface Quality Scale (IQS) to measure pragmatic quality. Extended the previous findings from Al-Shamaileh (2013) and Hinderks et al. (2019), the seven dimensions tested in this study are classical expressive, expressive aesthetics, perceived usability, and service quality (collected by the PVA scale), and then usability, pleasure, and content (collected by the IQS scale).

The International Standards Organization (ISO) (2019), defines usability in the ISO norm FDIS 9241-210 as 'the extent to which a system, product or service can be used by a particular user to achieve a specific goal effectively, efficiency and satisfaction/control in a particular context of use'. Gupta et al. (2014) extend the definition of ISO 9241-11 by adding attributes of ease of learning and safety in usability. Then, the quality of the content is measured using The Bernier Instructional Design Scale (BIDS) which serves as a standard or blueprint for the quality of instructional design. The quality of the content in this study includes the level of content detail, the amount of content, the relevance of the content, and the quality of the content (Beaunoyer et al. 2017).

The indicators discussing pleasure were developed by Al-Shamaileh (2013) and have been tested in his previous research. Such indicators consist of pleasure in interacting with the site, pleasantness to look at, preferred features, and positive feelings for the site. The perceived usability factor is measured by four indicators, namely comfort when used, ease when used, easy orientation, and easy navigation (Prastawa et al. 2019). Based on the researches by Al-Shamaileh (2013) and Hinderks et al. (2019),

classical aesthetics refers to traditional aesthetic ideas that emphasize orderly and clear design. The attributes that include classical aesthetics are such as "fun", "clear", "clean", "symmetrical" and "aesthetic design". Meanwhile, expressive aesthetics is characterized by qualities that capture the user's perception of the creativity and originality of the site design. The relevant attributes in this dimension are "creative", "interesting", "original", "advanced design", and "use of special effects". And in the last dimension, namely service quality, the five main dimensions of service quality are reliability, responsiveness, assurance, empathy, and real (Yousapronpaiboon 2014).

Customer Satisfaction

Customer satisfaction is a positive feeling that arises from the customer's experience when using a product or service and conformity to expectations by comparing the performance of the product or service with the customer's expectations (Hill and Brierley 2017). Customer satisfaction is one of the strategies in the company's competition to get customers by maximizing customer satisfaction with the products offered by the company. According to Chaffey and Ellis-Chadwick (2016), companies must prioritize the preparation of customer privileges. By doing so, customers will deliver higher customer satisfaction, higher repeat purchases, and ultimately higher profits for the company. Not a few satisfied customers will recommend the service to other customers. According to Hawkins and Lonney quoted in Tjiptono (2019), attributes forming customer satisfaction or important indicators consist of: (1) conformity with expectations, (2) interest in revisiting, (3) willingness to recommend, (4) overall satisfaction.

Based on the concepts that have been mentioned, the research model used in this study can be described as follows (Figure 1):

Goal-directed users:
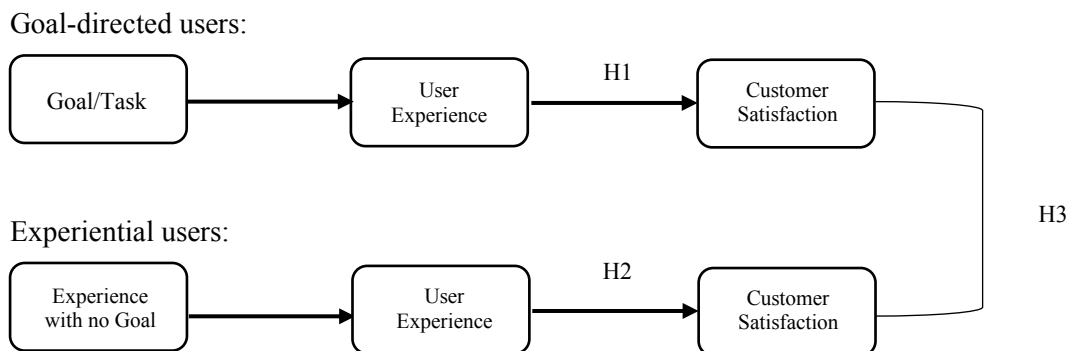

Experiential users:

Figure 1. Research model

H1: There is an influence of user experience on customer satisfaction in experimental group 1 (goal-directed)
H2: There is an influence of user experience on customer satisfaction in experimental group 2 (experiential)
H3: There are differences in user experience between experimental group 1 (goal-directed) and experimental group 2 (experiential)

Methodology

The type of research used in observing, collecting information, and presenting the analysis results in this research is quantitative research with an experimental study approach. Quantitative research is used to test specific theories by examining the relationship between hypothesized variables or, in this case, to see the influence between user experience variables based on user behavior and customer variables (Enny 2016). According to Sekaran and Bougie (2016), an experimental study is an experiment to test

the effect of the independent variable with a particular treatment on the dependent variable as a result/output under controlled conditions. In this study, the experimental design used was a true experimental design, with a post-test-only control design type. Post-test only control design was used to see the difference between the treated and untreated groups (Sugiyono 2020).

Data sources in this study are primary data and secondary data (Sugiyono 2020). Primary data was obtained directly from the respondents by conducting experiments in which the respondents would be given treatment and divided into 2 groups (goal-directed and experiential). Researchers obtained secondary data for this study through articles, websites, and journals. The sampling technique used is non-probability sampling with accidental and purposive sampling techniques. This study takes samples that are met by chance (accidental) and meet certain specific (purposive) to be used as samples (Etikan 2016). Specifically for experimental and comparative research, Alwi (2015) stated that a sample of 15-30 respondents per group is required. Therefore, the total number of respondents in this study was 60 respondents, with a grouping of 30 respondents for each experimental group. The criteria for this research sample have been adjusted and are considered representative of the population (Pigijo's target market): (1) Male and female, aged 21-40 years old (2) Have known Pigijo before (3) Have never visited www.pigijo.com, so it can be seen how the user experience affects users who visit the site for the first time.

The data collection technique uses a questionnaire that applies the measurement technique of the Likert scale of four interval scales, where the most extensive scale on each question was 4 and the lowest scale was 1 (please see Table 1). The modification of the Likert scale is intended to eliminate weaknesses in the five-level scale namely: (1) the category has a double meaning, usually interpreted as not being able to decide or give an answer or hesitate. (2) the purpose of the four-level category is mainly to look at the tendency of the respondent's opinion, towards agreeing or towards disagreeing (Wahyudi and Ratna Sari, 2019).

Table 1. Likert Measurement Interval Scale Modification

Scale	Score
Strongly agree	4
Agree	3
Disagree	2
Strongly disagree	1

In this experimental study, the researchers use a closed-ended questionnaire that provides respondents with a limited set of alternative answers (Sreejesh et al. 2014). Each experimental group will receive 2 (two) types of questionnaires: a user experience questionnaire and a customer satisfaction questionnaire. All components of the questions and measurements were the same for both groups. Experimental group 1 (goal-directed) is oriented towards achieving the goals when using the website. The treatment given is the experience of finding precise information when interacting on the site. Experimental group 2 (experiential) is oriented to the experience gained when using the website. No special treatment is given other than experience with the site without a goal.

Reliability testing in this study using the Alpha Cronbach test was conducted for instruments that had more than 1 correct answer (Adamson and Prion 2013). The standard alpha value used is 0.7, so if the value obtained is below 0.7, it can be said that the measuring instrument (indicator) made is not reliable. The validity test will be measured using the Pearson Product Moment correlation test. The usefulness of the Pearson Product Moment test or correlation analysis is to find the relationship of free variables (X) with bound variables (Y), i.e. between user experience and customer satisfaction. After the data is collected, the data will be processed with the help of SPSS software to conduct descriptive analysis, t-tests, and regression tests to see how much influence user experience variables have on customer satisfaction.

Results

This research was carried out in various regions in the Badung area, Bali for 7 (seven) days in May 2022. Researchers managed to gather 60 people to be respondents in this study. The selection of this location is aimed at limiting the wide scope of research, so as to provide optimal results. At the same time, to make it easier for researchers to collect data.

The collection of respondents was adjusted to the characteristics of a predetermined sample. As previously stated, treatment is distinguished based on the orientation of website users, namely goal-directed and experiential on the website of www.pigijo.com. The research tool / instrument used for data measurement is a questionnaire filled out by the research subject. The experiment begins with interacting with the website, followed by filling out a user experience questionnaire, and ends with filling out a customer satisfaction questionnaire.

Respondent Characteristics

To find out the background of respondents, an analysis of respondent characteristic data was carried out which can be input to clarify the research data, including gender, and age. The study's respondents totaled 60 respondents classified by gender and age (please see Table 2). As many as 33 respondents are female (55%), and as many as 27 respondents are men. Therefore, it can be concluded that most respondents in this study are female (55%). Most of the respondents were 21-22 years old, as many as 43 people (71.67%). There are no respondents under 21 years or above 40 years. It is considered following with the characteristics of the sample to be measured because Pigijo's primary target market ranges from 21 to 40 years.

Table 2. Respondent Characteristics

Characteristics		Frequency	Percentage
Gender	Female	33	55%
	Male	27	45%
Age	21-22	43	71.67%
	23-24	8	13.33%
	25-26	6	10%
	27-28	3	5%

Reliability Test and Validity Test

Reliability Test

The reliability test was carried out by looking at the Cronbach's alpha value of each indicator in the instrument. The user experience variable consists of 7 dimensions, with 31 indicators. Cronbach's alpha values were obtained, ranging from 0.967 to 0.969. The customer satisfaction variable consists of 4 indicators with Cronbach's alpha values obtained from 0.967 to 0.968 (please see Table 3). An alpha value above 0.7 indicates that the overall indicator for the two variables are declared reliable.

Validity Test

The validity test carried out in this study was the Pearson Product Moment correlation test, which was used to find the relationship between the independent variable (X) and the dependent variable (Y). The correlation coefficient value used is between $-1 < 0 < 1$. If $r = -1$ perfect negative correlation, the significance level of the influence of variable X on variable Y is fragile. If $r = 1$ perfect positive correlation, the significance level of the influence of variable X on variable Y is robust. From the validity test results above, the Pearson correlation value is close to 1, so it can be concluded that there

is a positive relationship between indicators and variables. The higher the indicator value, the higher the dimension value.

Table 3. Reliability Test and Validity Test

Dimension	Sub-dimension	Cronbach's Alpha	Pearson Correlation
Usability	Security	0.969	0.661**
	Ease of learning	0.968	0.913**
	Effectiveness	0.968	0.783**
	Efficiency	0.968	0.898**
	Control	0.969	0.816**
Content	Content detail	0.968	0.841**
	Amount of content	0.968	0.830**
	Relevance	0.968	0.798**
	Quality of content	0.968	0.838**
Pleasure	Feelings	0.967	0.936**
	Views	0.967	0.911**
	Features	0.967	0.882**
	Positive feelings	0.967	0.895**
Perceived Usability	Site comfort	0.968	0.718**
	Ease of orientation	0.968	0.950**
	Ease of use	0.969	0.907**
	Ease of navigation	0.969	0.916**
Classical Aesthetics	Aesthetic design	0.967	0.920**
	Pleasant design	0.967	0.917**
	Clean design	0.968	0.904**
	Symmetrical	0.968	0.882**
Expressive Aesthetics	Creativity	0.967	0.942**
	Fascinating	0.968	0.925**
	Originality	0.968	0.871**
	Use of special effects	0.968	0.875**
	Sophisticated design	0.968	0.906**
Service Quality	Reliability	0.968	0.907**
	Responsiveness	0.968	0.907**
	Assurance	0.968	0.823**
	Empathy	0.969	0.775**
	Tangible	0.968	0.718**
Satisfaction	Conformity with expectations	0.968	0.863**
	Interest in revisiting	0.967	0.877**
	Willingness to recommend	0.968	0.912**
	Overall satisfaction	0.968	0.910**

Descriptive Analysis

Descriptive analysis used in this study is used to get a descriptive picture of how user experience and customer satisfaction will be formed. Based on Figure 2, it can be seen that there are 5 (five) dimensions of user experience in experimental group 1 (goal-directed) which are higher than in experimental group 2 (experiential), except for the dimensions of content and pleasure. It shows that the dimensions that make up the user experience on the Pigijo website are considered more positive in the group with goal-directed behavior than the experiential behavior group.

When viewed per dimension, in the usability dimension, the average value of the experimental group 1 (goal-directed) is higher than the experimental group 2 (experiential), which is 3.302 versus 3.12. Based on this, it can be said that the ease of use usability on the Pigijo website is captured slightly better by goal-oriented users (goal-directed) than by experience-oriented users (experiential). On the other hand, in the content dimension, the average assessment of respondents in the experimental group 1 (goal-directed) was lower than that of experimental group 2 (experiential), which was 3.137 versus 3.14. Based on this, it can be concluded that the content on the Pigijo website is rated slightly better by experience-oriented users than by goal-directed users.

In the pleasure dimension, the average value of respondents in experimental group 1 (goal-directed) was lower than that of experimental group 2 (experiential), which was 3.257 versus 3.305. Based on this, it can be concluded that the pleasure while on the Pigijo site is captured slightly better by experience-oriented users than by goal-directed users. In the classical aesthetics dimension, the average assessment of respondents in experimental group 1 (goal-directed) was higher than in experimental group 2 (experiential), which was 3,195 versus 3.17. Based on this, it can be concluded that the overall classic aesthetic on the Pigijo website is rated slightly better by goal-directed users than by experience-oriented users.

In the expressive aesthetics dimension, the average value of the 1 (goal-directed) experimental group was higher than the experimental group 2 (experiential), which was 3.07 versus 3.05. Based on this, it can be concluded that the overall expressive aesthetic on the Pigijo website is rated slightly better by goal-directed users than by experience-oriented users. Furthermore, in the service quality dimension, the average assessment of respondents in experimental group 1 (goal-directed) was higher than in experimental group 2 (experiential), which was 3.05 compared to 2,904. Based on this, it can be concluded that the quality of service on the Pigijo website is captured slightly better by goal-oriented users than by experience-oriented users.

Based on the average answers from both experimental groups to each dimension, it can be concluded that in addition to the dimensions of content and pleasure, other dimensions that measure user experience on the www.pigijo.com site are rated more positively by goal-directed users than by experiential users.
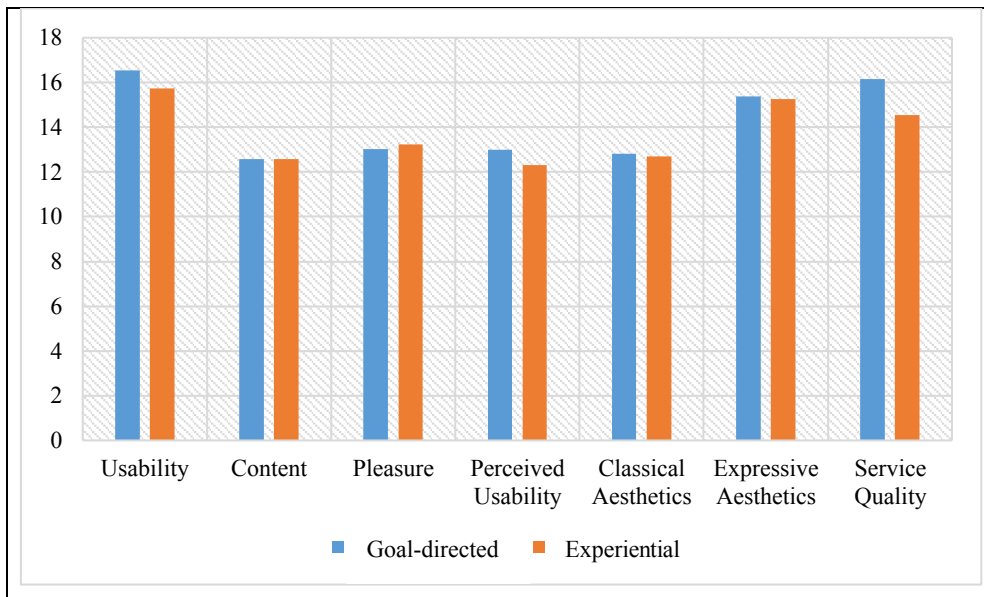
Figure 2. Comparison of the average value of the user experience dimensions

In Figure 3, it can be seen that the average rating (mean) of respondents in experimental group 1 (goal-directed) is higher than experimental group 2 (experiential). Furthermore, based on the results of descriptive analysis tests on customer satisfaction, the average value of variable customer satisfaction in the experimental group 1 (goal-directed) was higher than the experimental group 2 (experiential), which was 3.19 versus 3.165. Thus, it can be concluded that customer satisfaction (customer satisfaction) captured by the experimental group 1 (goal-directed) after getting a user experience with the site has a more positive assessment from respondents than the assessment by the experimental group 2 (experiential).
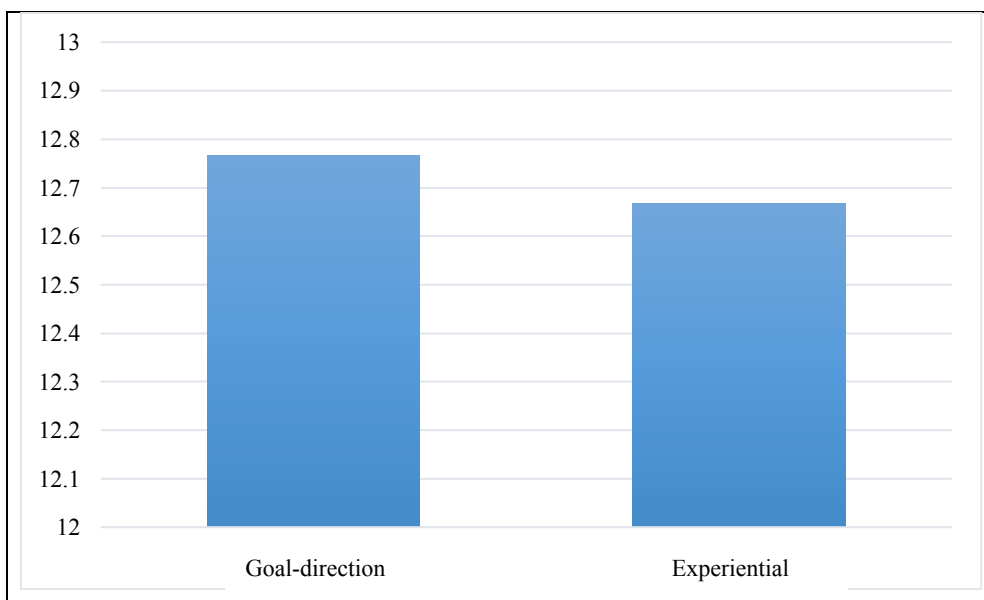

Figure 3. Comparison of the average value of customer satisfaction variable

T-test

Next, the researchers tried to see whether there was a difference in the respondents' assessment of customer satisfaction between the experimental group 1 and the experimental group 2 through the Independent Samples T-Test. Before conducting the independent sample t-test, the researchers first determined the variance through the F test to check whether the two variances of customer satisfaction

(experimental group 1) and customer satisfaction (experimental group 2) were the same or different. If both variances are assumed to be the same, then in the t-test, the test must use equal variance assumed, and if the variance is not the same, then the test t must use equal variance not assumed. The two variances are considered equal if the probability or significance is above 0.05 (p > 0.05), while if the probability or significance is below 0.05 (p < 0.05), the variance is assumed to be different (Santoso 2019).

Based on Table 4, it can be seen that the F test value is 0.391 with a significance of 0.534 (p=0.534 >0.05), so both variances are assumed to be the same so that the t-test can use equal variance assumed. Therefore, the value of t with equal variance assumed is 0.516. The positive t value was obtained because the value of customer satisfaction in the experimental group 1 (GD) was higher, namely 12.77, than the experimental group 2 (EXP), which was 12.67. The significance value of 0.877, which is above 0.05 (p=0.877 > 0.05), indicates that there is no significant difference in perceptions of customer satisfaction in experimental group 1 (GD) and experimental group 2 (EXP). Therefore, it indicates that each group has no different perceptions of customer satisfaction.

The results of this analysis are different from the theory presented by Lee (2016) which states that experiential and goal-directed behaviors measure different extrinsic and intrinsic aspects while on the web, because they are shown to have no different assessment results, where goal-directed groups and experiential groups both have a positive assessment of the experiences felt on www.pigijo.com sites.

Table 4. Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | | | | | | | | 95% Confidence Interval of the Difference | |
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Customer Satisfaction	Equal variances assumed	.391	.534	.156	58	.877	.100	.642	-1.184	1.384
	Equal variances not assumed			.156	58.000	.877	.100	.642	-1.184	1.384

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Customer	Goal Directed	30	12.77	2.487	.454
Satisfaction	Experiential	30	12.67	2.482	.453

Regression Test

Based on the calculation results, it was found that the R-value formed between user experience and customer satisfaction in the goal-directed group was 0.833. This figure shows a strong correlation between the two variables and has a positive direction of relationship, so it can be said that the higher the user's assessment of user experience (independent variable) on the website, the higher the assessment of customer satisfaction (dependent variable), and vice versa. The relationship between user experience and perceptions of customer satisfaction also indicates that user experience influences the formation of customer satisfaction. The value of the R square obtained in experimental group 1 (Goal-directed) is 0.694. It means that 69.40% of the satisfaction, revisit intention, willingness to recommend, and conformity of expectations towards the Pigijo website felt by the respondents in the goal-directed group, is the result of an assessment of usability, aesthetics, content, and service quality (user experience variable) formed on this tourism marketplace website or www.pigijo.com in this matter. This figure is classified as high because other factors influencing customer satisfaction are 30.60%.

Meanwhile, in experimental group 2 (Experiential), the R-value formed between user experience and customer satisfaction in this group is 0.809 with an R square of 0.655 (please see Table 5). From these data, it can be seen that in the experiential group, the correlation between user experience and perceptions of customer satisfaction is quite significant, with a positive relationship direction. It means that the higher the user's assessment of user experience (dependent variable) on the website, the higher the assessment of customer satisfaction (dependent variable) will be, and vice versa. From the value of R square, it can be concluded that 65.50% of the satisfaction, revisit intention, willingness to recommend, and conformity of expectations towards the Pigijo website felt by the respondents in the experimental group 2 (experiential), is the result of an assessment of the user experience variable of this tourism marketplace or www.pigijo.com. This number is significant because it exceeds 50%, and only 34.50% of others are forming factors by other variables not examined in this study.

Table 5. Coefficient of determination test results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Goal-directed	0.833[a]	0.694	0.597	1.579
Experiential	0.809[a]	0.655	0.545	1.675

a. Predictors: (Constant), Service Quality, Expressive Aesthetics, Usability, Perceived Usability, Content, Pleasure, Classical Aesthetics

Discussion

From the results of the study, there are several study implications both theoretically and practically, as follows:

Theoretical implications

1. User experience elements consisting of two measurements and six dimensions of usability, content, pleasure, perceived usability, classic aesthetics, and expressive aesthetics as carried out in research by Al-Shamaileh (2013), is proven to be able to measure user experience on websites.
2. The elaboration of differences in user behavior in the computer-mediated online environment as stated by Han (2021) can be proven that the involvement, search, decision-making, consumer benefits, and motivations that a person is looking for affect his assessment of user experience.

Practical implications

1. The results of this research have implications for Pigijo or PT Tourindo Guide Indonesia that with the appearance and design of the Pigijo website, it has succeeded in causing a positive influence on Pigijo's customer satisfaction, and increasing Pigijo's association, both in the revisit intention, willingness to recommend, and conformity of expectations. However, the results showed that the assessment of expressive aesthetics and service quality on the website was rated slightly lower by respondents compared to other dimensions, although this did not affect the overall user experience.
2. In addition, for Pigijo or PT. Tourindo Guide Indonesia, it is also known that the Pigijo website is less supportive for experiential user characters when compared to goal-directed users. This is what results in experiential users' assessment of the website tends to be lower than goal-directed users in most aspects.

Identification and classification of user experience elements can be used as a benchmark for analyzing the results of virtual interactions carried out by marketers in cyberspace. This classification can help marketing practitioners to be able to recognize and understand more deeply about the nature and potential of tools in online marketing and branding. This research shows that user experience is related to and affects customer satisfaction, so that a positive user experience can form positive customer

satisfaction as well. This also proves the statement from <u>Wiwesa's (2021)</u> research that says that customer satisfaction can be achieved by providing a good user experience (<u>Wiwesa 2021</u>).

This research shows that user experience is formed more positively in goal-directed users, while experiential users tend to experience a lower user experience and form a lower customer satisfaction with Pigijo. Www.pigijo.com website is designed with simplicity and informative style, and tend to be less than optimal in terms of interactivity and design aesthetics. So this is what causes the level of user experience and customer satisfaction to be higher in the goal-directed group than the experiential group who enjoy websites without a specific purpose more. However, based on this research, it is known that www.pigijo.com still provide a positive user experience to its users and affect customer satisfaction in a more positive direction. Therefore, overall it can be said that the user experience provided by the Pigijo website is relatively good, although it still has room to improve.

Conclusion

After testing, analyzing, and interpreting the research data, conclusions can be drawn to answer the research problem formulation as follows: (1) Respondents in experimental group 1 (goal-directed) have a higher assessment of user experience than respondents in experimental group 2 (experiential) (2) Respondents in experimental group 1 (goal-directed) have a higher assessment of customer satisfaction than respondents in experimental group 2 (experiential) (3) There is no difference in customer satisfaction in the experimental group 1 (goal-directed), and the experimental group 2 (experiential) (4) The independent variable (user experience) on the www.pigijo.com site has an influence of 69.40% on the dependent variable (customer satisfaction) formed on respondents in the experimental group 1 (goal-directed). (5) The independent variable (user experience) on the www.pigijo.com site has an influence of 65.50% on the dependent variable (customer satisfaction) formed on respondents in the experimental group 2 (experiential).

The limitation of this study is that the reason for the respondent choosing the answer cannot be explored further because this study only uses a closed-ended question form, so it cannot be known why the respondent chose a particular answer. For further research, the researchers recommend developing this research and reviewing user experience in a more diverse context of website objects in order to be able to generalize more about types of sites and also with different subjects. It is hoped that the relationship between user experience and customer satisfaction can be generalized to a broader and general context. The researchers also suggest that those who would conduct similar studies involve a more significant number of respondents and more homogeneous characteristics.

Acknowledgements

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