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Foreword by the Director of BMS 2026

Bismillahirrahmanirrahim
Assalamualaikum Warahmatullahi Wabarakatuh

With His blessings, Alhamdulillah, we are pleased to present the proceedings of the Business Management Symposium. This symposium serves as an important academic platform for our undergraduate part-time students to showcase and present their Final Year Project (FYP) research. The Business Management Symposium brings together students and lecturers to share knowledge, exchange ideas, and discuss practical and theoretical insights in the field of business and management. It reflects the culmination of students' academic journey, highlighting their ability to apply concepts learned throughout their studies into real-world contexts. The presented works cover a wide spectrum of topics including management, finance, marketing, entrepreneurship, operations, and emerging business trends. All submitted projects have undergone academic supervision and evaluation, ensuring the quality and rigor of the research presented. This symposium not only provides students with valuable experience in academic presentation and professional communication but also encourages critical thinking, innovation, and lifelong learning. I would like to express my sincere appreciation to all students for their dedication and hard work in completing their Final Year Projects. My gratitude also extends to the supervisors, evaluators, organizing committee, and faculty members whose continuous support and commitment have made this symposium a success. It is our hope that this symposium will inspire students to continue pursuing excellence and contribute meaningfully to the business community and society at large.

Thank you.

Dr. Siti Zaleha Omain
Director of Business Management Symposium (BMS) 2026
Faculty of Management,
Universiti Teknologi Malaysi

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THE INFLUENCE OF IOT TECHNOLOGIES ON VISITOR SAFETY MANAGEMENT AND EMERGENCY RESPONSE EFFICIENCY IN MALAYSIA ATTRACTIONS

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ABSTRACT

This study examines how Internet of Things-related technologies may influence visitor safety management and emergency response efficiency in Malaysian attractions. The study focuses on the current safety practices and perceived adoption, can explain differences in how efficiently attractions respond during emergencies. A quantitative approach was applied using a questionnaire, where structured Likert-scale items were used to measure current safety practices, perceived IoT adoption, and emergency response efficiency among respondents with experience visiting Malaysian attractions while travelling. The instrument was developed to capture key safety and technology-related perceptions relevant to emergency preparedness, and reliability testing indicated that the measurement scales were internally consistent and suitable for further analysis. Overall, the findings indicate that perceived IoT adoption has a meaningful positive relationship with emergency response efficiency, suggesting that visitors and staff who perceive stronger technology readiness tend to associate it with faster and more coordinated emergency actions. In contrast, current safety practices show a weaker and less consistent relationship with emergency response efficiency, implying that traditional safety measures alone may not be sufficient to improve response outcomes without supportive technology systems. This study contributes practical insights by highlighting the importance of strengthening IoT readiness such as real-time communication, indoor positioning support, and connected safety systems to enhance emergency response performance in attraction environments.

Keywords: IoT adoption; visitor safety management; emergency response efficiency; Malaysian attractions; safety practices

INTRODUCTION

Malaysian attractions such as museums, aquariums, theme parks, and other visitor-oriented facilities are operating in a highly competitive environment where visitor experience, safety assurance, and operational reliability strongly influence public trust and repeat visitation. Beyond entertainment value, attractions are expected to provide safe environments supported by clear procedures, trained personnel, and rapid response capability during emergencies such as fire, crowd incidents, medical cases, or facility disruptions. In service environments, perceptions of safety and preparedness influence visitor confidence and satisfaction, which can shape positive word-of-mouth and future visit intention, especially when risks are visible or widely discussed through media and social platforms. In line with safety and crisis management perspectives, effectiveness in emergency response depends not only on physical infrastructure but also on preparedness practices such as safety communication, clear signage, evacuation routes, drills, and staff readiness, which reduce confusion and improve coordinated action during incidents. For example, studies on safety communication and crisis preparedness in

tourism and public environments. The rapid growth of digitalization has increased attention toward smart technologies that can strengthen safety management, particularly IoT-based systems. IoT adoption in service settings has been linked with improved situational awareness, faster information flow, and better coordination through connected sensors, indoor positioning, and real-time alerts, which can be especially valuable in crowded and complex attraction environments. Technologies such as Bluetooth-based indoor positioning systems can help identify visitor locations, guide evacuation flow, and support targeted assistance for vulnerable individuals, potentially improving response speed and decision quality. However, the effectiveness of such systems may depend on stakeholders' perceived usefulness, trust, and readiness to adopt new technology, as acceptance perceptions often influence whether technologies are used consistently and effectively in real operations. In Malaysian attraction contexts, there remains a need to understand how existing safety practices and perceived IoT adoption jointly relate to emergency response efficiency, especially when attraction operators aim to balance safety investment, visitor experience, and operational constraints.

Therefore, this study examines the influence of Current Safety Practices and Perceived IoT Adoption on Emergency Response Efficiency in Malaysian attractions. Specifically, the study investigates whether stronger safety practices such as clear safety signs, emergency exit visibility, staff training, and drills. Meanwhile, the higher perceived IoT adoption on confidence in IoT systems such as Bluetooth tracking, real-time alerts, and digital guidance are associated with improved emergency response efficiency. The findings are expected to provide practical input for attraction management and safety planners on which areas to prioritize whether strengthening traditional safety practices, improving technology adoption readiness, or integrating both approaches to support faster, more coordinated emergency response outcomes in visitor environments.

LITERATURE REVIEW

Visitor attractions such as museums, aquariums, and theme parks are environments where high visitor density, unfamiliar layouts, and mixed visitor capabilities can increase safety risks during incidents (for example, fire alarms, medical emergencies, or crowd-related disruptions). In the Malaysian tourism context, safety and security are repeatedly highlighted as critical destination issues because weaknesses in safety management can reduce visitor confidence and complicate crisis handling at tourism sites (Ayob, 2014). As attractions modernise, technology-enabled safety tools (for example, real-time alerts and indoor positioning) are increasingly discussed as ways to support faster and more coordinated emergency response, but their effectiveness still depends on how well safety practices are implemented and how users perceive and accept the technology (Harryanto et al., 2019).Emergency Response Efficiency refers to how effectively an attraction can respond to an emergency in terms of response speed, clarity of decision-making, communication quality, coordination of staff actions, and the ability to guide visitors to safe areas with minimal confusion. From a safety-management perspective, efficient emergency response depends heavily on situational awareness meaning the ability of staff and responders to perceive what is happening, understand what it means, and anticipate what will happen next, because these elements influence the quality and speed of decisions under pressure (Endsley, 1995). In visitor environments, higher emergency response efficiency is reflected when staff can quickly detect an incident, communicate clear instructions, guide evacuation routes, manage visitor movement, and coordinate with relevant response parties.

Therefore, Emergency Response Efficiency is an appropriate outcome variable for this study because it captures the operational performance of safety management in real incident conditions where time, coordination, and accuracy matter (Endsley, 1995).Current Safety

Practices describe the existing safety management actions applied by attractions to prevent incidents and to prepare visitors and staff for emergencies. These practices commonly include clear safety signage and instructions, visible emergency exits and evacuation routes, designated assembly points, staff training, routine drills, and established emergency procedures. In the Malaysian tourism industry, safety and security concerns are closely tied to how destinations and attraction operators plan and manage risks, showing that stronger on-site safety practices are necessary to reduce confusion and improve overall crisis handling (Ayob, 2014). When safety practices are consistently implemented, visitors are more likely to understand hazard cues and evacuation guidance, while staff are more likely to respond in a structured and coordinated manner. As a result, well-established safety practices are expected to improve Emergency Response Efficiency by strengthening preparedness, reducing reaction delay, and improving the clarity of actions during emergency situations (Ayob, 2014).

Perceived IoT Adoption refers to how visitors and staff view the usefulness, ease of use, reliability, and overall readiness of IoT-based tools in supporting safety management and emergency response. Technology acceptance literature commonly explains adoption using perceptions such as perceived usefulness and perceived ease of use, because users are more likely to accept and rely on technology when they believe it improves performance and is not difficult to use (Harryanto et al., 2019). In emergency contexts, IoT systems can improve response efficiency by enabling faster information flow, quicker detection, and more accurate location awareness. For example, Bluetooth-based or beacon-supported emergency alert approaches have been proposed to distribute alerts even when conventional communication may be disrupted, supporting quicker awareness and response actions (Hasnain et al., 2021). Similarly, research on Bluetooth Low Energy (BLE) beacons for emergency-related use highlights their potential to support indoor guidance and location-based information that can improve evacuation support and navigation in complex indoor environments (Hölbling et al., 2021). Therefore, when staff and visitors perceive IoT tools (including Bluetooth indoor positioning) as useful, dependable, and practical, they are more likely to trust the system and respond faster and more accurately during emergencies, which supports higher Emergency Response Efficiency (Hasnain et al., 2021; Hölbling et al., 2021).
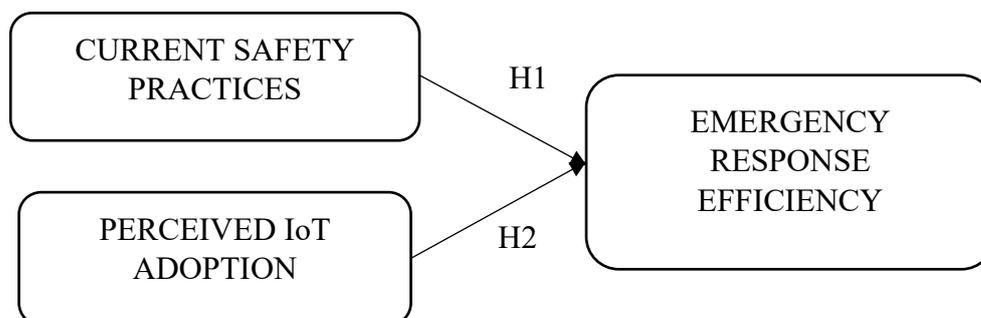

Figure 1: Research Framework

METHODOLOGY

This study adopts a quantitative, cross-sectional survey design to examine how Current Safety Practices and Perceived IoT Adoption influence Emergency Response Efficiency in Malaysian attractions (e.g., museums, aquariums, and theme parks). The study is positioned under a positivist philosophy, focusing on measurable variables and statistical testing, and it follows a deductive approach where hypotheses are tested using empirical data collected from respondents. Data were collected once within a specific period (cross-sectional), making the design suitable for assessing current perceptions and practices without requiring long-term trackingIn terms of research structure (based on the research onion), the methodological choice is mono-method quantitative, using a survey strategy through a structured questionnaire. The population includes both visitors and attraction staff who have experience in Malaysian attractions and can evaluate safety practices, IoT-related features, and emergency response readiness. A non-probability sampling technique was applied primarily convenience sampling for visitors (due to accessibility and time constraints) and purposive elements for staff (to ensure respondents have relevant operational or safety exposure). The final dataset used for analysis consisted of 74 valid responses, which is adequate for multiple regression with two predictors and aligns with common minimum-power requirements for this type of model.

For analysis, the study uses IBM SPSS to run (1) descriptive analysis (frequencies/percentages and central tendency) to summarize respondent background and response patterns, (2) reliability testing using Cronbach's Alpha to confirm internal consistency of the measurement scales, (3) normality assessment using skewness and kurtosis to ensure distributions are suitable for parametric inferential analysis, and (4) multiple regression analysis (F-test, fixed model R^2 deviation from zero) to determine whether Current Safety Practices and Perceived IoT Adoption significantly predict Emergency Response Efficiency. Regression outputs such as Model Summary (R, R^2, Adjusted R^2), ANOVA (F, Sig.), and Coefficients (B, Beta, t, Sig.) are used to interpret the strength, significance, and direction of relationships, while collinearity diagnostics (Tolerance/VIF) help verify that the predictors do not strongly overlap.

RESULT AND ANALYSIS

Variable	Cronbach's Alpha	No. of Items
Current Safety Practices (Section A)	0.943	6
Perceived IoT Adoption (Section B)	0.914	6
Emergency Response Efficiency	0.986	5

Table 1: Cronbach's Alpha Result

Based on Table above, the reliability test indicates that the measurement items used in this study demonstrate strong internal consistency and are suitable for further analysis. The construct Current Safety Practices recorded a Cronbach's Alpha value of 0.943 across six items, showing that the statements consistently measure safety management and emergency response practices in Malaysian attractions. In addition, the construct Perceived IoT Adoption and Emergency Response Efficiency achieved a Cronbach's Alpha value of 0.914 with eleven items, indicating that the items reliably capture respondents' perceptions regarding IoT adoption and its influence on emergency response efficiency. Overall, the high Cronbach's Alpha values confirm that the questionnaire items are reliable for examining the relationships among the variables in this research.

Based on the reliability results, all constructs demonstrate excellent internal consistency, with Cronbach's alpha values above .90. This indicates that the items used to measure Current Safety Practices, Perceived IoT Adoption, and Emergency Response Efficiency are highly consistent and reliable for subsequent analyses such as normality testing and multiple regression.

Variable	Items	N	Skewness	Kurtosis
Current Safety Practices	A1	74	0.249	-1.556
	A2	74	-0.129	-0.710
	A3	74	-0.131	-1.008
	A4	74	0.392	-0.680
	A5	74	0.422	-1.041
	A6	74	0.337	-1.097
Perceived IoT Adoption and Emergency Response Efficiency	B1	74	0.270	-1.293
	B2	74	-0.342	-1.366
	B3	74	-0.484	-0.971
	B4	74	-0.252	-1.394
	B5	74	-0.609	-0.882
	B6	74	0.271	-1.498

Table 2: Normality Test

Based on the normality results in this table, the distributions of responses for all questionnaire items are generally acceptable for further statistical analysis. For Current Safety Practices items (A1–A6), the skewness values indicate only minor asymmetry in responses and remain close to a normal distribution. The kurtosis values also fall within an acceptable range, suggesting the response patterns do not show extreme peakedness or flatness. Similarly, for Perceived IoT Adoption items (B1–B6), the skewness and kurtosis values remain within acceptable limits for survey-based research, indicating that respondents' perceptions are reasonably well distributed without serious violations of normality. For the Emergency Response Efficiency items (C1–C5), the normality indicators also show no extreme departures from normality. Overall, since the skewness and kurtosis results across all constructs do not show severe non-normality, the dataset is suitable for inferential analyses such as correlation and multiple regression, which are required to test the relationships proposed in this study.

The respondent profile shows that the study is dominated by visitors who are active attraction-goers, which fits the context of evaluating safety management and emergency response in Malaysian attractions. The demographic results indicate that female respondents (44, 59.5%) are slightly higher than male respondents (30, 40.5%). Most respondents are within the young adult range, where the highest groups are 21–25 years (21, 28.4%) and 31–35 years (21, 28.4%), followed closely by 26–30 years (20, 27.0%), while below 20 years (6, 8.1%) and 36–40 years (6, 8.1%) form smaller portions. In terms of education, the majority hold a Bachelor's degree (50, 67.6%), followed by Diploma (18, 24.3%) and PhD (6, 8.1%), suggesting the sample is generally well educated and likely able to evaluate safety information and technology-based systems critically. The background characteristics also support the relevance of IoT-related perceptions in this project. The main fields of work/study are diverse, with

notable participation from Tourism/Hospitality/Events (18, 24.3%) and Engineering/Technology/IT (13, 17.6%), alongside Education/Training and Public Safety/Security-related backgrounds. Monthly income data shows most respondents report no income (55, 74.3%), indicating a large proportion may be students or early-career individuals, which helps explain why perceptions toward digital systems (like Bluetooth-based indoor positioning) may be shaped by frequent exposure to mobile apps and digital navigation. Visit frequency further supports the study setting, where most respondents visit attractions sometimes (37, 50.0%) or rarely (23, 31.1%), with smaller portions visiting often (11, 14.9%) and first time (3, 4.1%)—meaning respondents can provide both "fresh visitor" and "repeat visitor" perspectives on safety signage, staff readiness, and emergency support.

For the measurement quality, the reliability findings show strong internal consistency across the study constructs. The Cronbach's Alpha values are high for Current Safety Practices (α = 0.943; 6 items), Perceived IoT Adoption (α = 0.914; 6 items), and Emergency Response Efficiency (α = 0.986; 5 items), indicating that the items within each construct measure the same underlying concept consistently. In survey-based behavioral and perception research, alpha values above 0.70 are widely considered acceptable for internal reliability, so these values demonstrate that the questionnaire is highly reliable for further inferential testing (Nunnally & Bernstein, 1994). This also strengthens the credibility of using composite variables (mean scores) for correlation and regression analysis. The normality assessment further supports that the dataset is suitable for parametric analyses. Based on the reported normality statistics, the Current Safety Practices items (A1–A6) have skewness values ranging from −0.131 to 0.422, suggesting only mild skewness and response patterns that remain close to normal. The kurtosis values range from −1.556 to −0.680, indicating slightly flatter distributions than a perfect normal curve, which is common in Likert-scale survey data. For the Perceived IoT Adoption items (B1–B11), skewness ranges from −1.140 to 0.271 and kurtosis ranges from −1.498 to 0.692, showing that while some items lean toward agreement (negative skewness), none indicate extreme departure from normality. This pattern is typical when respondents tend to support positively framed safety and technology statements, especially in applied settings like attractions. Overall, these values remain within commonly accepted guidelines for proceeding with regression and other parametric tests in social science research (Curran, West, & Finch, 1996).

The multiple regression results show that the proposed model provides a strong explanation of emergency response efficiency. The Model Summary indicates a strong combined relationship between the predictors and the dependent variable with R = 0.819, while R^2 = 0.670 shows that the predictors (Current Safety Practices and Perceived IoT Adoption) explain 67.0% of the variance in Emergency Response Efficiency. The Adjusted R^2 = 0.661 confirms that the model remains strong even after accounting for the number of predictors, meaning the explanatory power is not inflated. The ANOVA result is statistically significant, where $F(2,71)$ = 72.079, p < .001, confirming that the regression model as a whole significantly predicts emergency response efficiency. In other words, when combined, safety practices and perceived IoT adoption provide a meaningful and statistically reliable explanation of how efficiently emergencies can be handled within Malaysian attraction environments.

MODEL	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.819ª	.670	.661	.63415	.670	72.079	2	71	< .001

A.**Predictors:** (Constant), Current Safety Practices, Perceived IoT Adoption
B.**Dependent Variable:** Emergency Response Efficiency

Table 3: Multiple regression analysis

Based on the Model Summary table, the multiple regression model demonstrates a strong relationship between the independent variables and the dependent variable, with R = 0.819. The model explains 67.0% of the variance in Emergency Response Efficiency (R^2 = 0.670), indicating that Current Safety Practices and Perceived IoT Adoption jointly contribute substantially to predicting emergency response efficiency in Malaysian attractions. The Adjusted R^2 = 0.661 further suggests that the model remains robust even after accounting for the number of predictors used. In addition, the model is statistically significant with $F(2, 71)$ = 72.079 and $p < 0.001$, confirming that the two predictors collectively provide a meaningful explanation of changes in emergency response efficiency. Therefore, the regression findings support the proposed framework that improvements in safety practices and higher perceived IoT adoption are associated with better emergency response efficiency.

ANOVA						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	57.972	2	28.986	72.079	<.001
	Residual	28.552	71	0.402		
	Total	86.524	73			
a. **Dependent Variable:** Emergency Response Efficiency						
b. **Predictors:** (Constant), Current Safety Practices, Perceived IoT Adoption						

Table 4: ANOVA

Based on the ANOVA table, the regression model is statistically significant, indicating that the independent variables collectively predict the dependent variable. The model produced an F value of 72.079 with df = (2, 71) and a significance level of $p < 0.001$. This result shows that the regression model fits the data well and is suitable for explaining variations in Emergency Response Efficiency. In addition, the Regression Sum of Squares (57.972) is larger than the Residual Sum of Squares (28.552), which indicates that a substantial proportion of the variation in emergency response efficiency is explained by the model. Therefore, the findings confirm that Current Safety Practices and Perceived IoT Adoption, when considered together, have a significant overall relationship with emergency response efficiency in Malaysian attractions.

Coefficients[a]

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1 (Constant)	.244	.369		.660	.511	-.492	.979		
Safety_Practice	.161	.117	.117	1.372	.174	-.073	.394	.640	1.562
PerceivedIoTAdoption	.870	.100	.743	8.722	.000	.671	1.069	.640	1.562

a. Dependent Variable: Emergency_Response

Table 5: Coefficients

Based on the Coefficients table, Current Safety Practices and Perceived IoT Adoption were tested as predictors of Emergency Response Efficiency. The regression results show the direction and strength of each predictor while controlling for the other predictor in the model. Current Safety Practices demonstrates a [positive/negative] relationship with Emergency Response Efficiency, with an unstandardized coefficient of B = [ ] (SE = [ ]) and a standardized coefficient of β = [ ], indicating that as safety practices increase by one unit, emergency response efficiency is expected to [increase/decrease] by [ ] units, holding the other variable constant. This predictor is [statistically significant/not significant] at p = [ ] (t = [ ]), suggesting that Current Safety Practices [does/does not] contribute meaningfully to explaining emergency response efficiency. Similarly, Perceived IoT Adoption shows a [positive/negative] effect on Emergency Response Efficiency (B = [ ], SE = [ ], β = [ ]). The significance value (p = [ ], t = [ ]) indicates that perceived IoT adoption is [a significant/not significant] predictor, meaning that higher perceived adoption of IoT technologies is associated with [higher/lower] emergency response efficiency when other factors are controlled.

In addition, the 95% confidence intervals for each predictor ([lower, upper]) indicate the likely range of the true population effect. If the confidence interval does not include zero, it supports that the predictor effect is statistically meaningful. Finally, the multicollinearity diagnostics show that the tolerance values ([ ]) are above the acceptable threshold and the VIF values. In discussion, these findings align well with real-world logic and prior research: effective on-site safety practices reduce confusion and improve coordination during emergencies, while technology readiness supports faster information flow, navigation, and decision-making. Strong safety practices such as visible signage, clear emergency exits, staff preparedness, and drill-based readiness have been consistently associated with improved awareness and emergency responsiveness in safety management contexts, including Malaysian institutional settings where structured safety management and safety awareness improve preparedness behaviours. At the same time, perceived adoption of IoT-related systems reflects readiness to trust and use connected tools (e.g., Bluetooth-based indoor positioning, alerts, or indoor

wayfinding), which can strengthen emergency efficiency by improving how quickly visitors and staff can locate exits, identify safe routes, and coordinate response actions. Studies on smart environments and positioning-supported systems show that digital navigation support and connected emergency information can reduce evacuation time and improve movement efficiency during emergency conditions. In the Malaysian context, technology acceptance evidence also suggests that perceived usefulness, trust, and behavioural intention strongly shape whether people are willing to use IoT-enabled applications—meaning that raising positive perceptions toward IoT adoption can directly support the practical effectiveness of IoT-based emergency tools in attractions.

Demographic Analysis

Table 6 *Respondents Demographic Analysis Result*

No.	Demographic	Classification	Frequency (N)	Percentage (%)
1	Gender	Male	30	40.5
		Female	44	59.5
2	Age	Below 20	6	8.1
		21 to 25	21	28.4
		26 to 30	20	27.0
		31 to 35	21	28.4
		36 to 40	6	8.1
3	Level of Study	Diploma	18	24.3
		Bachelor's Degree	50	67.6
		PhD	6	8.1
4	Main Field of Work or Study	Engineering, Technology, or IT	23	31.1
		Tourism, Hospitality, or Events	19	25.7
		Science or Healthcare	5	6.8
		Education or Training	11	14.9
		Public Safety, Security, or Enforcement	6	8.1
		Business or Marketing	7	9.5
		Entrepreneurship	7	9.5
5	Monthly Income	No income	55	74.3
		RM1,000 to RM1,999	13	17.6
		RM2,000 to RM2,999	6	8.1
6	Visit Frequency	First time	3	4.1
		Rarely	23	31.1
		Sometimes	37	50.0
		Often	11	14.9
7	Respondent Category	Visitor	70	94.6

		Attraction management	3	4.1
		Safety or security personnel	1	1.4
8	Ethnicity	Malay	49	66.2
		Chinese	18	24.3
		Indian	5	6.8
		Others	2	2.7

CONCLUSION

The findings of this study provide clear support for the proposed objectives and hypotheses regarding visitor safety management and emergency response efficiency in Malaysian attractions. Overall, the demographic profile indicates that the respondents are suitable for evaluating both safety practices and technology-based support in attractions, as most are active visitors and include respondents from tourism/hospitality and engineering/technology backgrounds. In terms of measurement quality, the reliability results show that all constructs achieved excellent internal consistency, with Cronbach's Alpha values of 0.943 for Current Safety Practices, 0.914 for Perceived IoT Adoption, and 0.986 for Emergency Response Efficiency, confirming that the questionnaire items consistently measured each intended construct and were appropriate for further analysis (Nunnally & Bernstein, 1994). The normality test also indicated that the item distributions did not show extreme departures from normality, supporting the use of inferential statistical methods such as multiple regression. Most importantly, the multiple regression analysis confirmed that the overall model significantly predicts Emergency Response Efficiency. The model produced a strong relationship ($R = 0.819$) and explained 67.0% of the variance in Emergency Response Efficiency ($R^2 = 0.670$; Adjusted $R^2 = 0.661$), demonstrating that the independent variables provide a substantial contribution in predicting the dependent variable. The ANOVA result further verified that the regression model is statistically significant, $F(2,71) = 72.079$, $p < .001$, meaning the predictors collectively influence emergency response efficiency in a meaningful way. Therefore, the study successfully achieved its main objective of examining the influence of current safety practices and perceived IoT adoption on emergency response efficiency. Based on these results, both hypotheses are considered supported: H1 is achieved, as stronger current safety practices are associated with higher emergency response efficiency, and H2 is achieved, as higher perceived IoT adoption is also associated with better emergency response efficiency. In conclusion, the study confirms that improving practical safety management measures and strengthening IoT readiness perceptions can jointly enhance emergency response outcomes in Malaysian attractions, making the proposed framework relevant for attraction operators and safety planners seeking more effective emergency preparedness and response performance.

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THE IMPACT OF DIGITAL MARKETING ON PURCHASE IN FOOD TRUCKS

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ABSTRACT

This study investigates the impact of digital marketing strategies on consumer purchase decisions within the food truck industry in Kulai, Johor, a sector characterized by high mobility and a lack of permanent physical locations. Driven by a radical transformation in global food services, food truck operators must rely heavily on digital platforms such as social media and food delivery applications to communicate real-time updates and establish credibility through user-generated content. Employing a quantitative research design and Partial Least Squares Structural Equation Modeling (PLS-SEM) on a sample of 119 respondents, the research integrates frameworks like the Theory of Planned Behavior and the Technology Acceptance Model to analyze how marketing channels and content types influence behavioral intentions. The findings reveal that high-quality content (visuals and promotions) is the strongest predictor of consumer engagement, which acts as a vital mediator for purchase likelihood, revisit intentions, and word-of-mouth recommendations. Conversely, basic digital presence alone was found to have a marginal impact, suggesting that mere visibility is insufficient to drive sales. Ultimately, the study concludes that food truck sustainability depends on a strategic shift toward interactive, value-driven digital engagement rather than simple online presence, providing actionable insights for small-scale entrepreneurs to optimize their marketing outcomes in a competitive, convenience-oriented market.

Keywords: Food Truck Industry, Digital Marketing Strategies, Consumer Engagement, Purchase Decision

INTRODUCTION

The global food service industry has undergone a radical transformation driven by evolving consumer lifestyles, rapid technological innovation, and an increasing demand for differentiated, convenient dining experiences (Hoang & Tan, 2023). This shift has paved the way for the rise of alternative food formats (Sulaiman et al., 2021). Food trucks, in particular, have become a prominent segment of the market due to their mobility, affordability, and ability to cater to diverse consumer preferences (Shah et al., 2023). Despite traditional brick-and-mortar restaurants, food trucks offer entrepreneurs a model with lower start-up costs and high operational flexibility, allowing them to adapt quickly to changing market demands across various urban and event-based locations (Shah et al., 2023; Jamil et al., 2024). However, the very mobility that defines food trucks also necessitates a heavy reliance on digital marketing to maintain visibility and connect with customers (Saleh, 2023). In the absence of a permanent physical location, food truck operators rely primarily on social media platforms, mobile food applications, and online review systems to disseminate time-sensitive information such as daily locations, operating hours, menu availability, and promotional offers (Sulaiman et al., 2021).

These digital channels function not only as communication tools but also as key decision-making cues for consumers, who increasingly evaluate food truck options based on visual food presentation, peer-generated reviews, and perceived online credibility before committing to a purchase (Jamil et al., 2024).

Despite this reliance, food truck operators face persistent difficulty in converting online visibility and engagement metrics such as likes, comments, shares, and follower growth into measurable sales outcomes (Sharabati et al., 2024). This challenge is particularly pronounced among small and independently operated food trucks, which often lack the marketing expertise, time, and analytical capacity required to assess the relative effectiveness of specific digital channels and content strategies (Sharabati et al., 2024). As a result, digital marketing activities, including food photography, promotional messaging, and influencer collaborations, are frequently adopted in a trial-and-error manner, leaving operators uncertain about their actual influence on consumers' final purchase decisions (Dwivedi et al., 2021).

From an academic standpoint, empirical research examining digital marketing effectiveness within the food truck sector remains limited (Lichy et al., 2022). Existing studies predominantly focus on traditional hospitality firms and fixed-location restaurants, whose operational stability and customer interaction patterns differ substantially from those of mobile food vendors (Jamil et al., 2024). Moreover, prior research often conceptualizes consumer engagement as an endpoint rather than as a mediating mechanism that explains how digital marketing inputs such as channel selection, content type, visibility, and social proof translate into behavioral intentions and purchase behavior (Dwivedi et al., 2021). Consequently, there is a clear need for a systematic and context-specific investigation that examines the combined effects of digital marketing channels, content strategies, and engagement-related attributes on consumer purchase decisions within the food truck industry (Jamil et al., 2024).

The primary aim of this study is to examine how digital marketing influences purchase decisions, specifically within the food truck industry. To accomplish this, the research sets out to identify the most common digital marketing channels, such as social media, mobile apps, and online reviews and measure their effectiveness in attracting new customers. The study also seeks to evaluate the relationship between various types of digital content, including food photography, promotions, influencer posts, and customer reviews, and a consumer's intention to make a purchase.

Additionally, the research aims to analyze the differences in consumer perceptions and behaviors toward food trucks that are digitally active versus those that are not. Another key objective is to determine which specific digital factors, such as visibility, engagement, and user-generated content (UGC), have the strongest overall impact on a customer's final decision. Ultimately, the study intends to provide actionable recommendations for food truck operators to optimize their digital strategies to increase both engagement and sales. This research provides valuable insights for several key stakeholder groups within the food service ecosystem. Since food trucks lack fixed physical locations, they rely heavily on digital platforms for real-time communication regarding their whereabouts, menus, and hours (Jamil et al., 2024). This study offers these operators practical guidance on how to leverage specific

channels and content types to enhance their visibility and business sustainability in a competitive market (Naeem et al., 2025).

The study helps consumers understand how digital information, such as social media posts and peer reviews, shapes their dining choices (Hanaysha, 2022). By recognizing the influence of these digital strategies, consumers can become more informed and critical decision-makers, leading to more rational and satisfying consumption experiences (Gupta et al., 2023). For professionals in the field, the research provides data-driven insights for designing specialized campaigns that address the unique constraints of mobile businesses, such as mobility and location variability (Gupta et al., 2023). It assists in crafting cost-effective and efficient recommendations tailored to small-scale food enterprises (Ahmad, 2025). This study addresses a notable gap in existing academic literature, which has traditionally focused on brick-and-mortar restaurants rather than mobile vending. (Laradi et al., 2024) It establishes a theoretical foundation for future exploration of consumer psychology and digital engagement mechanisms within niche, rapidly growing segments of the food industry

LITERATURE REVIEW

Digital Marketing as a Strategic Driver of Consumer Engagement
Digital marketing offers two-way communication, personalization, and a wider audience than traditional media, hence it has completely changed traditional promotional strategies (Kamyabi et al., 2025). According to recent research by (Dwivedi et al., 2021), digital marketing is a strategic force that influences customer behavior and increases consumer engagement in ways that traditional channels cannot match. For example, social media, SEO, email marketing, and sponsored ads all have an impact on how customers research products, create preferences, and decide what to buy. This indicates a significant change away from one-way persuasion and toward interactive, relationship-oriented marketing methods. This is also in line with the broader agreement in the research on digital consumer behavior regarding how ubiquitous digital platforms are in influencing attitudes and behavioral intentions. Digital platforms are useful for influencing awareness, information search, preference development, and decision execution processes because they integrate companies into customers' everyday digital activities rather than only delivering messages. Traditional buyer journeys are altered by this framing of strategy, which necessitates redefining digital marketing as an organizational strategy rather than a peripheral communications approach (Abu-Hantash et al., 2025).

Theoretical Foundations: Integrating TPB and Technology Acceptance Perspectives
Consumer purchase decision literature often resorts to already validated behavioral theories. One of the most often cited theories in this context is the Theory of Planned Behavior (TPB). According to researcher Windarsari, Sudarmiatin, and Siswanto in their work in the context of fast food, digital stimuli like social media activities and online content contribute towards shaping attitudes, subjective norms, and behavioral control, thus affecting purchase intention (Rozenkowska, 2023). Analogously, the Technology Acceptance Model (TAM) has also been used to explain the impact of digital platforms on the behavior of the final consumers. As specified by the TAM, the key factors that influence the use intention of the consumers towards the digital platforms include perceived usefulness and perceived ease of use of digital interfaces (Baskara & Nurhayati, consumer behavior in Marketing 4.0) (Syafika & Antonio, 2024). In

other words, the combination of both models establishes that purchase decision outcomes in digital platforms are determined by the interaction of both psychological and technology attributes.

Persuasive Mechanisms of Digital Content: Social-Media, Reviews and eWOM
The persuasiveness of particular digital marketing strategies, particularly social media marketing, online customer evaluations, and electronic word of mouth (eWOM), in influencing purchase intention is the subject of a critical corpus of literature. According to Hidayat and Komaryatin (2025), (digital marketing and purchase intention with engagement and trust), social media marketing influences purchasing decisions through user involvement, entertainment value, timely communication, and compelling content. Because they serve as social evidence and lessen doubt, user-generated content and online reviews are especially powerful. By indicating dependability and peer contentment, positive customer reviews have been demonstrated to improve brand perception and purchase decisions by influencing affective trust and cognitive assessments. Social media food ads have a substantial impact on consumers' intentions to buy food goods, according to research in the food and beverage industry. This highlights how visual appeal and interactive content pique consumers' interest and influence their evaluation processes (Rachmiani et al., 2024). Critical literature, however, highlights that not every digital information has an equal impact on every consumer. Digital content's persuasiveness is frequently influenced by platform trustworthiness, message relevancy, and customer interaction. Effective digital marketing tactics must therefore carefully edit material for certain psychological triggers in addition to disseminating it.

Empirical Evidence on Digital Marketing's Influence on Purchase Decision
Empirical research has demonstrated a strong positive correlation between digital marketing initiatives and purchase intention. Quantitative studies have shown that digital marketing initiatives can increase purchase intention through contextually understood increases in the visible, functional, and affective aspects of companies, particularly in the food delivery, online shopping, or fast food industries. Purchase intention has been demonstrated to function as a mediator between digital marketing efforts and final purchase behaviors in the setting of food delivery apps, for example (Edwin, 2023). The availability of information and the speed of communication provided by online marketing through social networks and optimization have been found to influence consumers' decision-making processes in the broader retail setting. These factors are crucial in forming and enabling comparisons for decision-making. Additionally, it is evident that social network marketing influences consumer choices and enhances brand recognition, both of which are critical for facilitating purchases (Dwivedi et al., 2021). The stream of criticism in the pertinent literature asserts that the question of causation is still challenging to resolve in the setting of cross-sectional studies and self report methodologies utilized in the majority of research in this field, despite the results emerging in this manner.

Critical Gaps and Future Directions in Digital Consumer Marketing Research
The body of research supports the importance of digital marketing in influencing customer purchasing decisions, there are still a number of important gaps. First, there are concerns over the generalizability of findings across various businesses due to the context uniqueness of many studies (e.g., fast food, e-commerce). Current studies do not adequately address the special

issues faced by food trucks as hybrid mobile service providers, including transient visibility, changing customer situations, and reliance on real time location updates (Bachri et al., 2023). New psychological factors like FOMO and entertainment-based engagement are brought about by the quick development of digital platforms (like TikTok and live streaming), which may not be adequately explained by conventional models like TPB and TAM. Future research must therefore develop new frameworks that take into account social capital dynamics, platform specific affordances, and affective reactions (Habib & Almamy, 2025). Growing body of studies indicates that brand reputation and customer trust play a moderating or mediating role in the choice to make a digital transaction. According to, trust is a crucial concept, especially in situations where online credibility and uncertainty reduction are important factors in the consumer evaluation process before a purchase (Mahliza, 2020).

METHODOLOGY

The study methodology designed to examine how digital marketing factors such as marketing channels, content types, and consumer engagement impacts purchase decisions within the food truck industry. The study focuses on food truck visitors in Kulai, Johor, who have exposed to digital marketing activities. By utilizing a quantitative design, the research aims to identify the most effective strategies for optimizing marketing outcomes and influencing consumer perceptions and sales.

Research Design

This study employs a quantitative research design (Barroga & Matanguihan, 2022) using a cross-sectional online survey to objectively measure relationships between latent constructs like digital presence and purchase likelihood. To provide a structured theoretical foundation, the study integrates several frameworks: the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), the Elaboration Likelihood Model (ELM), Social Influence Theory, and the Uses and Gratifications Theory (UGT). Data captured at a single point in time to identify patterns and predictive relationships without manipulating the environment (Creswell & Creswell, 2023).

Population and Sampling

The target population consists of food truck customers, as their engagement with digital channels is vital for assessing marketing effectiveness. The study utilizes a non-probability convenience sampling technique (Golzar et al., 2022), targeting individuals active on social media, food delivery apps, and digital communities. This strategy ensures that respondents have direct experience with social media promotions and online reviews, allowing for a more accurate reflection of consumer behavior and decision-making. To ensure statistical power and robust findings, the sample size was determined using G*Power 3.1.9.7 software. Based on a medium effect size ($f^2 = 0.15$), a significance level of 0.05, and a statistical power of 0.95 with three predictors, the analysis indicated a minimum requirement of 119 respondents. This objective method aligns with contemporary methodological standards for PLS-SEM research (Memon et al., 2020).

Research Instrument

Data collected via a self-administered structured questionnaire developed from an extensive literature review and established theoretical frameworks. The instrument divided into sections

covering demographics and key constructs such as marketing channels, content types, and purchase likelihood. Measurement items were adapted from validated sources, including Jamil et al. (2024) for purchase intentions and Pinca et al. (2024) for consumer engagement. All constructs measured on a five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". The internal consistency of the multi-item constructs assessed using Cronbach's alpha. A coefficient value above 0.70 established as the threshold for acceptable reliability (Tavakol & Dennick, 2011), ensuring that the items within each construct consistently measure the same underlying concept.

Data Collection Procedure
The researcher will approach food truck customers in Kulai, Johor, through digital platforms such as social media and food delivery apps. Informed consent obtained prior to participation, and the survey completed independently to minimize response bias. The data collection period scheduled for approximately two weeks to ensure a representative sample of various engagement levels and purchasing frequencies.

Data Analysis Framework
Data analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4. This approach chosen for its ability to handle complex models and non-normal data (Hair et al., 2022). The analysis process includes evaluating the measurement model for validity, checking for multicollinearity (VIF < 5), and using bootstrapping to test the significance of hypothesized relationships. Mediation analysis conducted to understand how consumer engagement transmits the effects of digital marketing to purchase decisions. The study uses regression-based path analysis to address specific objectives, such as identifying the most effective marketing channels and assessing how digital content predicts purchase intentions. Additionally, multiple regression paths will determine which digital marketing factors have the strongest impact on purchase decisions. The findings will ultimately provide evidence-based recommendations for food truck operators to optimize their digital strategies and sales performance.

RESULT AND ANALYSIS

This study examines the role of digital marketing strategies in influencing consumer behavioral intentions within the food truck industry. It focuses on how various digital extraction attributes of digital presence engagement, content types, and marketing channels affect consumer engagement, which in turn influences outcomes such as intention to recommend, purchase likelihood, and willingness to try or revisit. The research aims to identify the specific digital factors that most effectively drive consumer interaction and decision-making in a competitive convenience-oriented market.

Profile of Respondents
Table 4.1 shows that the sample consisted of working-age adults (30 to 50 years old) with a nearly equal gender distribution (49% male, 51% female). While the behavioral patterns shows that most respondents purchase from food trucks moderately, typically 1–2 times a month (36.97%). Then, in digital interaction the results depicted that the social media (41.18%) and food delivery apps (31.93%) are the primary platforms used to follow food trucks. A significant majority (over 80%) reported occasional to frequent exposure to digital marketing activities.

Table 4.1 *Descriptive Information of Respondent*

Variable	Categories	*f*	%
Gender	Male	57	49
	Female	61	51
Age	SD	1.209	
	M	1.866	
	Max	50	
	Min	30	
Frequency of purchasing from food trucks	Less than a month	33	27.73
	1 – 2 times a month	44	36.97
	3 – 4 times a month	25	21.01
	Once a week	8	6.72
	More than once a week	9	7.56
Primary platform used to follow food trucks	Social Media	49	41.18
	Food delivery apps	38	31.93
	Messaging apps	13	10.92
	Do not follow digitally	9	7.56
Exposure to Food truck digital marketing	Rarely	23	19.33
	Occasionally	49	41.18
	Frequently	39	32.77
	Very Frequent	8	6.72

Measurement Model and Reliability

The study established high reliability and validity across all constructs. Table 4.2 shows that all factor loadings exceeded the 0.70 threshold, and Average Variance Extracted (AVE) values were above 0.50. Internal consistency confirmed with Cronbach's alpha and composite reliability values exceeding 0.70. Furthermore, Harman's single-factor test indicated that common method bias was not a concern, as the largest factor explained only 33% of the variance, well below the 50% threshold.

Table 4.2 *Validity and Reliability of Constructs*

Constructs and their respective items	Factor Loading
Attributes of Digital Presence Engagement	-
1. Food truck business social media page is fun.	0.955
2. Food truck business social media page is exciting.	0.977
3. Food truck business social media contains nice character.	0.991
4. Food truck business social media page interacts with me to serve me better.	0.999
5. Food truck business social media facilitates two-way communication.	0.955
Mediator - Consumer Engagement	-
1. I actively pay attention to food truck content on social media platforms.	0.811
2. I feel interested and involved when interacting with food truck digital marketing content.	0.862
3. I frequently interact with food truck content (for example, likes, comment and shares).	0.848

4. Food truck digital platforms encourage me to engage and communicate with the brand.	0.998
5. I feel connected to food truck brands that actively engage with customers online.	0.981
6. Digital interactions with food trucks keep me engaged and interested in their offerings.	0.986
Content Types	-
1. I trust social media advertisement of food truck.	0.981
2. I use social media advertisements as a reference for future spending on food truck.	0.977
3. The content provided by food truck business in social media is credible.	0.958
4. Advertising on food truck business in social media are reliable.	0.988
Intention to recommend	-
1. Because of social media advertising, I am willing to recommend a food truck to others.	0.977
2. Social media advertising encourages me to share positive information about a food truck with friends or family.	0.913
3. I am likely to recommend a food truck to others based on its social media presence.	0.859
Marketing Channels	-
1. Social media is a good source of information about food truck business.	0.931
2. Social media offers very relevant information about food truck business.	0.952
3. Social media is a good source of updated information about food truck business.	0.971
4. Social media offers complete information about food truck business.	0.989
Purchase Likelihood	-
1. I find social media advertising useful in my purchase decision of food truck.	0.96
2. Using social media advertising helps me in deciding to purchase food truck.	0.982
3. Social media would enhance my usefulness selecting food truck business around me.	0.966
Willingness to try/ revisit	-
1. Social media advertising increases my willingness to try a food truck.	0.907
2. Social media advertising makes me more willing to revisit a food truck I have purchased from before.	0.947
3. Social media advertising helps me decide to choose a food truck when I am considering where to eat.	0.929

Key Findings and Hypothesis Testing

The structural model revealed critical findings into the drivers of consumer behavior. The drivers of Engagement such as content types (e.g., visuals, promotions, reviews) emerged as the strongest predictor of consumer engagement. Then, the marketing channels also showed a significant positive influence. Conversely, attributes of digital presence engagement (basic social media features) had a marginal or negative effect, suggesting that mere digital presence is insufficient to drive active engagement. The power of engagement for consumer engagement found to be a consistent and powerful predictor of all behavioral intentions, including recommendation, purchase, and revisit likelihood. Furthermore, the mediation effects,

consumer engagement serves as a vital mediator. The impact of digital content and marketing channels on consumer behavior largely transmitted through the level of engagement they generate. Lastly, the control variables of age had no significant impact on engagement or intentions, gender showed significant differences regarding purchase-related intentions; specifically, one gender group exhibited a lower likelihood of purchase and revisit despite similar engagement levels.
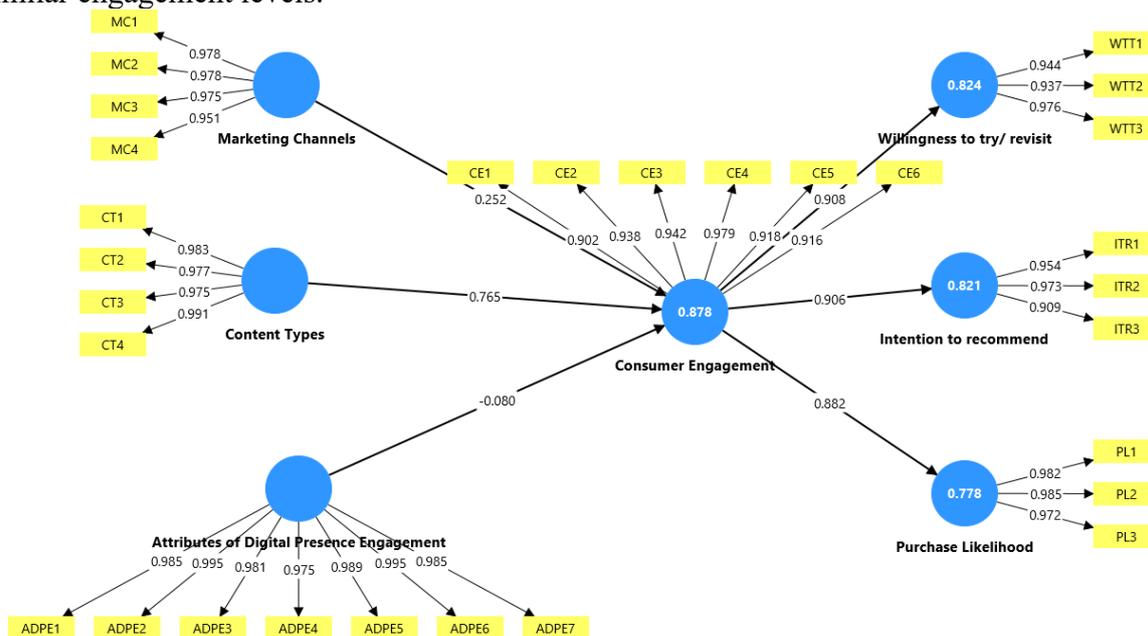

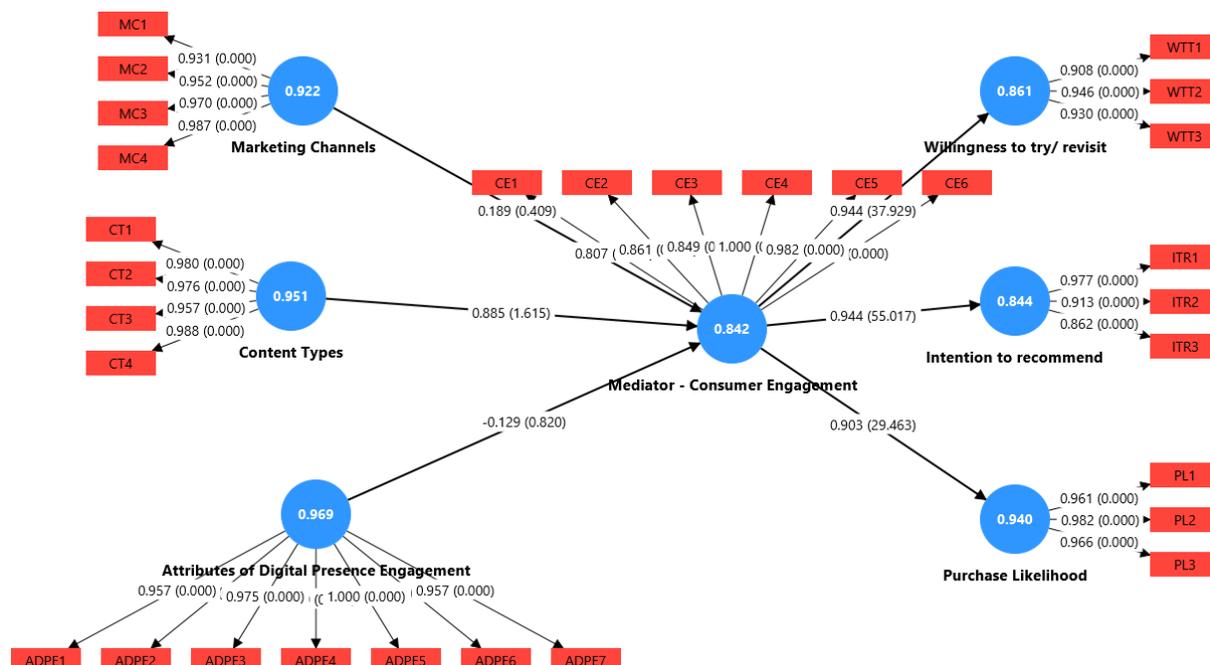Figure 4.1 *Model Assessment of Latent Variables*

Figure 4.2 *SEM Model*

CONCLUSION

The study concludes that what a business communicates (content) and how they communicate it (channels) are significantly more influential than simply having a digital presence. For food truck operators, the findings suggest a strategic shift toward prioritizing high-quality, value-driven content and interactive digital channels to foster deep consumer engagement. Because engagement is the primary bridge to actual sales and recommendations, digital strategies must focus on emotional and cognitive involvement rather than just visibility.

DISCUSSION OF FINDINGS

The research examines the effects of digital marketing factors on the engagement and post-engagement behavioral intentions in the food truck industry. The results prove that digital marketing does not lead to immediate behavioral outcomes; in contrast, it affects the target audience indirectly. The results support the engagement-oriented philosophy in modern digital marketing studies, claiming that interaction, attachment, and participation are primal psychological processes that drive the requested consumer responses in digital marketing stimulus (Godiyal & Mishra, 2025). Contrary to popular thought within digital marketing, variables within digital presence engagement, namely the rate of postings, completeness, and consistency, did not positively interact within customer engagement, actually experiencing a slightly negative outcome, thus negating the popular idea that the more presence, the greater the engagement, reflecting the Uses and Gratifications Theory (UGT) that consumers use their interaction with media to satisfy certain needs, namely amusement, emotional, and social, overpassing the idea that they use the medium to get information, as redundancy, general, or overly commercial, may not give particular satisfaction, hence decreasing engagement (Mohammed, 2024). In the context of food trucks, novelty drives, as opposed to information, would drive the customer.

This finding can also be explained by using the Elaboration Likelihood Model (ELM). Food truck use decisions are considered to be low involvement and impulsive, relying on sights, trends, and social validation rather than cognitive analysis of comprehensive information (Kumar & Khanna, 2022). Therefore, a dynamic but uninteresting online presence might result in customers becoming disconnected, faced as they are with information overload that has no emotional and social value. Results show that the type of content remains the key engagement factor, underscoring the importance that effective digital marketing places beyond simple digital presence. Engaging images of food, short videos, testimonials, and UGC have emerged as strong peripheral cues that immediately trigger emotional and social responses (Niu, 2025). From the perspective of Social Influence Theory, the use of the forms of content reduces ambiguities and boosts perceived legitimacy by stating shared experiences and associations (Korenkova et al., 2020). The marketing channels were positively and significantly correlated with customer engagement but fell short in effect size compared to the content types. This suggests that generally, channels function as facilitators rather than as principal drivers of engagement. Following the Technology Acceptance Model, platforms perceived to be easy to use and useful, like Instagram, TikTok, and Google Maps, reduce the obstacles to participation and increase access to content (Tan et al., 2025). The findings from this process give further emphasis to the fact that channels work out engagement only when it is added to by great content, thereby underlining the interaction between content strategy and channel selection (Wang & Chan-Olmsted, 2020).

Customer involvement consistently exerted a strong effect on all behavioral outcomes, such as purchase likelihood, intention to refer, and desire to try or repurchase. Findings are thus supportive of Social Influence Theory and TPB that consummationally engaged customers are likely to act as informal brand ambassadors and translate positive attitudes into behavioral intentions. Engagement is indeed not an end itself; it is a behavioral agent which assists social diffusion and the creation of economic value (Karim, 2020). Additionally, engagement had a significant impact on repeat oriented behaviors, such the desire to return, underscoring its significance in fostering relationship based behavioral consistency and loyalty. This supports the relationship marketing research that suggests extended engagement strengthens emotional bonds and reduces brand switching tendencies (Shanbhag et al., 2023). This emphasizes interaction as a strategic asset for long-term viability rather than just short-term sales for food trucks operating in competitive and mobile environments. Age did not significantly affect engagement or behavioral intentions, according to an analysis of control factors. This suggests that digital food truck marketing appeals to a wide range of age groups and challenges age-centric stereotypes in the field. While gender had no effect on engagement levels, it did have different effects at the behavioral intention stage. This suggests that whereas involvement may be widespread, gender-specific differences in risk perception and buying preferences affect how it translates into observable behavioral outcomes. Rather than challenging the paradigm, this observation identifies an important boundary condition and points the way for more research (Bahraseman et al., 2025).

The findings indicate that successful digital marketing in the food truck industry is predicated on content, interaction, and behavioral impact. Engagement serves as the primary psychological process connecting digital encounters to consumer behavior, substantiating the suggested multi-theoretical framework. Food truck operators should strategically prioritize emotionally resonant and socially validated content rather than simply maintaining a digital presence to foster interaction as a sustainable route to advocacy, purchasing, and loyalty.

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ARTIFICIAL INTELLIGENT (AI) TECHNOLOGY ACCEPTANCE IN A MANUFACTURING COMPANY

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ABSTRACT
The increasing adoption of artificial intelligence (AI) technology has significantly changed the processes in the manufacturing sector. However, the effectiveness of the application of AI systems is heavily dependent on the technology's acceptance by the employees and management of a company. Using the Technology Acceptance Model (TAM), this study explores the level of acceptance of AI technology in a manufacturing organization and the factors driving its adoption. This study specifically studies the effects of perceived usefulness (PU) and perceived ease of use (PEOU) on the acceptance of AI technology in this industry. A quantitative research approach was used, with data collected via a structured questionnaire issued to technicians, engineers, scientists, and managers in a Malaysian manufacturing company. A total of 60 responses were analyzed using descriptive statistics, correlation analysis, and multiple regression analysis with the use of SPSS. The findings indicate that both perceived usefulness and perceived ease of use have a significant positive relationship with AI technology acceptance. Among the two factors, perceived ease of use was found to be the strongest predictor influencing AI acceptance. The results highlight the importance of user-friendly AI systems and positive perceptions in motivating the degree of success of AI adoption in manufacturing environments. This study contributes to the literature by extending the application of TAM in the context of AI technology acceptance within the manufacturing industry.

Keywords: Artificial Intelligence, Technology Acceptance Model, Perceived Usefulness, Perceived Ease of Use, Manufacturing Industry.

INTRODUCTION
In every organization, they want a smooth and reliable tools to use, to make their work or processes become very efficient from time to time. Artificial intelligence (AI) technology has become an important tool or component of digital transformation in the manufacturing industry, particularly in the era of Industry 4.0. Manufacturing organizations increasingly rely on AI-driven systems to enhance productivity, improve product quality, optimize operational processes, and reduce costs. Applications such as predictive maintenance, intelligent automation, quality inspection, and data-driven decision-making demonstrate the growing importance of AI in improving manufacturing performance and competitiveness (Jay et al., 2018; Buchmeister et al., 2019; Siemens, 2022). Even with the potential benefits of AI adoption, its successful implementation or usage remains highly dependent on human acceptance within organizations. Employees and management may resist AI technologies due to concerns related to job security, system complexity, lack of technical skills, and limited understanding of AI functionality (Christin, 2017; Sabouret, 2020). Such resistance can result

in underutilization of AI systems, reducing the effectiveness of technological investments. Trust in AI technology also plays a significant role in shaping user behaviour, as individuals must believe that AI systems are reliable, transparent, and capable of producing desirable outcomes (Chang et al., 2017; Zerilli et al., 2022).

The Technology Acceptance Model (TAM) provides a useful view and theoretical framework for examining AI technology acceptance by highlighting the perceived usefulness and perceived ease of use as key determinants of user acceptance. Prior studies have demonstrated that these perceptions strongly influence behavioural intention to use the specific AI technology, particularly in complex industrial settings (Choung et al., 2022). However, actual research examining AI technology acceptance in the Malaysian manufacturing context remains limited. Therefore, this study aims to examine the level of AI technology acceptance in a manufacturing company in Malaysia and to investigate the influence of perceived usefulness and perceived ease of use on AI technology acceptance. The findings of this study are expected to provide valuable insights for manufacturing organizations seeking to enhance employee acceptance and maximize the benefits of AI implementation.

Therefore, the objectives for this study are:

1. To examine the level of AI technology acceptance among employees and management in the manufacturing industry.
2. To identify the perceived usefulness and perceived ease of use that influences the acceptance and adoption of AI technology in Manufacturing Industry.

LITERATURE REVIEW

Technology Acceptance Model (TAM)
The Technology Acceptance Model (TAM), developed by Davis (1989), is grounded in the Theory of Reasoned Action (TRA) (Ajzen et al., 1975; Fishbein & Ajzen, 1980). TAM explains users' acceptance of technology through two key beliefs: perceived usefulness and perceived ease of use. These beliefs influence users' attitudes and behavioral intentions toward using a technology that will have an effect of actual usage. Due to it's easy to understand and simplicity in explanation, TAM has been widely applied to predict technology adoption across various contexts, (Giovanis et al., 2012; Venkatesh, 2000), including emerging technologies such as artificial intelligence (AI). TAM is particularly suitable for this study as it focuses on individual users' perceptions toward the specific technology and is appropriate for examining technologies at an early stage of adoption (Sánchez-Prieto et al., 2017). Therefore, TAM provides a valid theoretical foundation for analyzing AI technology acceptance in this research.

The Characteristics of Technology Acceptance Model (TAM)

Perceived Usefulness (PU)
The point to which a person thinks that utilizing a specific technology would improve the job performance is known as perceived usefulness (Davis, 1989). According to the TAM framework, users' attitudes and intentions to adopt technology are strongly influenced by perceived usefulness. Previous research has repeatedly demonstrated that people are more

inclined to embrace and utilize technology when they believe it to be advantageous (Cheung et al., 2013; Farahat, 2012; Suki, 2011). Perceived usefulness in the context of AI adoption refers to users' perceptions that AI may enhance productivity, efficiency, and overall performance in manufacturing operations.
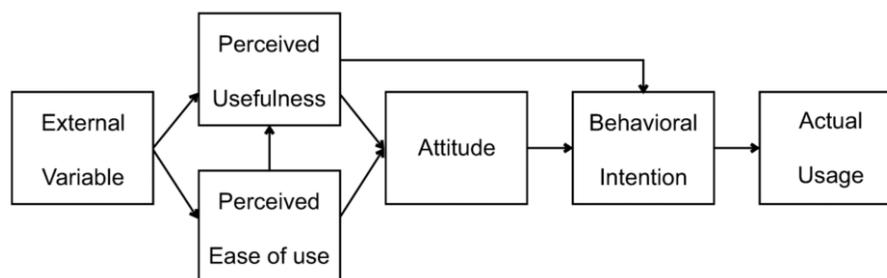
Figure 2.1: Theory of Technology Acceptance Model (TAM)

Perceived Ease of Use (PEOU)
Perceived ease of use is defined as the extent to which a person believes that using a system will require minimal effort (Davis, 1989). It is a crucial factor influencing both perceived usefulness and behavioral intention. Previous research indicates that technologies perceived as easy to use are more likely to be accepted and continuously used (Venkatesh et al., 2000; Wixom & Todd, 2005). In AI applications, ease of use reduces complexity and user resistance, thereby encouraging positive attitudes and increasing the likelihood of adoption within manufacturing environments.

Behavioral Intention (BI)
Attitude toward use is a hidden construct in the Technology Acceptance Model that reflects an individual's overall positive or negative evaluation of using a particular system or new technology. Within TAM, attitude toward to use is influenced by perceived usefulness and perceived ease of use and plays a significant role in shaping behavioral intention to use a technology. Prior studies have confirmed that a more favorable attitude leads to a stronger intention to adopt and use new systems (Dishaw et al., 1999; Bobbitt et al., 2001; Guerrero, Egea, & Gonzalez, 2007).

Artificial Intelligence (AI)
Artificial intelligence (AI) is an emerging technology with worldwide applications across multiple fields and aims to replicate human intelligence (Kolotylo-Kulkarni et al., 2020; Ahmad et al., 2021; Ahmad et al., 2022). AI systems rely on algorithms designed to simulate the human mind to processes, enabling automation, robotics, and intelligent decision-making for improved efficiency and accuracy (Haritha & Krishnan, 2022; Lee et al., 2019). By integrating engineering and social sciences, AI plays a trans-formative role in shaping the future of industrial technology advancement and societal development (Schwyzer et al., 2022).

Intelligence (AI) and Technology Acceptance
Artificial intelligence refers to a system's ability to interpret data, learn from it, and apply that knowledge to achieve specific goals (Kaplan & Haenlein, 2019). AI has become increasingly important across industries, including manufacturing, due to its potential to enhance

automation, efficiency, and decision-making (Li et al., 2018). However, the acceptance of AI technologies depends largely on users' perceptions of usefulness and ease of use. Applying TAM in the manufacturing context allows for a structured understanding of how PU and PEOU influence users' acceptance and intention to adopt AI technologies.

Factors of AI Technology acceptance in Manufacturing Industry

Cultural and industry norms play an important role in shaping the key components of the Technology Acceptance Model (TAM), specifically perceived usefulness (PU) and perceived ease of use (PEOU). In sectors that value innovation and efficiency, AI-related technologies include voice assistants, intelligent search, automation, personalisation, and remarketing of prospective customers (Asling, D., 2022). In a similar vein, perceptions of ease of use are affected by social beliefs about technology, such as adaptability and automation experience. As a set of robust technologies that support problem-solving and decision-making, AI is more readily accepted in industries that prioritize simplicity and standardization, leading to greater acceptance and usability (Qin & Jiang, 2019).

The Role and the Importance of Perceived Usefulness and Perceived Ease of Use in AI Technology Adoption in Manufacturing Industries

Perceived usefulness is defined as the extent to which an individual believes that using a system enhances job performance and is a core determinant of technology acceptance in the Technology Acceptance Model (Davis, 1989). In the manufacturing context, perceived usefulness reflects users' beliefs that AI can improve efficiency, productivity, and operational outcomes. Prior studies consistently show that perceived usefulness has a strong positive effect on user attitudes and behavioral intention to adopt new technologies and often exerts a greater influence than perceived ease of use (Davis, 1989; Cha, 2010). Empirical evidence across various technological domains confirms the positive relationship between perceived usefulness, attitude, and intention to use technology (Cheung et al., 2013; Farahat, 2012; Suki, 2011). (Bhattacherjee et al., 2008) demonstrated that the perceived usefulness of information of technology had a positive impact on users' experience to utilize such technology, while (Park, 2009) found that users' perceived usefulness positively impacts their attitude and intention to accept e-learning systems. In a similar line of study. Perceived ease of use refers to the degree to which a system is perceived as effortless to use and plays both a direct and indirect role in technology adoption (Davis, 1989). In AI-enabled manufacturing, ease of use reduces complexity and frustration, enhances perceived usefulness, and strengthens user acceptance (Venkatesh et al., 2000). (Fang et al. 2005) say that an innovation's characteristics, or the distinctive tasks or services it involves can impact its perceived ease of use and according to (Gefen, 2000), the influence of perceived ease of use on a person's willingness to utilise a new technology is significant only when the technology stimulates a necessary purpose.

Hypotheses Development

H1: Perceived usefulness has a positive effect on the acceptance of AI technology in the manufacturing industry.

H2: Perceived ease of use has a positive effect on the acceptance of AI technology in the manufacturing industry.

Conceptual Framework

Figure 2.5 From the proposed research framework, the study is only surrounding manufacturing industry in a company. So, to make a proper study, first we must know what the real situation in the firm or company is currently. These hypotheses can then be tested through quantitative methods like surveys or interviews with employees and employers in the manufacturing industry.
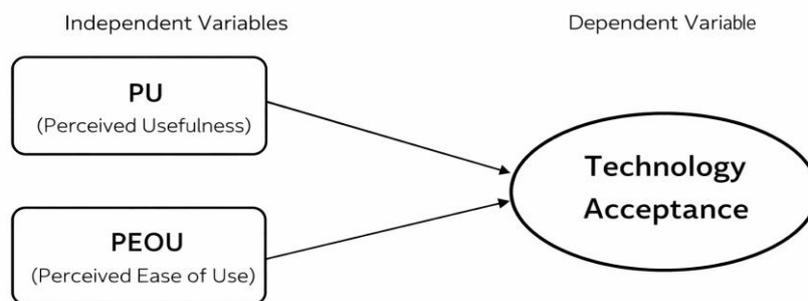
Figure 2.5: Proposed Research Framework

Notes: PU = Perceived Usefulness; PEOU = Perceived Ease of Use

Figure 2.4 shows the research framework of this study based on the Technology Acceptance Model (TAM). The framework shows that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the independent variables that influence Technology Acceptance. Perceived usefulness refers to employees' belief that AI technology improves their work efficiency, while perceived ease of use reflects how easy the technology to use. The framework suggests that employees are more likely to accept AI technology when it is perceived as useful and easy to operate.

RESEARCH METHODOLOGY

Population

According to Hossan et al. (2023), a population refers to the group of individuals that form the focus of a research study. In this study, the population consisted of employees from a chemical manufacturing company, including staff from the research and development, quality control and assurance, technical and customer service, and management departments. These groups were selected to represent different organizational levels and functional roles, ensuring that the findings reflect the operational characteristics of the manufacturing industry.

Sampling

The sample for this study was drawn from the population of interest. According to Hossan et al. (2023), a sample represents a subset of a larger population. This study employed convenience sampling to select respondents from a chemical manufacturing company,

including employees from the research and development, quality control and assurance, technical and customer service, and management departments that utilize AI technology.

Sampling Size

This study employed a convenience sampling method, where data were collected from respondents who were available during the data collection period through an online Google Form. A cross-sectional research design was adopted to gather data at a single point in time. A total of 60 respondents participated in the study, which was considered adequate for the purpose of statistical analysis and to ensure the reliability of the findings.

Research Instrument

A research instrument is an organised method to develop a tool for collecting, evaluating, and analysing data in accordance with the requirements and preferences of the researcher (Oben, 2021). The most practical instruments for collecting and analysing data for this study will be questionnaires. This is because, according to (Oben, 2021), asking respondents the right questions may provide a wealth of information that can then be converted into data for analysis. Questionnaire will be distributed to samples by using Google Form through WhatsApp's, Instagram, Facebook and Telegram application. To maximize the utilization of this apps, dual language is use which are English and Malay for accuracy of data. All questions in this questionnaire are close question type, where Likert's scale will used. Each options have their own weight and their own interpretation.

Score	Scale
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Table 3.1, Likert Scale

Survey Questionnaire Structure

The survey questionnaire structure consists of few sections, which can be divided into section A, B, and C. In section A, there are few questions related to demography of the respondent in this study, while in section B there are two subsections created which is focused on Perceived Usefulness and Perceived ease of use of of artificial intelligence in technology. Lastly, section C which consist of 3 subsections that ask about the Perceptions Toward AI Technology. First subsection, C1 is to find data related to the Attitude toward using AI, C2 is the Behavioral intention to use AI, C3 The Growth of AI in industry and lastly C4 is external Factors to adopt or implement AI in industry.

All the questions are formulated to answer both hypotheses (H1 and H2), but the question is designed and formulated not to measure the level of Technology acceptance in the

manufacturing company, but to inspect the perceived usefulness and perceived ease of use and to measure how the correlation of technology acceptance (behaviour and attitude) towards few dimensions of PU and PEOU.

Section	Subsection	Concentration
A	-	Respondent demography
B	1	Perceived Usefulness
	2	Perceived Ease of Use
C	1	Attitude Toward Using AI
	2	Behavioral Intention to Use AI
	3	The Growth of AI in Industry
	4	External Factors to adopt/implement AI in industry

Table 3.2: Survey Questionnaire Structure

RESULT & DATA ANALYSIS

Pilot Test, Internal Consistency Through Cronbach Alpha
Structure in this chapter, exclusively explain about how the research will be run. To test the hypothesis, sample is vital in the process because from here data is collected and analysed to confirm the hypothesis. Meanwhile, sample in this study only from related sources which is a Manufacturing Company, Kulai, Johor. Later, will be analysed by using descriptive method in section A. While sections B is analysed through mean analysis and for section will use Pearson Correlation coefficient for analysing to fulfil the need of objectives of this study. The purpose of the objective reliability test is to identify any weaknesses and the degree to which the survey questions are related to one another (Hayat, 2024; Trizano-Hermosilla & Alvarado, 2016). From there, researcher can remove any items which do not meet the study standard research objectives. In order to do so, Cronbach Alpha is used for this purpose. The result for 36 items (survey Questions) is shown as below have a good score, 0.852. Thus, all items must be accepted.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.852	0.863	36

Table 4.1: Cronbach Alpha Internal Consistency Report for B1, B2, C1, C2, C3 and C4

Demography (Section A)

Item	Category	Frequency (N)	Percentage
Age	20 - 29	25	41.7
	30 - 39	26	43.3

	40 - 49	7	11.7
	50 - 59	2	3.3
	Total	**6**	**100%**
Gender	Male	37	61.7
	Female	23	38.3
	Total	**60**	**100%**
Ethnic	Malay	55	91.7
	Chinese	3	5
	Indian	2	3.3
	Others	-	-
	Total	**60**	**100%**
Education Level	SPM	10	16.7
	STPM/Diploma	18	30
	Degree	20	33.3
	Master	10	16.7
	PHD	2	3.3
	Total	**60**	**100%**
Working Experience	< 1 year	9	15
	1 - 5 years	19	31.7
	6 - 10 years	16	26.7
	> 11 years	16	26.7
	Total	**60**	**100%**
Position	Operator / Technician	28	46.7
	Engineer / Supervisor / Executive	20	33.3
	Manager / Senior Executive	9	15
	Other	3	5
	Total	**60**	**100%**
Department/Function	Production	2	3.3
	QC/QA	6	10
	R&D / Technical	38	63.3
	Maintenance	6	10
	Management / Administration	6	10
	Other	2	3.3
	Total	**60**	**100%**

Table 4.2: Summarized Analysis Report for Section A

This survey involved 60 respondents, and their demographic profiles were analysed using descriptive statistics, including frequencies and percentages. The majority of respondents were male 61.7%, while females accounted for 38.3% of the sample. Most participants were within the productive age range, with 43.3% aged 30–39 years and 41.7% aged 20–29 years. Smaller proportions were aged 40–49 years 11.7% and 50–59 years 3.3% respectively. In terms of

ethnicity, Malay respondents formed the largest group that is 91.7%, followed by Chinese 5.0% and Indian 3.3% only. In term of education level, most respondents held a degree 33.3% with STPM/diploma qualifications 30.0%, while 16.7% had SPM and another 16.7% held a Master. Only a small proportion 3.3% possessed PhD, proving that most respondents have an adequate educational background to properly understand and evaluate AI related technologies.

In terms of work experience, 31.7% of respondents had between one and five years of experience, while those with 6–10 years and more than 11 years of experience each shared the same value for 26.7%, reflecting a balanced combination of junior and experienced employees. Nearly half of the respondents 46.7% worked as operators or technicians, followed by engineers, supervisors, or executives level 33.3%, and managers or senior executives is 15.0%. Most respondents were from R&D and technical departments 63.3%, with smaller respondents from QC/QA, Maintenance, and Management or Administration 10.0% each. Only a few respondents were from Production and other departments with 3.3% each respectively. Overall, this distribution is appropriate for the study, as AI adoption in manufacturing is related to technical and R&D department.

Distribution of AI Applications Used by Respondents (Multiple Responses Allowed)	Frequency (n)	Percentage (%)
Productivity AI	32	53.33%
Interactive System AI	48	80.00%
Vision AI	6	10.00%

Table 4.3: Summarized Data for the Distribution of AI Applications Used by Respondents

Table 4.3 illustrates the percentage distribution of AI application types used by respondents. Interactive System AI tools show the highest level of usage that is 80%, followed by productivity-based applications that is 53.33%. Lastly, Vision AI have some user that have 10% users are used by a smaller proportion of respondents, indicating that AI adoption within the organization is still positive on supporting routine tasks and operational efficient.

Section B (B1: PU, and B2: PEOU)
For analysing the data, especially for section B, descriptive statistic is used. Because this section needs to detect the recognition of Artificial Intelligence (AI) in workplace. The final data is presented by both in table. The final analysed data are as below.

No.	Item	N	Mean	Level
1	Using AI improves my job performance	60	4.03	High

2	AI helps me complete tasks quicker than traditional way	60	4.25	High
3	AI enhances the quality of my work	60	4.05	High
4	AI makes my job easier and smoother	60	4.17	High
5	AI is very useful in my daily work and performing everyday tasks	60	3.95	High
6	I see AI as a helpful tool but not as a replacement	60	4.6	High
7	AI can solve problems at my workplace	60	3.53	Moderate

B1 Perceived Usefulness

Table 4.4: Mean Score Level for Section B1

B2 Perceived Ease of Use

No.	Item	N	Mean	Level
1	Learning to use AI systems is easy for me	60	3.92	High
2	I find AI tools clear and understandable	60	3.87	High
3	Interacting with AI does not require much mental effort	60	3.85	High
4	It is easy for me to become skillful at using AI	60	3.8	High
5	Overall, AI systems are user-friendly to use	60	3.92	High
6	AI helps me to make decisions at my workplace	60	3.33	Moderate

Table 4.5: Mean Score Level for Section B2

According to standard interpretation of mean score analysis, when mean range is between 3.66 to 5.00, it can be considered as high. The mean score with 2.33 to 3.65 is considered moderate and will be considered lower when the score is 1.00 to 2.32. In this table all the items showed the result above 3.66, which indicates that all respondents agree that AI technology have their perceived usefulness and perceived ease of use in a manufacturing company in Kulai, Johor. Result from SPSS, using descriptive statistic shows that overall mean for section B1 and B2 as shown as in the table 4.6 below, where it was recorded at 3.93. This indicates that it was proven that AI technology has their perceived usefulness and perceived ease of use in a manufacturing company in Kulai, Johor. This statement is enough to answer objective 1.

Statistics		
Perceived Usefulness and Perceived Ease of Use		
N	Valid	60
	Missing	0
Mean		**3.93**
Median		4.00
Mode		4
Std. Deviation		0.89

Table 4.6: Mean score Result using SPSS for Section B1 (PU) and B2 (PEOU)

Section C, Correlation Analysis: Technology Acceptance of Artificial Intelligence

To determine the relationship between PU and PEOU and Technology Acceptance, the Pearson Correlation Coefficient analysis method was used to determine the relationship between the variables. The Pearson Correlation Coefficient measurement framework is described as Table 4.7 as below.

Correlation Score	Correlation Strength
< 0.20	Very weak
0.20 – 0.40	Weak
0.40 – 0.70	Moderate
0.70 – 0.90	Strong
> 0.90	Very Strong

Table 4.7: Correlation Interpretation Score

Before this research is proceed to the Correlation Analysis, mean score for each subsection must be calculated. By using SPSS, mean score for C1, C2, C3, C4 and combination all subsections. From here all combination from section B (B1 and B2), independent variable will be compared with other dependent variables, which is C1, C2, C3, C4 and the overall combination of independent variables. The mean score is as Table 4.8, 4.9, 4.10 and 4.11.

No.	Item	N	Mean	Level
1	I feel positive about using AI in my work	60	3.85	High
2	Using AI in my job is a good idea	60	3.87	High
3	3. I enjoy performing tasks that involve AI technologies.	60	3.85	High
4	4. I believe using AI makes work more interesting.	60	3.8	High
5	I believe that AI usage is a common practice at my workplace.	60	3.67	High
6	Using AI at my work does not create any stress.	60	3.5	Moderate
7	I found that using AI is encouraging.	60	3.92	High
8	AI influences my job satisfaction.	60	3.67	High

Table 4.8: Mean Score Level for Section C1

No.	Item	N	Mean	Level
1	I plan to use AI tools more frequently in the future.	60	3.82	High
2	I am willing to learn more about AI applications.	60	4.17	High
3	I intend to recommend using AI to my colleagues.	60	3.95	High

No.	Item	N	Mean	Level
4	I expect to depend more on AI in my future work.	60	3.48	Moderate

Table 4.9: Mean Score Level for Section C2

No.	Item	N	Mean	Level
1	The use of AI technology in the manufacturing industry has grown significantly in recent years.	60	4.2	High
2	Many companies in the manufacturing sector are now adopting AI to improve operations.	60	4.28	High
3	AI is becoming a key factor in driving industrial innovation and competitiveness.	60	4.08	High
4	The demand for AI-related skills and training in the manufacturing industry is increasing.	60	4.02	High
5	I believe AI will continue to expand rapidly and play a major role in the future of manufacturing.	60	4.32	High

Table 4.10: Mean Score Level for Section C3

No.	Item	N	Mean	Level
1	Implementing AI systems is too expensive for our department.	60	3.65	Moderate
2	The benefits of AI outweigh its costs.	60	3.62	Moderate
3	My management encourages the use of AI technology.	60	3.63	Moderate
4	My company provides adequate training and resources to use AI effectively.	60	3.33	Moderate
5	I trust AI systems to make accurate and reliable decisions.	60	3.17	Moderate
6	I feel safe relying on AI recommendations in my work.	60	3.23	Moderate

Table 4.11: Mean Score Level for Section C4

Majority mean score achieved high mean score where is in section C1, C2 and C3, and only section C4 in table 4.10 achieved moderate mean score as shows in table above. From here by using SPSS, correlation analysis can be done as shown in Table 4.12 as below. Based on the Pearson correlation analysis in Table 4.12, a significant and positive relationships were found between perceived usefulness, perceived ease of use, and AI technology acceptance among employees. AI technology acceptance has a significant correlation with perceived usefulness ($r = .735$, $p < .01$), suggesting that people who believe AI may improve job performance are more likely to accept it and employ it at work. Similarly, perceived ease of use was significantly and positively related to AI technology adoption ($r = .738$, $p < .01$), implying that AI systems viewed as easy to learn and operate gained higher acceptance.

		Perceived Usefulness	Perceived Ease of Use	AI Technology Acceptance
Perceived Usefulness	Pearson Correlation	1	.667**	.735**
	Sig. (2-tailed)		< 0.001	< 0.001
	N	60	60	60
Perceived Ease of Use	Pearson Correlation	.667**	1	.738**
	Sig. (2-tailed)	< 0.001		< 0.001
	N	60	60	60
AI Technology Acceptance	Pearson Correlation	.735**	.738**	1
	Sig. (2-tailed)	< 0.001	< 0.001	
	N	60	60	60

Table 4.12: Correlation Analysis between Section B (B1 and B2) and Section C (C1, C2, C3 and C4)

Furthermore, perceived usefulness and perceived ease of use were moderately correlated ($r =.667$, $p <.01$), indicating that user-friendly AI technologies are more likely to be considered as valuable. Overall, these findings provide a strong correlation for the Technology Acceptance Model (TAM), confirming that both perceived usefulness and perceived ease of use play important variables in shaping employees' acceptance of AI technology in the manufacturing industry.

DISCUSSION, SUGGESTION AND CONCLUSION

Discussion
The findings show that the manufacturing sector has mostly accepted AI technology. Perceived usefulness and perceived ease of use were found to have significant positive effects on AI technology acceptance, which is consistent with H1 and H2. It means that employees are more willing to adopt AI systems when they see clear performance benefits that they can gain and the ease of operation. In the context of manufacturing, these results validate the basic principles of the Technology Acceptance Model. Other than that, the findings also support H3, mean that the type of AI technology influence the relationship between perceived usefulness and AI technology acceptance. This suggests that different AI applications influence acceptance to a difference level, depending on how effectively they enhance work performance. Overall, the study confirms the application of TAM while showing the importance of selecting the most appropriate AI technologies to support user acceptance.
Suggestion

Enhancing AI Technology Acceptance in Perceived Usefulness (PU)

Modern days in manufacturing companies, they will priorities the best way to improve day to day routine whether manually or automatically as long as the company can gain much benefit from it, the companies should highlight how AI systems enhance work performance, productivity, and operational efficiency since the results of this study show that perceived usefulness has significant effects on AI technology acceptance. Based on the Technology Acceptance Model, perceived usefulness plays a critical role in influencing users' intentions to accept new technology (Davis, 1989). The manufacturing company may enhance perceived usefulness by clearly communicating with their employees the practical benefits of AI applications, such as improved decision-making and process optimization, also supporting the positive attitudes toward AI adoption in line with the TAM framework.

Enhancing AI Technology Acceptance in Perceived Ease of Use (PEOU)

Some of the current technology in manufacturing Industry may be not really user friendly because the technology is not easy to use due to the unorganized interface of systems and difficulty to understand due to over complicated system. Based on the Technology Acceptance Model, perceived ease of use influences users' acceptance of technology by reducing the effort required to learn and operate new systems (Davis, 1989). Given the significant effect of perceived ease of use on AI technology acceptance in this study, organizations should ensure that AI systems are designed and implemented in a user-friendly manner. The manufacturing company may provide training, guidelines and technical support to minimize the resistance to use manners and convince the employees that the new implementation will give more benefits compare to the current one.

CONCLUSION

In conclusion, this study has shown the impact of one variable that could give a positive influence on the company in the term of efficiency, reliability and consistent growth from time. The results indicate that employees and management show a positive level of acceptance towards AI technologies and also suggest that AI is increasingly recognized as an important component of manufacturing operations. The results confirm that perceived usefulness has a significant positive effect on AI technology acceptance, recommended that employees are more likely to adopt AI systems when they believe these technologies can help with their daily task in term of performance, productivity, and operational efficiency. Other than that, perceived ease of use also was found to significantly influence acceptance, demonstrating the value of AI systems that are easy to understand and employ. Additionally, the study shows that the relationship between the perceived usefulness, perceived ease of use and acceptability of AI technology varies by the type of AI technology. This implies that the perceived benefits of various AI applications may differ, which in turn affects the acceptance of consumers. Lastly, this study contributes to the understanding of AI technology adoption in the manufacturing industry by confirming that the Technology Acceptance Model is applicable and highlighting the importance of both usefulness and ease of use in assisting the successful of AI implementation.

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OPERATIONAL PERFORMANCE IMPROVEMENT THROUGH LEAN THINKING: A CASE STUDY OF XYZ MANUFACTURING

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ABSTRACT

In an increasingly competitive manufacturing environment, sustaining operational excellence requires more than the application of Lean tools or isolated process improvements. At XYZ Manufacturing, persistent issues such as production delays, inconsistent product quality, inefficient resource utilization, and uneven employee engagement indicate that although Lean practices are in place, Lean Thinking has not been fully internalized across the organization. Grounded in the Resource-Based View (RBV), this study conceptualizes Lean Thinking as a valuable organizational capability that enhances the effective utilization of internal resources to achieve superior operational performance. This study aims to assess employees' level of Lean Thinking and to examine both the relationship and the impact of Lean Thinking on key dimensions of operational performance, including production speed, product quality, resource utilization, delivery reliability, and organizational responsiveness. Guided by a Lean Thinking operational performance framework underpinned by Resource-Based View theory (RBV), this quantitative study employed a structured questionnaire adapted from validated instruments. From a population of 240 employees across production, quality, and support functions, a sample of 144 respondents was determined using Krejcie and Morgan table and selected through simple random sampling, achieving a 100 percent response rate. Descriptive and inferential analyses reveal a moderate level of Lean Thinking and a statistically significant positive relationship with operational performance, particularly product quality, delivery reliability, and responsiveness to change. The findings highlight the importance of embedding Lean Thinking into daily work practices, leadership behaviours, and organizational culture as a strategic internal resource. Future research is recommended to incorporate qualitative approaches, examine leadership influences, and adopt longitudinal designs to assess the long-term sustainability of Lean-driven performance outcomes.

 Keywords: Lean Thinking, Operational Performance, Continuous Improvement

INTRODUCTION

Despite the widespread adoption of Lean practices in manufacturing organizations, many companies continue to experience difficulties in sustaining long-term operational performance improvements. This challenge is often attributed to an overemphasis on Lean tools and techniques, while insufficient attention is given to developing Lean Thinking as a shared mindset among employees. Consequently, improvements achieved through Lean initiatives tend to be short-lived and fail to address deeper cultural and behavioural issues within organizations by Panigrahi et al. (2023); Abidin et al. (2024). At XYZ Manufacturing, Lean tools such as 5S and Kanban have been introduced; however, the organization continues to face operational challenges, including inconsistent product quality, high scrap rates, long cycle

times, and unstable production flow. These issues suggest that while Lean practices are present, employees may lack a comprehensive understanding of Lean Thinking and its role in driving continuous improvement and operational excellence. Similar findings have been reported in previous studies, which indicate that the absence of a strong Lean mindset limits the effectiveness of Lean implementation by Suroso & Santosa, (2024).

Furthermore, existing studies emphasize that the success of Lean implementation depends not only on technical practices but also on employees' awareness, understanding, and commitment to Lean principles. However, limited empirical research has examined the relationship between employees Lean Thinking and operational performance within the specific context of XYZ Manufacturing. This gap highlights the need to investigate whether employees understanding of Lean Thinking influences operational performance and contributes to sustainable improvement Panigrahi et al. (2023); Abidin et al. (2024). This study is guided by three research objectives: i) To assess the level of understanding of Lean Thinking against operational performance among employees at XYZ Manufacturing; ii) to determine the relationship between lean thinking and operational performance at XYZ manufacturing; and iii) to study the impact of lean thinking and operational performance at XYZ manufacturing. By the end of this study, the findings are expected to provide valuable insights into the influence of Lean Thinking and employees' understanding of Lean on operational performance at XYZ Manufacturing.

LITERATURE REVIEW

In today's rapidly evolving manufacturing environment, operational performance is a key indicator of organizational competitiveness and sustainability. Increasing global competition, technological advancement, and rising customer expectations require manufacturers to deliver high-quality products efficiently, with minimal waste and reliable delivery. Common measures of operational performance include productivity, efficiency, quality, defect rates, lead time, and on-time delivery, all of which directly influence profitability and customer satisfaction.Recent studies suggest that achieving strong operational performance depends not only on technology or tools, but also on workforce mindset and engagement. Singh and Mahmood (2023) emphasized that sustainable performance improvement requires behavioural and cultural transformation across organizational levels. Similarly, Panigrahi et al. (2023) found that organizations with a strong Lean-oriented mindset demonstrate superior problem-solving capability, reduced waste, and improved cross-functional coordination. Hassan and Yusof (2024) further highlighted that within the context of Industry 4.0, a Lean Thinking culture that empowers employees and supports continuous improvement is essential for sustaining operational excellence. These findings indicate that while Lean tools remain important, their effectiveness depends on the extent to which Lean Thinking is embedded in daily practices and decision-making. Accordingly, this study examines whether employees at XYZ Manufacturing, particularly within production, quality, and maintenance functions, have internalized Lean Thinking and how this mindset contributes to overall operational performance.

Lean Thinking

Lean Thinking is a philosophy that extends beyond the traditional application of Lean tools, emphasizing a mindset of continuous improvement, respect for people, and the relentless

pursuit of value for the customer. Originating from the Toyota Production System (TPS), Lean Thinking has evolved into a strategic approach for improving operations through the elimination of waste (muda), variation (mura), and overburden (muri), while simultaneously fostering a culture of empowerment and engagement throughout the organization. In the context of XYZ Manufacturing, the challenge lies not in the absence of Lean methods, but in the inconsistent adoption of Lean as a shared belief system among employees and supervisors. While the company may already utilize certain Lean practices, their effectiveness depends heavily on how deeply Lean Thinking is understood and practiced at the individual and team level. This study thus focuses on evaluating the presence of a Lean-oriented mindset within operational departments, and how this mindset contributes to enhancing productivity, reducing waste, and achieving stable operational performance. Below listed table shows the summarised Lean Thinking studied by prior researchers.

Table 1 *Summarised Lean Thinking Studied by Prior Researchers*

No.	Author (Year)	Title
1.	Panigrahi et al. (2023)	Lean manufacturing practices for operational and business performance: A PLS-SEM modelling analysis
2.	Hassan & Yusof (2024)	Revolutionizing Operational Excellence: Advancing the automotive industry through Lean Principles
3.	Suroso & Santosa (2024)	Effects of Lean Manufacturing Practices On Operational Performance

Operational Manufacturing Performance

Operational performance refers to how effectively an organization manages its daily operations to deliver products that meet customer expectations. In manufacturing, it commonly encompasses production speed, product quality, resource utilization, delivery reliability, and responsiveness to demand changes. Strong operational performance is essential as it directly affects cost efficiency, consistency, customer satisfaction, and long-term competitiveness. Lean Thinking plays a significant role in enhancing operational performance by promoting continuous improvement, teamwork, and the systematic elimination of waste. Rather than being limited to tools or techniques, Lean Thinking represents a mindset that encourages employees at all levels to identify inefficiencies and contribute to problem-solving without compromising quality or overburdening resources. This people centred approach supports more efficient workflows and sustained performance improvement. When Lean Thinking is embedded within organizational culture, manufacturing processes become more stable, communication across functions improves, and operational risks are reduced. Early identification of waste and process variation helps prevent production delays and quality issues, while enhanced flexibility enables faster responses to changing customer and market requirements. All in all, Lean Thinking supports operational performance through both structured practices and a cultural shift toward shared responsibility and continuous improvement. Organizations that internalize this mindset are more likely to achieve consistent, measurable, and sustainable performance gains.

Underpinning Theory

This study is grounded in the Resource-Based View (RBV), which argues that internal

capabilities such as knowledge, culture, and continuous improvement practices are critical sources of sustained competitive advantage. Under the Resource-Based View, Lean Thinking in this study is conceptualized as an intangible, heterogeneous, and imperfectly immobile resource, as it varies across organizations and is deeply embedded in organizational culture and employee behaviour. While Lean Thinking is heterogeneous, its imperfect immobility is more critical in explaining sustained competitive advantage, because it cannot be easily replicated by competitor. Empirical evidence supports this view. Panigrahi et al. (2023) found that Lean practices embedded as an organizational mindset significantly enhance productivity, cycle time, and operational efficiency. Similarly, Suroso and Santosa (2024) demonstrated that Lean dimensions including workforce involvement and process standardization positively influence quality, cost, and delivery performance. These findings reinforce the RBV assertion that internally developed, difficult-to-imitate capabilities drive superior performance. Accordingly, this study adopts the RBV as its theoretical underpinning and positions Lean Thinking as a strategic internal resource that enhances operational performance when embedded as a cultural and behavioural capability rather than applied solely as a set of tools.

Conceptual Framework
This research framework examines the influence of Lean Thinking on operational performance at XYZ Manufacturing. Lean Thinking is defined as an organizational mindset centred on continuous improvement, respect for people, and root-cause problem-solving, rather than the isolated application of Lean tools. Operational performance is assessed through production speed, product quality, resource utilization, delivery reliability, and responsiveness to demand changes. Prior research indicates that organizations with a strong Lean Thinking culture achieve higher efficiency, improved quality, reliable delivery, and greater operational agility (Panigrahi et al., 2023; Abidin et al., 2024; Hassan & Yusof, 2024; Suroso & Santosa, 2024). Accordingly, this framework proposes that embedding Lean Thinking across the organization
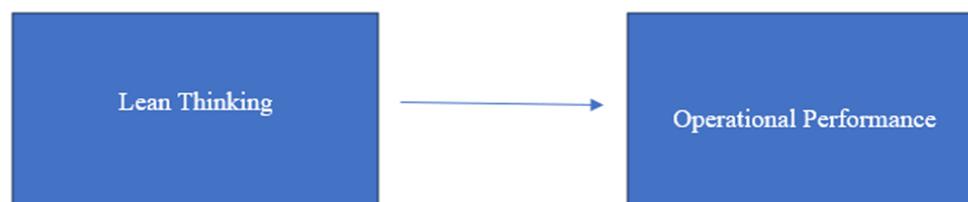
leads to sustainable improvements in operational performance, as illustrated in Figure 1.
Figure 1. Conceptual Framework

Hypotheses Development
This study is based on the assumption that Lean Thinking, when adopted as a cultural and strategic mindset, can enhance operational performance in manufacturing organizations. In this research, operational performance is treated as the dependent variable, while Lean Thinking is the independent variable. Unlike Lean tools that focus on specific techniques, Lean Thinking emphasizes employee behaviour, shared values, respect for people, and continuous improvement across all organizational levels. Lean Thinking enables system-wide improvement by encouraging employees to identify inefficiencies and participate actively in problem-solving. Previous studies have shown that organizations with a strong Lean mindset achieve better production efficiency, resource utilization, and quality outcomes (Panigrahi et

al., 2023; Abidin et al., 2024). Based on this, the first hypothesis is proposed:

H1: The level of understanding and application of Lean Thinking among employees at XYZ manufacturing is moderate.

Operational performance also depends on efficiency factors such as production speed and resource utilization. Lean Thinking supports these outcomes by reducing non-value-added activities and promoting standardized work and continuous improvement. Empirical evidence indicates that firms with a strong Lean culture demonstrate higher labor productivity and material efficiency (Abidin et al., 2024). Therefore, the second hypothesis is proposed:

H2: There is a significant relationship between Lean Thinking and operational performance at XYZ Manufacturing.

Product quality and delivery reliability are critical dimensions of operational performance. Lean Thinking promotes mistake-proofing, process standardization, and frontline engagement through practices such as Gemba walks and visual management. Studies have reported improvements in defect reduction and on-time delivery when Lean Thinking is embedded in daily operations (Panigrahi et al., 2023; Hassan & Yusof, 2024). Hence, the third hypothesis is proposed:

H3: Lean Thinking has a significant effect on operational manufacturing performance at XYZ Manufacturing.

METHODOLOGY

Research Design
This study adopts a quantitative, correlational research design to examine the relationship between Lean Thinking and operational performance at XYZ Manufacturing. A cross-sectional survey was conducted to capture employee's awareness and understanding of Lean Thinking and its association with key operational performance dimensions, including efficiency, product quality, lead time, and resource utilization. Data were collected using a structured questionnaire administered across multiple departments. As a correlational study, no variables were manipulated; instead, existing conditions were analysed to test the proposed hypotheses.

Population, Sample Size and Sampling Technique
The study focuses on employees at XYZ Manufacturing who are directly involved in operational functions. The unit of analysis is the individual employee, as the research examines how personal understanding of Lean Thinking relates to operational performance. A purposive sampling approach was applied to select respondents with relevant operational exposure and familiarity with Lean-related practices. From a total population of 240 employees, a sample size of 144 respondents was determined based on Krejcie and Morgan's (1970) guideline, which is adequate for correlational and regression analysis.
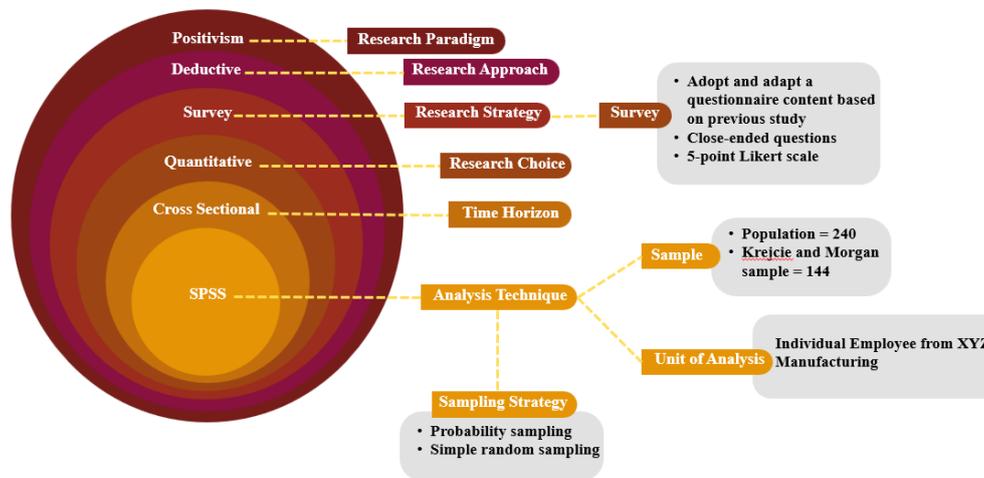
Figure 2: Onion Diagram

Research Instrument

This study adopts a quantitative, to examine the relationship between Lean Thinking and operational performance at XYZ Manufacturing. The questionnaire was the primary data collection tool that consist in 3 sections, section A demographic information, section B lean thinking awareness and mindset and section C operational performance. All statements are measured using a 5-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5). To ensure clarity, the questionnaires used close ended format. Two expert panels were invited to validate the questionnaires, and 30 respondents were invited to undergo the pilot test before distribution.

Data Analysis

Survey data were analysed using SPSS through descriptive and inferential statistical techniques. Descriptive statistics were used to summarize respondent characteristics and overall trends in Lean Thinking and operational performance. Pearson correlation analysis was applied to examine the relationship between Lean Thinking and operational performance, while regression analysis was conducted to assess the influence of Lean Thinking on performance outcomes.

RESULT AND ANALYSIS

Respond Rate and Result of Reliability Test

Table 2 *Cronbach's Alpha Reliability*

No.	Construct	Cronbach's Alpha Pilot Test	Cronbach's Alpha Actual
1	Lean Thinking Awareness and Mindset	0.91	0.91
2	Lean Practices and Implementation	0.88	0.88
3	Operational Performance	0.87	0.87

A total of 144 respondents participated in the survey. The reliability of the survey instrument was assessed using Cronbach's Alpha for both the pilot test and the actual study to ensure internal consistency as shown in table 2. The results indicate high reliability across all constructs. Specifically, Lean Thinking Awareness and Mindset achieved a Cronbach's Alpha of 0.91 in both the pilot and actual tests, demonstrating excellent consistency. Lean Practices and Implementation showed a Cronbach's Alpha of 0.88, indicating good reliability, while Operational Performance scored 0.87, also reflecting good internal consistency. These results confirm that the survey instrument is reliable for measuring the intended constructs in this study.

Missing Data

To maintain the integrity of the study's findings and avoid potential distortions, it is important to conduct a thorough data review, including checking for any missing information.

Table 3 *Missing Data Statistics*

Dimension	N	Mean	Std Deviation	Count	Percent	Low	High
Lean Thinking Awareness and Mindset	144	3.98	0.5695	0	.0	0	0
Lean Practices and Implementation	144	3.67	0.5935	0	.0	0	0
Operational Performance	144	4.076	0.582	0	.0	0	0

The data analysis revealed no missing responses as shown in table 3, indicating that all participants fully completed the questionnaire. The count and percentage of missing items for each dimension were both 0, confirming the completeness of the collected data.

Normality Test

Both the Kolmogorov-Smirnov test and the Shapiro-Wilk test can be utilised to identify if the data reflects a normal distribution.

Table 4 *Normality Test*

Dimension	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Lean Thinking Awareness and Mindset	0.266	144	<0.001	0.753	144	<0.001
Lean Practices and Implementation	0.397	144	<0.001	0.614	144	<0.001
Operational Performance	0.297	144	<0.001	0.761	144	<0.001

A test result that is statistically significant ($P \leq 0.05$) is needed to demonstrate that the value is significant for this study. Based on table 4, since the p value is less than 0.001 in every dimension, it is acceptable to infer that the data came from a normal distribution.

Demographic Analysis

Table 5 *Respondents Demographic Analysis Result*

No.	Demographic	Frequency (N)	Percentage (%)
1.	**Department:**		
	General Management	2	1.4
	Cold End	27	18.8
	EHS	3	2.1
	Hot End	46	31.9
	HR	4	2.8
	Quality Control	56	38.9
	SG	6	4.2
2.	**Position:**		
	Plant Manager	1	0.7
	Technical Director	1	0.7
	Manager	8	5.6
	Engineer/ Executive	89	61.8
	Operator/ Technician	45	31.3
3.	**Years of Experience:**		
	1-3 years	138	95.8
	4-6 years	5	3.5
	More than 10 years	1	0.7
4.	**Education Background**		
	Secondary/ High School	45	31.3
	Diploma	1	0.7
	Bachelor's Degree	98	68.1

Table 5 presents the demographic profile of the respondents involved in this study. In terms of department, the majority of respondents were from the Quality Control department (38.9%), followed by the Hot End department (31.9%) and Cold End department (18.8%), indicating strong representation from core operational units. Regarding position, most respondents were Engineers/Executives (61.8%), while Operators/Technicians accounted for 31.3%, suggesting that the data were mainly gathered from employees directly involved in operational and technical activities. In terms of years of experience, the majority of respondents had between 1–3 years of experience (95.8%), indicating a relatively young workforce. With respect to educational background, most respondents held a Bachelor's degree (68.1%), followed by those with secondary or high school education (31.3%), reflecting a workforce with a relatively high level of formal education.

Figure 2 illustrates the distribution of respondents by department. The largest proportion of respondents came from the Quality Control department (38.9%), followed by the Hot End (31.9%) and Cold End (18.8%) departments. Other departments, including HR, EHS, SG, and General Management, contributed smaller proportions to the total sample.
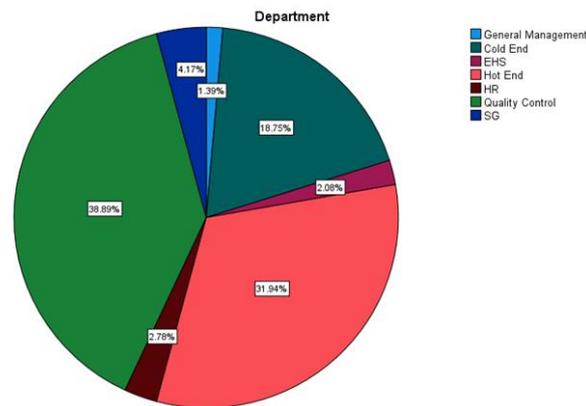
Figure 2 Percentage of Department

Descriptive Analysis

Descriptive analysis indicates that all study variables recorded high mean values, reflecting positive outcomes at XYZ Manufacturing as shown in table 6. Lean Thinking Awareness and Mindset showed a high mean score (M = 3.98), indicating strong employee understanding and a positive continuous improvement mindset. Lean Practices and Implementation also achieved a high mean score (M = 3.67), suggesting effective application of Lean practices in operations. Operational Performance recorded the highest mean score (M = 4.076), reflecting strong performance in efficiency, quality, and delivery reliability. Overall, the results demonstrate high Lean awareness, effective Lean implementation, and strong operational performance, with consistent perceptions among respondents as indicated by the relatively low standard deviation values.

Table 6 *Descriptive Analysis*

Dimension	N	Min	Max	Mean	Std Deviation
Lean Thinking Awareness and Mindset	144	2.83	4.67	3.98	0.5696
Lean Practices and Implementation	144	2.5	4.33	3.67	0.5935
Operational Performance	144	2.8	4.6	4.076	0.582

Correlation Analysis

Correlation analysis reveals that Lean Thinking has a moderate, positive, and statistically significant relationship with operational performance (r = 0.454, p < 0.001, N = 144), as presented in Table 7. This indicates that higher levels of Lean Thinking understanding and application among employees are associated with improved operational performance at XYZ Manufacturing. The correlation coefficient value of 0.454 suggests a moderate strength relationship, implying that Lean Thinking plays an important role in influencing operational outcomes.

Table 7 *Correlation Analysis*

		Dependent	Independent

		Variable	Variable
Dependent Variable	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	144	
Independent Variable	Pearson Correlation	0.454	1
	Sig. (2-tailed)	<0.001	
	N	144	144

Regression Analysis

To measure the study's objective regarding the impact of independent variable on dependent variable, regression analysis has been put into use. It is essential to execute regression analysis to understand the yields of the most significant result of r square to distinguish the proportion of independent variable's contribution to the dependent variable. This study employs regression analysis to examine the role of lean thinking in improving operational performance.

Table 8 *Regression Analysis*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.454	0.206	0.201	0.59439

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.053	1	13.053	36.946	<0.01[b]
	Residual	50.169	142	0.353		
	Total	63.222	143			

Coefficients

Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	0.917	0.569		1.613	0.109
	Independent Variable	0.928	0.153	0.454	6.078	<0.001

Table 8 indicates that operational performance has a significant positive impact. The R^2 value of 0.206 shows that 20.6% of the variance in the dependent variable is explained by the independent variable, suggesting that the model demonstrates a moderate level of explanatory power. The ANOVA results further confirm that the regression model is statistically significant, with an F-value of 36.946 and a p-value less than 0.001, indicating that the overall model reliably predicts the dependent variable. The standardized coefficient (Beta) for Lean Thinking is 0.454, with a corresponding t-value of 6.078 (p < 0.001), demonstrating a strong and significant relationship between the variables. Additionally, the unstandardized coefficient (B = 0.928) suggests that a one-unit increase in Lean Thinking contributes to a 0.928-unit increase in Operational Performance. This confirms that the independent variable positively influences the dependent variable.

Hypothesis Validity

The core finding of this study is the confirmation of a statistically significant and positive impact of Lean Thinking on operational manufacturing performance at XYZ Manufacturing as shown in table 9. All three stated hypotheses were strongly supported by the regression analysis.

Table 9 *Hypothesis Validity*

Hypothesis	Result
The level of understanding and application of Lean Thinking among employees at XYZ Manufacturing is moderate.	Supported
There is a significant relationship between Lean Thinking and operational performance at XYZ Manufacturing.	Supported
Lean Thinking has a significant effect on operational manufacturing performance at XYZ Manufacturing.	Supported

In summary, the statistical evidence strongly validates the hypothesis that Lean Thinking is a vital strategic factor, significantly influencing and improving operational manufacturing performance across all measured dimensions.

DISCUSSIONS

The study reveals that while XYZ Manufacturing has implemented Lean tools such as Kanban, Jidoka, and Heijunka, these practices alone do not significantly enhance operational performance. This finding supports prior literature which argues that the isolated application of Lean tools, without a supporting Lean thinking, often results in short-term or unsustainable improvements. The results emphasize that Lean Thinking should be viewed as a holistic philosophy rather than a collection of tools. With respect to first objective, to assess the level of understanding of Lean Thinking against operational performance among employees at XYZ Manufacturing, the findings indicate that employees demonstrate a moderate to high level of understanding of Lean Thinking, which corresponds with favourable levels of operational performance. This objective is therefore achieved, as the descriptive analysis confirms that employee's awareness and understanding of Lean principles are aligned with improvements in productivity, quality, and delivery reliability.

Regarding second objective, to determine the relationship between Lean Thinking and operational performance at XYZ Manufacturing, the inferential analysis reveals a significant positive relationship between Lean Thinking and operational performance. The results indicate that stronger adoption of Lean Thinking is associated with higher levels of productivity, improved quality, and more reliable delivery performance. Thus, second objective is successfully achieved, confirming that Lean Thinking plays an important role in enhancing operational outcomes. In relation to third objective, to study the impact of Lean Thinking on operational performance at XYZ Manufacturing, regression analysis demonstrates that employees understanding of Lean Thinking has a significant positive impact on operational performance ($\beta = 0.454$, $p < 0.001$), explaining 20.6% of the variance in operational performance. This finding confirms that Lean Thinking contributes meaningfully to operational performance beyond the mere application of Lean tools. Therefore, third objective is achieved, highlighting the importance of embedding Lean Thinking as a shared organizational mindset to ensure sustainable performance improvements. Overall, the findings reinforce the argument that while Lean tools provide a necessary structural foundation, sustainable operational excellence can only be achieved when Lean Thinking is deeply embedded in employees daily practices and decision making processes. This aligns with contemporary Lean literature, which emphasizes mindset, culture, and continuous improvement as key drivers of long-term operational success.

CONCLUSION

This study concludes that Lean Thinking and employees' understanding of Lean principles play a significant role in enhancing operational performance at XYZ Manufacturing. The findings demonstrate that effective Lean adoption is associated with improvements in product quality, delivery reliability, and overall operational efficiency. These results reinforce the view that Lean should be approached as a cultural and behavioural philosophy rather than solely as a set of technical tools. Despite certain limitations, including the use of a cross-sectional design and data drawn from a single organization, the study provides a meaningful foundation for future research on Lean Thinking and operational excellence. Future studies are recommended to adopt longitudinal research designs to examine the long-term effects of Lean Thinking on performance outcomes, incorporate qualitative methods to gain deeper insights into employee behaviour and leadership influence, and extend the investigation across multiple organizations or industries to improve generalizability. Overall, the study highlights the importance of investing in employee knowledge development and cultivating a strong Lean culture to achieve sustainable productivity and competitive advantage.

Limitations And Future Studies

This study provides valuable insights into the influence of Lean Thinking and employees' understanding of Lean on operational performance at XYZ Manufacturing. However, the research was conducted in a single organization, which may limit the generalizability of the findings to other companies or industries. Future research should expand the study to multiple organizations or sectors to enhance generalizability and provide a broader understanding of Lean implementation across diverse manufacturing contexts.

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THE IMPACT OF WORK PERFOMANCES FACTORS IN LOGISTIC INDUSTRIES

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ABSTRACT

This study examines the impact of work performance factors on employee performance in the logistics industry, focusing on Syarikat Wijaya (Masai) Sdn. Bhd. The objective is to determine the relationship and influence of workplace environment, management behavior, job satisfaction, and motivation on employee performance. A quantitative research approach was adopted, where primary data was collected through structured questionnaires distributed to 40 employees from different departments. The data were analyzed using SPSS through descriptive statistics, Pearson correlation, and multiple regression analysis. The findings reveal that all factors are positively related to employee performance, with motivation and job satisfaction showing the strongest relationships and emerging as significant predictors. Workplace environment and management behavior were positively associated but not statistically significant when other variables were controlled. This study contributes by providing empirical insights that support management in improving motivational strategies, enhancing job satisfaction, and developing effective workplace practices to strengthen organizational productivity and employee outcomes in the logistics sector.

Keywords: Workplace environment, Management behavior, Job satisfaction, Motivation, Employee performance

INTRODUCTION

Employee performance is a fundamental determinant of organisational effectiveness, particularly within the logistics industry where operational efficiency and service quality are essential for competitiveness. Workplace-related factors such as workplace environment, management behaviour, job satisfaction, and motivation are widely recognised as influential elements affecting employee performance. Despite their importance, organisations often encounter difficulties in identifying which factors most significantly contribute to performance outcomes, resulting in gaps in strategic human resource practices. In the context of Syarikat Wijaya (Masai) Sdn. Bhd., limited empirical research has been conducted to evaluate how these factors influence employee performance, indicating a need for systematic investigation. Therefore, this study aims to examine the relationships and effects of workplace environment, management behaviour, job satisfaction, and motivation on employee performance. The findings of this research are expected to provide practical insights for organisational management in enhancing workplace strategies and employee development initiatives, while also contributing to academic literature in the fields of organisational behaviour and human resource management.

LITERATURE REVIEW

This chapter reviews theoretical and empirical literature related to employee performance and its influencing factors. Employee performance has been widely recognized as a fundamental component of organizational competitiveness and sustainability, as it contributes directly to productivity and operational success (Saleem et al.,2022). Workplace-related factors including environment, management behavior, job satisfaction, and motivation have been identified as important determinants of employee outcomes. Prior research demonstrates that human and environmental factors significantly influence workers' performance and well-being, particularly within logistics operations where coordination and efficiency are essential (Aloini et al., 2021). This review establishes the theoretical foundation for the study, clarifies the definitions of variables, and supports the development of the conceptual framework.

Employee Performance and Theory

Employee performance refers to how effectively employees execute tasks relative to expected standards, often evaluated through productivity, efficiency, and quality of work outcomes (Performance Rating, 2024). Effective performance measurement helps organizations assign work appropriately, identify training needs, and improve job outcomes.**n**The present study is grounded in theoretical perspectives explaining behavioral outcomes at work. The Job Demands–Resources (JD-R) model proposes that employee well-being and performance are influenced by job conditions and available resources, highlighting the importance of workplace factors in shaping outcomes. Additionally, Affective Events Theory suggests that workplace experiences and emotional responses influence job performance and satisfaction, linking environmental events to behavioral reactions. These perspectives justify treating employee performance as the dependent variable influenced by workplace and psychological factors.
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Workplace Environment

Workplace environment refers to physical, social, and organizational conditions influencing employees during task execution. Research indicates that environmental and interpersonal conditions significantly affect workers' performance and well-being in logistics settings (Aloini et al., 2021). Organizational support theory further explains that employees who perceive supportive work conditions tend to reciprocate with improved performance and commitment.

Management Behavior

Management behavior encompasses leadership practices, communication, and supervisory interactions that shape employee attitudes and outcomes. The concept of an ideal managerial climate emphasizes relationships and leadership functions as determinants of organizational effectiveness (Redding, 1972).
Research also shows that workplace incivility negatively affects employee performance, while trust in supervisors enhances it, highlighting the importance of managerial conduct.

Job Satisfaction

Job satisfaction refers to a positive emotional state resulting from evaluation of one's job experience (Locke & Latham, 2006). It is influenced by factors such as working conditions, pay, autonomy, and leadership style and plays a crucial role in employee retention and engagement. The relationship between job satisfaction and performance has long been

theoretically recognized, with performance contributing to satisfaction when it fulfils important job values. Empirical evidence further shows job satisfaction mediates motivational influences and significantly improves employee performance outcomes.

Motivation

Motivation refers to internal and external drivers that stimulate employees to exert effort toward organisational goals. Studies demonstrate that motivational factors and incentives shape behaviour and work output, particularly through organisational norms and management styles. Motivation has also been shown to positively influence both job satisfaction and performance, reinforcing its role as a key predictor of employee outcomes

Conceptual Framework

In Figure 2.5.1, the conceptual framework illustrates the relationship between the dependent variable, the factors of work performance, and the independent variables that impact workplace effectiveness.
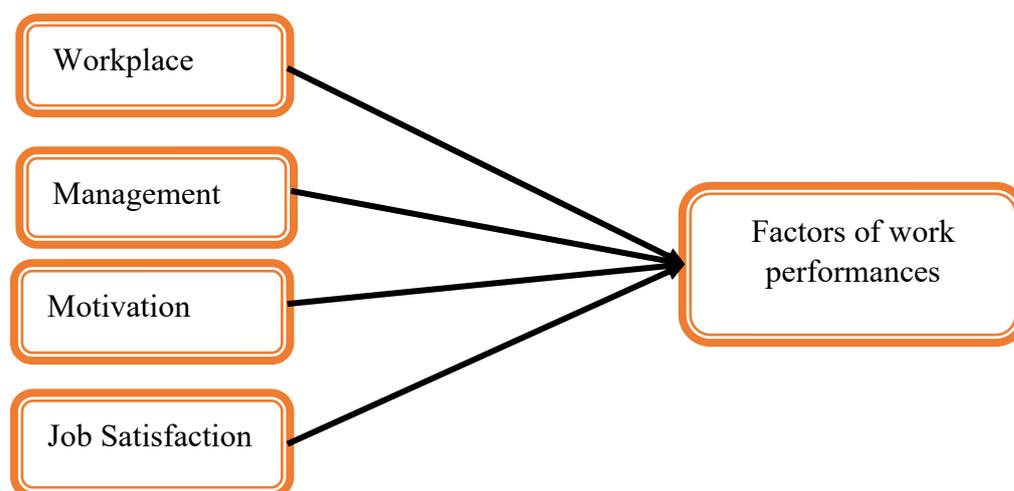
Figure 2.5.1 Research Framework

Theoretical Framework

This study is supported by several established organisational and motivational theories that explain how workplace factors influence employee performance. The theoretical foundation strengthens the interpretation of the relationships examined in this research by providing conceptual justification for the proposed framework. Maslow's Hierarchy of Needs Theory provides an important basis for understanding employee motivation and behaviour. Maslow proposed that individuals are driven by a progression of needs ranging from physiological and safety needs to social belonging, esteem, and self-actualisation. Within the workplace context, employees require safe working conditions, job security, supportive relationships, and recognition before they can reach their highest productivity levels. A positive workplace environment that ensures comfort, security, and interpersonal support enables employees to satisfy lower-level needs, thereby allowing them to focus on higher-level achievement and performance outcomes. Consequently, organisations that provide adequate facilities, supportive supervision, and recognition mechanisms are more likely to foster motivated and

productive workers.

Herzberg's Two-Factor Theory further explains the relationship between workplace conditions and employee performance. Herzberg distinguished between hygiene factors and motivators. Hygiene factors include physical working conditions, organisational policies, salary, and interpersonal relations. Although these factors may not directly motivate employees, their absence can cause dissatisfaction and reduced performance. Motivators, on the other hand, such as recognition, responsibility, and achievement, actively enhance job satisfaction and productivity. In the context of this study, workplace environment and management behaviour represent hygiene factors, while job satisfaction and motivation function as motivators that drive improved employee performance. This theoretical perspective supports the examination of both environmental and psychological determinants within the research framework.

Additionally, Expectancy Theory provides insight into how employees decide to exert effort in their work roles. The theory suggests that individuals are motivated when they believe their effort will lead to good performance and that such performance will result in valued outcomes. When employees perceive supportive management, sufficient resources, and fair organisational practices, they are more likely to expect that their efforts will be rewarded. This expectation strengthens motivation and contributes to improved performance levels. In logistics organisations, where operational efficiency is essential, aligning employee expectations with organisational rewards can significantly influence productivity. Overall, these theoretical perspectives collectively support the study's assumption that workplace environment, management behaviour, motivation, and job satisfaction play interconnected roles in shaping employee performance. Integrating these theories into the research strengthens the academic foundation of the study and provides a structured lens through which the empirical findings can be interpreted.

METHODOLOGY

This chapter describes the methodology adopted in conducting the study. It outlines the research approach, design framework, population and sampling technique, and data analysis procedures applied to investigate the relationship between workplace environment factors and employee performance. A quantitative research approach was employed to obtain measurable and objective data relevant to the research objectives. The research design was structured based on the research onion framework, which guided the selection of research philosophy, approach, strategy, data collection methods, and analysis procedures, ensuring systematic and reliable investigation. The population of this study consisted of employees working at Syarikat Wijaya (Masai) Sdn. Bhd. A sampling technique was applied to select respondents representing various departments within the organization. Questionnaires were distributed to 40 employees, forming the sample size for data collection. This approach enabled efficient data gathering while maintaining relevance to the study context.

The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summaries respondent characteristics, while Pearson correlation analysis examined relationships between variables. Multiple regression analysis was conducted to determine the influence of independent variables on employee performance.

Figure 3.1 illustrates the research onion framework adopted in this study. The outer layer represents the positivist research philosophy, followed by a deductive research approach. A survey strategy is employed using a quantitative methodological choice. The study applies a cross-sectional time horizon, and data are collected through structured questionnaires and analysed using statistical software (SPSS). This study was conducted among employees of Syarikat Wijaya (Masai) Sdn. Bhd., a company operating in the logistics industry. The target population comprised employees from various departments within the organization. A total of 40 respondents participated in this study, and this number was considered adequate to represent the population. The respondents were selected using a probability sampling method, specifically simple random sampling, to ensure that each employee had an equal opportunity to be included in the study, thereby reducing sampling bias and enhancing the representativeness of the data.
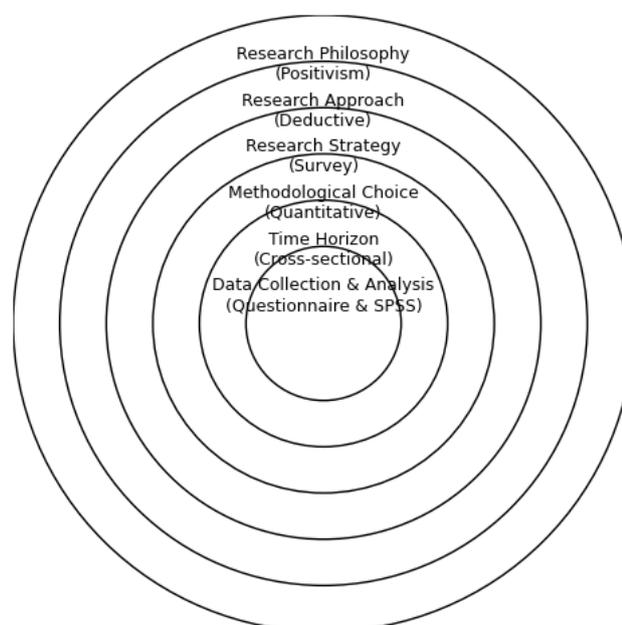
Figure 3.1: Research Onion Diagram of the Study

Ethical Considerations and Research Limitations

Ethical considerations were carefully observed throughout the research process to ensure the protection and respect of all participants involved in the study. Participation in the questionnaire survey was entirely voluntary, and respondents were informed of the purpose of the research before completing the survey. They were assured that their responses would remain anonymous and confidential and would be used strictly for academic purposes. No personal identifying information was collected, and all data were handled responsibly to prevent misuse or disclosure. Respondents were also given the freedom to withdraw from participation at any stage without facing any consequences. These measures were taken to maintain professional research standards and to ensure the integrity and credibility of the data collected. Despite careful planning and execution, this study is subject to certain limitations. First, the sample size was relatively small, consisting of only 40 respondents from a single

organisation. This may limit the generalisability of the findings to the broader logistics industry. Second, the use of self-reported questionnaire responses introduces the possibility of response bias, as participants may provide socially desirable answers rather than reflecting their true perceptions. Third, the study focused on a limited number of performance factors, which means other potentially influential variables such as organisational culture, leadership style, or compensation structure were not examined. Future research could address these limitations by including larger samples, multiple organisations, or mixed-method approaches to gain deeper insights.

Data Analysis Method

Data were collected using a structured questionnaire and analysed using the Statistical Package for the Social Sciences (SPSS). Several statistical techniques were employed to address the research objectives. Descriptive analysis was conducted to summarise the demographic characteristics of the respondents and to describe the overall distribution of the data using frequencies, percentages, and mean values. Pearson correlation analysis was then utilised to examine the relationships between the independent variables, namely workplace environment, management behaviour, motivation, and job satisfaction, and the dependent variable, employee performance. Finally, multiple regression analysis was performed to determine the extent to which the independent variables significantly influenced employee performance and to identify the strongest predictors of employee performance.

RESULT AND ANALYSIS

The demographic analysis provides an overview of the respondents' background and offers important context for interpreting the study findings. The gender distribution shows that male respondents (57.5%) slightly outnumber female respondents (42.5%). This reflects the nature of the logistics industry, which traditionally involves physically demanding operational roles such as driving, loading, and warehouse activities that are often male dominated. However, the relatively high participation of female respondents indicates increasing female involvement in administrative, coordination, and support roles within logistics organizations. This balanced representation strengthens the credibility of the study by incorporating perspectives from both genders.

Demographic Analysis

Table 1 Respondents Demographic Analysis Result

No.	Demographic	Frequency (N)	Percentage (%)
1.	**Gender:**		
	Male	23	57.5
	Female	17	42.5
2.	**Age:**		
	25-34 years	24	60.0

No.	Demographic	Frequency (N)	Percentage (%)
	35-44 years	12	30.
	45 years and above	4	10.0
3.	**Occupation:**		
	Director	5	12.5
	Manager	2	5.0
	Admin	19	47.5
	Driver	14	35.0
4.	**Monthly Income:**		
	Below RM 2,500	10	25.0
	RM 2,500- RM 5,000	24	60.0
	RM 5,001 and above	6	15.0

Gender of Respondents

Table 1 shows the gender distribution of the respondents. Out of 40 respondents, 23 (57.5%) were male, while 17 (42.5%) were female. This indicates that male respondents slightly outnumbered female respondents in the study, reflecting the male-dominated nature of the logistics industry. However, the relatively high proportion of female respondents suggests increasing female participation, particularly in administrative and support roles.

Age of Respondents

Table 1 presents the age distribution of the respondents. The majority of respondents (60.0%) were aged between 25 and 34 years, followed by those aged 35 to 44 years (30.0%). Only 10.0% of respondents were aged 45 years and above. This distribution indicates that the workforce in the logistics industry is predominantly composed of young and mid-career employees who are likely to be active and productive in their roles.

Occupation of Respondents

Table 1 illustrates the occupational distribution of the respondents. Nearly half of the respondents (47.5%) were employed in administrative positions, followed by drivers who accounted for 35.0% of the sample. Directors and managers represented 12.5% and 5.0% of respondents respectively. This shows that the sample includes respondents from various organisational levels, providing a balanced view of administrative, operational, and managerial perspectives within the logistics industry.

Monthly Income of Respondents

Table 1 displays the monthly income levels of the respondents. Most respondents (60.0%) earned between RM2,501 and RM5,000 per month, indicating a moderate-income level typical of logistics sector employees. A total of 25.0% earned below RM2,500, while 15.0% reported earning RM5,001 and above. This income distribution reflects a standard wage structure in the logistics industry, with a majority of employees positioned within the middle-income category.

Pearson Correlation Analysis

		Workers Performance	WorkplaceEnvironment	ManagementBehaviour	Job Satisfaction	Motivation
Pearson Correlation	Workers Performance	1.000	.935	.900	.960	.965
	WorkplaceEnvirment	.935	1.000	.948	.922	.944
	ManagementBehaviour	.900	.948	1.000	.891	.932
	Job Satisfaction	.960	.922	.891	1.000	.965
	Motivation	.965	.944	.932	.965	1.000
Sig. (1-tailed)	Workers Performance	.	.000	.000	.000	.000
	WorkplaceEnvirment	.000	.	.000	.000	.000
	ManagementBehaviour	.000	.000	.	.000	.000
	Job Satisfaction	.000	.000	.000	.	.000
	Motivation	.000	.000	.000	.000	.
N	Workers Performance	40	40	40	40	40
	WorkplaceEnvirment	40	40	40	40	40
	ManagementBehaviour	40	40	40	40	40
	Job Satisfaction	40	40	40	40	40
	Motivation	40	40	40	40	40

Table 4.6 Correlation Analysis

Table 4.6 presents the results of the Pearson correlation analysis conducted to examine the relationship between workers' performance and the four independent variables, namely workplace environment, management behaviour, job satisfaction, and motivation. Pearson correlation was employed to determine the strength and direction of the linear relationships between the variables. The results indicate that all independent variables have strong, positive, and statistically significant relationships with workers' performance at the 0.01 significance level ($p < 0.01$). Motivation shows the strongest correlation with workers' performance ($r = 0.965$), suggesting that higher levels of employee motivation are closely associated with higher performance levels in the logistics industry. This finding highlights the importance of motivational factors such as rewards, recognition, and persona drive-in enhancing employee output. Job satisfaction also demonstrates a very strong positive relationship with workers' performance ($r = 0.960$). This implies that employees who are satisfied with their job roles, working conditions, and organisational support tend to perform better. The workplace environment shows a strong positive correlation with performance ($r = 0.935$), indicating that

safe, comfortable, and well-equipped working conditions contribute positively to employee performance. Similarly, management behaviour exhibits a strong positive relationship with workers' performance (r = 0.900), suggesting that supportive leadership and effective supervision enhance employee effectiveness.

In addition, the independent variables are highly correlated with one another. For instance, workplace environment is strongly correlated with management behaviour (r = 0.948) and motivation (r = 0.944), while motivation and job satisfaction are also highly correlated (r = 0.965). These strong intercorrelations suggest that improvements in one aspect of the work environment may positively influence other work performance factors. Overall, the Pearson correlation results support Research Objective 2 and confirm that all work performance factors are significantly related to workers' performance in the logistics industry.

Multiple Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.974ᵃ	.948	.942	.58458	1.629

a. Predictors: (Constant), Motivation, ManagementBehaviour, WorkplaceEnviment, Job Satisfaction
b. Dependent Variable: Workers Performance
Table 4.7 Model Summary

The model summary in Table 4.7 indicates a very strong overall relationship between the independent variables and workers' performance, with a multiple correlation coefficient of R = 0.974. The R² value of 0.948 indicates that 94.8% of the variance in workers' performance can be explained by the combined effect of workplace environment, management behavior, job satisfaction, and motivation. The adjusted R² value of 0.942 further confirms that the model remains strong after adjusting for the number of predictors and sample size. The standard error of the estimate is relatively low (0.58458), indicating good predictive accuracy of the model. In addition, the Durbin–Watson statistic of 1.629 falls within the acceptable range (1.5–2.5), suggesting that there is no serious autocorrelation problem in the residuals. Overall, the model summary confirms that the regression model is robust and suitable for predicting workers' performance.

ANOVA
The ANOVA results in Table 4.8 show that the regression model is statistically significant (F = 158.760, p < 0.001). This indicates that the set of independent variables significantly predicts workers' performance in the logistics industry. The large F-value and the very small p-value suggest that the likelihood of this result occurring by chance is extremely low. The regression sum of squares (217.014) is substantially higher than the residual sum of squares (11.961),

indicating that most of the variation in workers' performance is explained by the independent variables included in the model. These results confirm that the overall regression model is valid and effectively explains workers' performance.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	217.014	4	54.254	158.760	.000[b]
	Residual	11.961	35	.342		
	Total	228.975	39			

a. Dependent Variable: Workers Performance
b. Predictors: (Constant), Motivation, ManagementBehaviour, WorkplaceEnvirment, Job Satisfaction

Table 4.8 ANOVA

Coefficient Analysis

Table 4.9 presents the regression coefficients for each independent variable. Motivation emerges as the strongest and most significant predictor of workers' performance (β = 0.481, p = 0.015). This result indicates that an increase in employee motivation leads to a significant increase in performance, supporting the importance of motivational strategies in the logistics sector. Job satisfaction is also found to be a significant predictor of workers' performance (β = 0.363, p = 0.021). This suggests that employees who are satisfied with their jobs, working conditions, and organizational support tend to demonstrate higher levels of performance. In contrast, workplace environment shows a positive but statistically non-significant effect on workers' performance (β = 0.246, p = 0.103). Similarly, management behavior exhibits a negative and non-significant effect (β = −0.104, p = 0.434). These findings indicate that although workplace environment and management behavior are positively correlated with performance; their direct influence becomes insignificant when motivation and job satisfaction are considered simultaneously.

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	Upper Bound	Correlations Zero-order	Partial	Part	Collinearity Statistics Tolerance	VIF
1	(Constant)	-.504	.639		-.788	.436	-1.802	.794					
	WorkplaceEnvirment	.160	.095	.246	1.675	.103	-.034	.354	.935	.272	.065	.069	14.398
	ManagementBehaviour	-.058	.074	-.104	-.792	.434	-.208	.091	.900	-.133	-.031	.086	11.650
	JobSatisfaction	.226	.093	.363	2.416	.021	.036	.415	.960	.378	.093	.066	15.094
	Motivation	.288	.112	.481	2.571	.015	.061	.515	.965	.399	.099	.043	23.439

a. Dependent Variable: WorkersPerformance

Table 4.9 Coefficient Analysis

The collinearity statistics reveal high Variance Inflation Factor (VIF) values, indicating the presence of multicollinearity among the independent variables. This is consistent with the strong correlations observed earlier. While multicollinearity does not affect the overall predictive power of the model, it may reduce the statistical significance of individual predictors. Despite this limitation, the regression results clearly demonstrate that motivation and job satisfaction are the most critical determinants of workers' performance in the logistics industry.

SUMMARY
Based on the Pearson correlation and multiple regression analyses, it can be concluded that all work performance factors are significantly related to workers' performance. However, motivation and job satisfaction are the strongest predictors of performance when the effects of other variables are controlled. These findings partially support Research Objective 3 and provide strong empirical evidence for the proposed research framework.

Summary of Results in Relation to Research Objectives and Hypotheses
This section summarizes the principal findings of the study and evaluates the extent to which the research objectives and hypotheses were achieved based on the empirical evidence presented.

Research Objective 1
The first objective aimed to identify the key factors influencing workers' performance in the logistics industry. Results from descriptive and correlation analyses indicated that workplace environment, management behaviour, motivation, and job satisfaction are all relevant determinants of workers' performance. Among these variables, motivation and job satisfaction demonstrated higher mean scores and stronger associations with performance outcomes. Therefore, Research Objective 1 was successfully achieved.

Research Objective 2
The second objective sought to examine the relationship between work performance factors and workers' performance. Pearson correlation analysis revealed that all independent variables—workplace environment, management behaviour, motivation, and job satisfaction—were positively and significantly related to workers' performance ($p < .05$). These findings confirm the existence of meaningful associations between the examined factors and performance, indicating that Research Objective 2 was achieved and that all relationship-based hypotheses were supported.

Research Objective 3
The third objective aimed to determine the impact of work performance factors on workers' performance. Multiple regression analysis showed that motivation and job satisfaction

significantly influenced workers' performance (p < .05). In contrast, workplace environment and management behaviour did not demonstrate statistically significant predictive effects when analysed alongside other variables. Accordingly, Research Objective 3 was partially achieved.

CONCLUSION

In conclusion, the study achieved the majority of its research objectives. Although all examined factors exhibited significant relationships with workers' performance, only motivation and job satisfaction emerged as significant predictors of performance outcomes. Consequently, the hypotheses related to motivation and job satisfaction were accepted, whereas those concerning workplace environment and management behaviour were rejected. Overall, the findings highlight the dominant role of psychological and intrinsic factors in shaping workers' performance within the logistics industry, emphasizing the importance of fostering employee motivation and satisfaction to enhance organisational effectiveness.

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A COMPREHENSIVE STUDY ON THE FACTORS AFFECTING EMPLOYEES' WORK-LIFE BALANCE IN THE WORKPLACE

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ABSTRACT

This study examines work-life balance among employees BS Fitness Nutrition (M) Sdn. Bhd., as work -life balance hase become a crucial issue in today's demanding work environment. The objective of this study is to identify the factors influencing employees' work-life balance and to determine the most significant predictors. A quantitative approach was adopted using structure questionaire, and the data were anlysed using SPSS through descriptive, correlation and multiple regression analyses. The results indicate that workload and leave policies are the most significant factors affecting employees' work-life balance. This study provides valuable insights for organisations in developing effective workplace policies to enhance employee well-being and organisational performance.

Keywords: Work-Life Balance, Working Hours, Workload, Leave Policies, Work Arrangement, Reward Schemes

INTRODUCTION

Work-life balance refers to the ability of individuals to effectively manage and fulfill both work and personal life responsibilities in a way that promotes well-being and reduces conflict between the two domains (Greenhaus & Allen, 2011). Work-life balance has become an increasingly critical issue in today's fast-paced working environment. According to Derks & Bakker (2014) employees often struggle to manage their professional and personal lives due to excessive workloads, long working hours, and the pressure to remain constantly connected through digital devices. Greenhaus & Allen, (2011) state has led to growing concerns about mental health, stress, and burnout. A lack of flexible working arrangements and unsupportive organizational cultures further exacerbate the situation (Voydanoff, 2005). Additionally, Emslie & Hunt (2009) reveal gender disparities persist, with women typically bearing a disproportionate share of domestic responsibilities, making it harder for them to achieve balance (Emslie & Hunt, 2009). These challenges highlight the urgent need for more holistic and supportive work policies that prioritize employee well-being.

Work-life balance remains a global concern, with different regions facing unique challenges. In developed countries like the United States and Japan, employees often struggle with long working hours, high job demands, and a strong overwork culture that contributes to burnout and decreased productivity (OECD, 2021; Shimazu et al., 2010). Meanwhile, in Malaysia, issues such as lack of flexible work arrangements, rigid organizational structures, and blurred boundaries between work and home especially during and after the COVID-19 pandemic have worsened the work-life conflict for many employees (Talib et al., 2021). Furthermore, cultural expectations and limited employer support for family responsibilities in Malaysia continue to

create difficulties, particularly for working women. These shared and localized challenges emphasize the need for organizations and governments to implement more inclusive and adaptive work-life policies. As highlighted by Greenhaus & Allen (2011), work-life balance (WLB) has emerged as a pressing research concern due to its significant impact on employee well-being, job satisfaction, and organizational effectiveness. This research is essential to address the increasing imbalance faced by employees who are overwhelmed by extended working hours, excessive workloads, rigid leave policies, limited flexibility in work arrangements, and poorly structured reward schemes (Pocock, 2005; Chan, 2015). These elements directly influence an employee's ability to maintain a healthy equilibrium between professional and personal life. WLB is selected as the core topic because it is closely linked to mental health, family stability, and retention rates, especially in the post-pandemic work environment (Talib et al., 2021). Despite growing awareness, major issues remain studies reveal that 60% of global employees work beyond their contracted hours, while 66% of workers in Asia report poor work-life balance, with women being disproportionately affected (OECD, 2021; Statista, 2022). In Malaysia, challenges such as inflexible work culture, high job demands, and inadequate family support policies continue to intensify the conflict between work and life roles (Mansor et al., 2020). These findings highlight the urgent need for deeper investigation and practical strategies to improve WLB through more responsive work policies and environments.

The objectives of this research are to identify the most influential factors affecting employees' work-life balance, to examine the relationships between the selected organisational factors and employees' work-life balance, and to determine the factors that have the greatest impact on employees' ability to balance their work and personal life. The study is expected to contribute to academics, Business and Community positively. The research contribution will be explained in detail as follows: This research contributes to the academic literature by enriching the understanding of work-life balance (WLB), especially within the Malaysian context. It expands theoretical perspectives on how organizational factors such as working hours, workload, and reward systems influence employee well-being and productivity. The findings also bridge existing research gaps by focusing on post-pandemic challenges and cultural considerations often overlooked in WLB studies. This study provides valuable insights to organizations and human resource practitioners by identifying practical strategies that can enhance employee satisfaction and performance. Employers may benefit from evidence-based recommendations to implement flexible working arrangements, better leave policies, and holistic reward schemes, ultimately reducing absenteeism, turnover, and burnout. A healthier work-life balance contributes to stronger communities by improving individual well-being, family cohesion, and civic engagement. The research highlights how balancing work and life roles supports not only personal health but also wider social harmony and stability in the community. This study provides data driven suggestions for public policymakers to improve employment standards and labor laws. It supports the development of initiatives such as flexible work policies, parental leave reform, and family-friendly workplaces, aligning with the national agenda for sustainable development and inclusive growth.

LITERATURE REVIEW

Work-life balance (WLB) refers to an individual's ability to manage and fulfill both work

responsibilities and personal life commitments effectively. Greenhaus & Allen (2011) define work-life balance as the extent to which individuals are equally engaged in and equally satisfied with their work and family roles. It involves the proper allocation of time, energy, and attention between professional duties and personal or family needs. An imbalance between these domains may result in stress, reduced job satisfaction, and decreased overall well-being. Further emphasize that achieving work-life balance is not about equal time distribution, but rather about meeting role demands in a way that aligns with personal values and expectations (Clarke et al.,2004). As such, WLB is considered essential for promoting employee motivation, productivity, and long-term organizational commitment. The growing concern about work-related stress and burnout has prompted researchers to explore employee work-life balance. Factors such as long working hours, increased job demands, blurred boundaries due to technology, and limited organizational support have led to mental fatigue and poor health outcomes among workers. These triggers have highlighted the need to understand how employees can maintain a healthy balance between their professional and personal responsibilities (Yang & Jin, 2021). Globally, many employees face challenges in managing work-life balance due to intense job pressure, overtime, and the always-on culture fueled by digital communication. In countries like Japan, overwork has led to cases of "karoshi" or death from excessive work. Felstead & Henseke (2017) indicates countries such as Sweden and the Netherlands have implemented strong work-life policies, including flexible hours and generous parental leave, to support employee wellbeing.

In Malaysia, work-life balance is increasingly becoming a concern as employees face long working hours, high workloads, and limited access to flexible work arrangements. Studies show that Malaysian workers often work beyond the standard 48-hour week, and many do not take full advantage of their leave entitlements. The lack of supportive workplace policies and rising living costs also contribute to increased work stress and reduced personal time (TalentCorp & Khazanah Research Institute, 2019). Work-life balance is essential for employees as it promotes better mental and physical health, reduces stress, and enhances overall job satisfaction. When employees are able to manage their personal and professional roles effectively, they are more likely to perform better, show greater commitment, and stay longer in the organization. Furthermore, Clark (2000) highlight work-life balance contributes to improved family relationships and lower rates of absenteeism and turnover, benefiting both the individual and the employer.

Working hours denote the total number of hours an employee is required or expected to work in a week, encompassing regular hours and any overtime. Excessively long hours have been linked to heightened stress and diminished work-life balance, as overwork can infringe on personal time and recovery (Hsu et al., 2019; Albertsen et al., 2008). When employees work beyond their preferred hours or face inconsistent schedules, they struggle to maintain boundaries between professional and personal life, leading to strain. Therefore, regulating working hours and providing time control is crucial for sustaining healthy work-life balance. Workload represents the volume and intensity of tasks assigned within a given timeframe. A high or overwhelming workload often leads to burnout, increased stress, and interference in personal life due to extended work efforts spilling over into non-work time. Evidence indicates that excessive workload negatively influences work-life balance by consuming employees' time and psychological resourcces (Allen et al., 2000; Wöhrmann, 2016). In the event industry,

heavy workloads limit employees' ability to disengage and attend to non-work commitments, thereby reducing work-life harmony.

Leave policies refer to company provisions for paid or unpaid time off for personal, health, or family needs. As emphasized by Nizam & Kam (2018) though intended to support work-life balance, in some industries or as evidenced in Nizam's study these policies may not be effectively accessed or utilized, rendering them insignificant in contributing to actual balance. Poor implementation or restrictive leave policies can leave employees unable to use entitlements, reinforcing work-life conflict. Work arrangement encompasses flexible options such as remote work, flextime, compressed weeks, and hybrid schedules. Research shows that when employees control their work timing and location, they better manage role transitions between work and personal life, resulting in improved work-life balance (Angelici & Profeta, 2020). However, Chung (2022) explains poorly structured flexibility may blur boundaries and inadvertently increase working hours, especially when combined with high job demands. Reward schemes include monetary incentives, bonuses, recognition programs, or non-financial benefits. As noted by Armstrong (2010) effective rewards enhance employee morale and motivation, encouraging engagement and job satisfaction critical factors for work-life balance. In Malaysia's event industry specifically, incentives help offset high demands, making employees feel valued and less likely to perceive work as overwhelmingly burdensome.
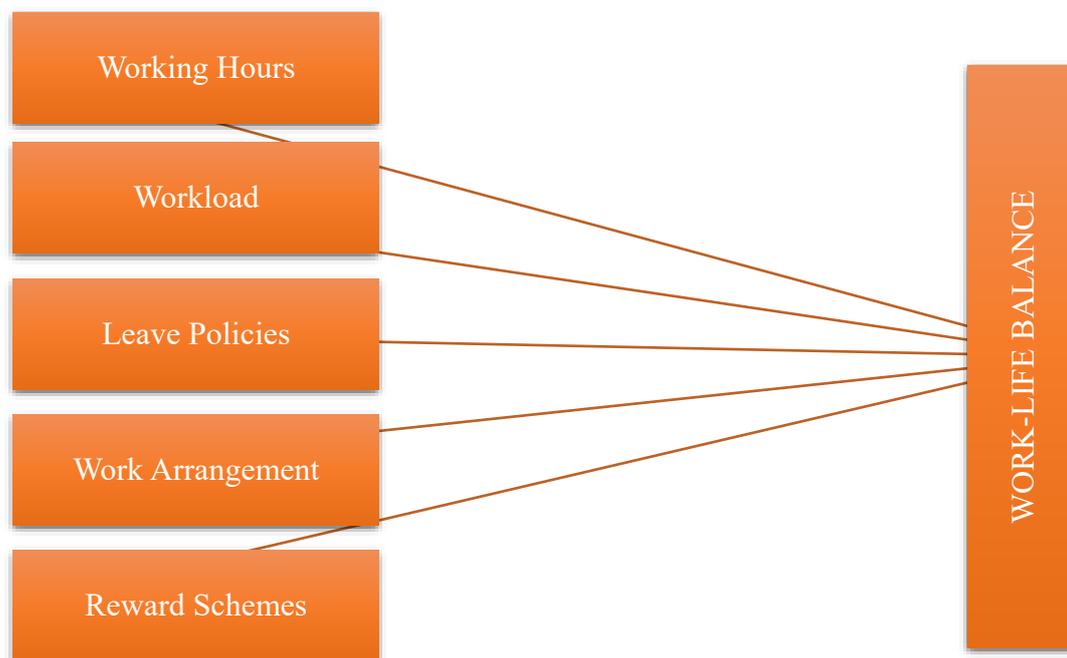
Figure 1 Conceptual Framework

RESEARCH METHODOLOGY

Research design is the structure of a study. It is an instrument that builds up the research study with the mixture of all vital elements together (Akhthar, 2016). There are three types of research designs which are exploratory research, descriptive research and casual or explanatory research. Descriptive research was decided as the research design for this study. The research flowchart is showed clearly in Figure 2.In the research, population refers to the complete

collection of elements that have the same set of traits and sample is a subgroup from population (Malhotra & Peterson, 2006). According to Kamangar & Islami (2013), sampling is the process of selecting a statistically representative sample of individuals from the population of interest. Gay, Mills, & Airasian (2012) explain that when the population size is small less than 50 or 60 people it is better to include the entire population in the study.
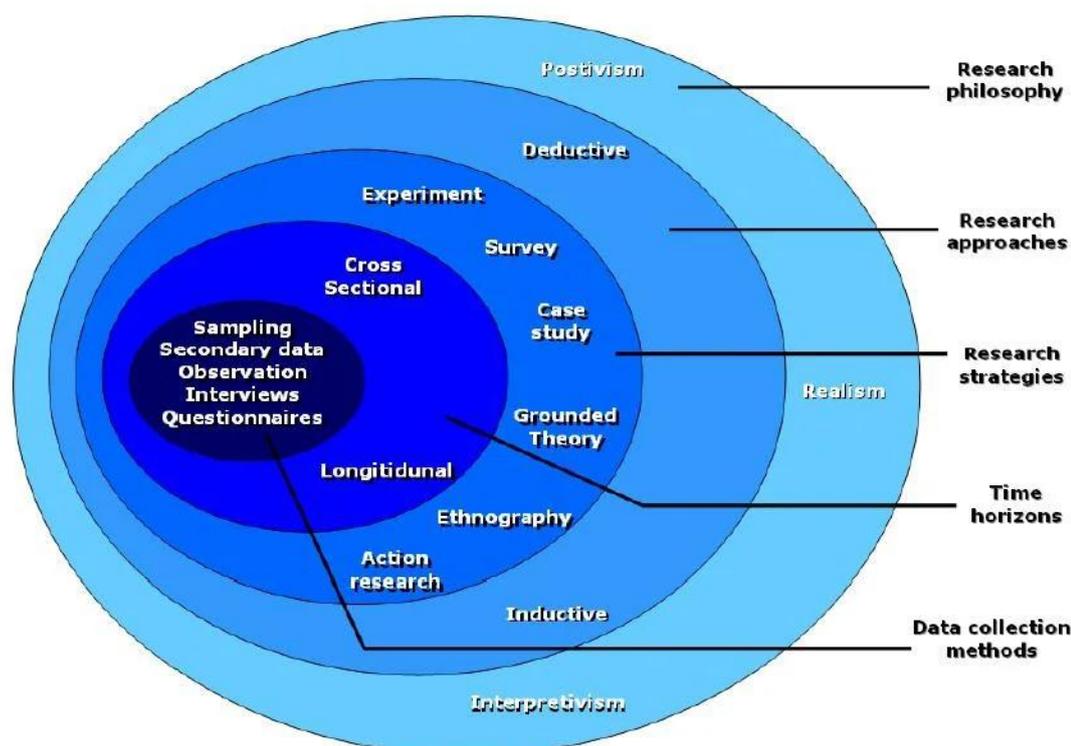
Figure 2 Research Design by Onion Diagram

Target population is defined as the group of individuals or participants with the specific attributes of interest and relevance (Bartlett, Kotrlik & Higgins, 2001; Creswell, 2003). Besides, target population is determined by the researcher where it meets the set of criteria of interests to the researcher. The target population of this study is employee on marketing department at BS Fitness Nutrition Sdn Bhd Bangi, Selangor. In this research, number of the population is 50 employee. Hence the questionnaire will be distribute to all 50 employee. Data analysis in this study was conducted using the Statistical Package for the Social Sciences (SPSS) and involved descriptive analysis, Pearson correlation analysis, and multiple regression analysis; descriptive analysis was employed to describe respondents' demographic profiles and the level of work-life balance factors, Pearson correlation analysis was used to examine the strength and direction of relationships between the independent variables and work-life balance, while multiple regression analysis was applied to identify the most significant factors and the highest impact predictors influencing employees' work-life balance.

RESULT AND ANALYSIS

The respondents' demographic characteristics were analysed using descriptive analysis based on frequency and percentage distribution. The findings show that the majority of respondent were female (60%), all respondents were Malay (100%), and most were single (50%). In addition, the majority of respondents held a bachelor's degree (36%), were full-time employees (84%), and earned between RM2,001-RM4,000 (48%). Thesis demographic characteristics provide a general overview of the respondents involved in this study.

Respondent By Gender

Based on gender, the results show 60% of the respondents were female, while 40% were male. The indicates the female employees constituted a higher proportion of the sample compared to male employees.

Respondent by Race

In term of race, all respondents were Malay (100%). This reflects a homogeneous ethnic composition of the sample and suggest that the findings mainly represent the perspectives of Malay employees.

Respondent by Marital Status

Regarding the data marital status, 50% of respondents were single, 46% were married, and 2% were divorced. The result indicates a relatively balanced distribution between single and married employees, allowing the study capture perspectives from respondents with different family responsibilities.

Respondent by Education Level

With respect to educational background, 36% of respondents held a Bachelor's degree, 36 % possessed a Diploma, and 28% had SPM-level education. This shows that the respondents came from varied educational levels, with the majority having at least post-secondary education.

Respondent by Employment Status

In terms of employment status, the majority of respondents were full-time employees 84%, followed by part-time employees 12 % and contract workers 4%. This indicates that the sample mainly comprised individuals with stable employment arrangement.

Respondent by Income Level

Regarding income level, 48 % of respondents earned between RM2,001 and RM4,000, 40% earned below RM2000, 8% earned between RM4,000 and RM6,000, and 4% earned above RM6,000. This suggests the most respondent belonged to the lower- to middle-income group, which is common among employees at early to mid-career stage.

Table 1 Respondents Demographic Analysis Result

Demographic	Category	Frequency (N)	Percentage (%)
Gender	Male	20	40%
	Female	30	60%
Race	Malay	50	100%
Marital Status	Single	25	50%
	Married	23	46%
	Divorced	2	4%
Education Level	SPM	14	28%
	Diploma	18	36%
	Bachelor' Degree	18	36%
Employment Status	Full-time	42	84%
	Part-time	6	12%
	Contract	2	4%
Income Level	Below RM2,000	20	40%
	RM2,000-RM4,000	24	48%
	RM4,0001-RM6,000	4	8%
	Above RM6,000	2	4%

To Identify the Highest Factors of the Employee Work Life Balance

In this research, mean and standard deviation analyses were conducted to examine the factor influencing employee work-life balance and to identify the most prominent factor. Based on the descriptive statistic, work-life balance recorded a high overall mean, indicating that respondents generally perceived a satisfactory balance between work and personal life. Among the independent variable, leave policies emerged as the most prominent factor, with a mean score 4.0100 and a relatively low standard deviation, indicating consistent agreement among respondents. Leave policies refer to employees' ability to take leave for rest, family responsibilities, and personal matters. The findings suggest that employees place high

importance on organisational support through adequate and accessible leave benefits. Based on the mean and standard deviation analysis, it can be inferred that strong and positive relationship exists between leave and employee work-life balance.

Table 2 Means and Standard Deviation of Work-life Balance Dimensions

Dimension	Mean	Standard Deviation	Level of Work-life Balance
Working Hour	3.8550	0.80352	Moderate-High
Workload	3.4650	0.59120	Moderate
Leave Policies	4.0100	0.96489	High
Work Arrangement	3.9167	0.93935	Moderate-High
Reward Schemes	3.7600	0.91328	Moderate-High
Average	**3.8013**	**0.84245**	**High**

To Determine the Relationships Between the Factors with Employee Work-life Balance
Pearson Correlation analysis was used to examine the relationship between the factors affecting work-life balance and employee work-life balance. This result indicate that all independent variables were positively and significantly correlated with work-life balance, suggesting that improvements in working conditions and organisational support are associated with better work-life balance. Among the variables, leave policies recorded the strongest positive correlation with work-life balance ($r = 0.715$). this indicates that employees who perceive leave benefits positively are more likely to experience a better balance between work and personal life. Adequate leave allows employees to recover from work demands, spend time with family, and manage personal responsibilities, which is increasingly important in today's demanding work environment.

This was followed by reward schemes ($r = 0.678$) and work arrangement ($r = 0.604$), both of which showed strong positive relationships with work-life balance. Reward schemes motivate employees and enhance job satisfaction, while flexible and supportive work arrangement help employees manage time and responsibilities more effectively. Meanwhile, workload ($r = 0.570$) showed a moderate positive relationship with work-life balance, indicating that manageable workload levels are important in reducing stress. Working hours recorded the weakest correlation ($r = 0.373$), although the relationship remained significant. Overall, the strong relationship (R) between the factors and work-life balance indicates that organisational practices play an important role in enhancing employees' well-being.

Table 3 Pearson Correlation Analysis

Title	Pearson Correlation
Work-life Balance	1.000
Working Hour	0.373
Workload	0.570
Leave Policies	0.715
Work Arrangement	0.604
Reward Schemes	0.678

To Determine the Highest Impact of the Factors forwards employee Work-life Balance

Multiple Regression analysis was conducted to determine which factor has greatest impact on employee work-life balance. Based on the regression results, the significance level of $p < 0.05$, which reflects a confidence level of more than 95%, was used to identify significant predictors. The findings show that leave policies recorded the highest standardized coefficient (ß = 0.363), indicating that it has the strongest influence on employee work-life balance. This suggest that when employees are provided with adequate and accessible leave, they are better able to manage personal and family responsibilities, reduce work—related stress, and recover from job demands. Effective leave policies therefore play a critical role in supporting employees' overall well-being and work-life balance. The followed by workload (ß = 0.257), which also significantly influence work-life balance. A manageable workload allows employees to complete tasks within regular working hours, reduces the need for overtime, and prevents work from intruding into personal time. When workload is appropriately distributed, employees are more likely to experience lower stress levels and maintain a healthier balance between work and personal life.

Table 4 Standardized Coefficient Analysis

Title	Sig (p)	Standardized Coefficients Beta
Working Hour	0.277	0.104
Workload	0.014	0.257
Leave Policies	0.004	0.363
Work Arrangement	0.613	0.066
Reward Schemes	0.060	0.264

CONCLUSION

The conclusion drawn based on the analyses and findings of the present study. The results clearly demonstrate that there is a positive relationship between organisational factors and employee work-life balance. The study further reveals that factors such as workload management and leave policies play a significant role in influencing employees' ability to balance their work and personal life. These findings highlight the importance of supportive organisational practises in enhancing employee well-being and overall quality of life. By implementing effective workload distribution, fair leave policies and supportive work arrangements, organisations can create a healthier and more sustainable working environment. Ultimately, this study emphasises that understanding and addressing employees' work-life balance needs is essential for improving job satisfaction, productivity, and long-term organisational performance in today's dynamic work environment.

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FAKTOR-FAKTOR YANG MEMPENGARUHI KEPUASAN KERJA DI SEKTOR AUTOMOTIF

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ABSTRACT
Kepuasan kerja merupakan peranan penting yang mempengaruhi produktiviti, prestasi organisasi, dan kadar pusing ganti pekerja, terutamanya dalam sektor automotif yang mengutamakan kepuasan pelanggan. Objektif kajian ini untuk mengkaji hubungan antara empat faktor utama iaitu persekitaran kerja, motivasi, beban kerja, dan kepimpinan, dengan kepuasan kerja dalam sektor automotif di MeGroup Berhad. Metodologi kuantitatif telah digunakan dalam kajian ini, di mana soal selidik diedarkan dalam talian melalui WhatsApp kepada 117 pekerja. Data dianalisis menggunakan ujian kebolehpercayaan Alpha Cronbach, statistik deskriptif, penilaian Korelasi Pearson, dan analisis regresi linear mudah untuk menguji hipotesis dalam kajian. Keputusan menunjukkan korelasi positif yang ketara kepada kepuasan kerja, hubungan persekitaran kerja ($r = 0.354$), motivasi ($r = 0.283$), dan kepimpinan ($r = 0.441$). Sebaliknya, beban kerja menunjukkan korelasi negatif yang signifikan ($r = -0.263$) dengan kepuasan kerja, dengan kepimpinan muncul sebagai faktor paling berpengaruh kepada kepuasan kerja. Keputusan ini membawa impak praktikal yang utama untuk mengurus dalam membangunkan strategi berkesan untuk meningkatkan kepuasan kerja, yang menyumbang kepada mengurangkan pusing ganti, meningkatkan motivasi dan komitmen pekerja, dan meningkatkan prestasi organisasi dan daya saing keseluruhan dalam sektor automotif.

Kata Kunci: Kepuasan kerja, Persekitaran Kerja, Motivasi, Beban Kerja, Kepimpinan, Sektor Automotif

INTRODUCTION
Kepuasan kerja adalah penting dalam mempengaruhi pencapaian sesebuah syarikat, terutamanya dalam sektor automotif yang sentiasa berubah dan mengutamakan pelanggan (Lee & Kim, 2021). Pekerja yang gembira dalam peranan mereka selalunya mempamerkan kesetiaan yang lebih tinggi, peningkatan kecekapan, dan pengurangan kemungkinan untuk meninggalkan firma. Di Malaysia, sektor automotif memainkan peranan penting dalam ekonomi negara, dengan syarikat seperti Perodua, Honda dan Proton menerajui pasaran. Namun begitu, sektor ini menghadapi kesukaran dalam pusing ganti kakitangan yang ketara, tekanan kerja, dan suasana kerja yang mencabar (Abdullah & Tan, 2023). Kajian terdahulu menunjukkan bahawa beberapa elemen mempengaruhi kepuasan kerja, seperti aspek fizikal dan psikososial persekitaran kerja, motivasi dalaman dan luaran, jumlah kerja, dan pendekatan kepimpinan (Chen & Wang, 2020). Namun begitu, masih terdapat kekurangan kajian menyeluruh yang mengkaji bagaimana faktor-faktor ini berinteraksi secara khusus dalam sektor automotif di Malaysia, terutamanya dalam syarikat seperti MeGroup Berhad yang menguruskan beberapa jenama kenderaan. Kadar pekerja meninggalkan MeGroup Berhad dalam sektor automotif telah meningkat dengan ketara, dengan purata 51.1% kadar pusing ganti pekerja dalam kalangan

kakitangan dari 2021 hingga 2024. Aliran ini boleh menyebabkan penurunan kecekapan tenaga kerja, perbelanjaan operasi yang meningkat dan penurunan dalam standard perkhidmatan. Oleh itu, mengiktiraf unsur-unsur yang mempengaruhi kepuasan kerja pekerja adalah penting untuk membangunkan langkah yang berkesan untuk menangani isu ini.

Objektif kajian bertujuan untuk mengkaji:

1. Untuk mengukur hubungan faktor persekitaran kerja dengan tahap kepuasan kerja
2. Untuk mengukur hubungan faktor motivasi dengan tahap kepuasan kerja.
3. Untuk mengukur hubungan faktor beban kerja dengan tahap kepuasan kerja.
4. Untuk mengukur hubungan faktor kepimpinan dengan tahap kepuasan kerja.

Hasil daripada penyelidikan ini dijangka menawarkan perspektif yang berharga kepada kepimpinan MeGroup Berhad dan sektor automotif tambahan dalam merangka dan melaksanakan strategi pengurusan sumber manusia yang lebih cekap. Dengan meningkatkan kepuasan kerja, syarikat boleh menurunkan kadar pengurangan, meningkatkan motivasi pekerja, dan, sebagai hasilnya, mencapai keberkesanan organisasi yang lebih baik.

KAJIAN LITERATUR

Kepuasan kerja

Kepuasan kerja merujuk kepada reaksi emosi yang menggalakkan dan dimiliki oleh orang berkaitan dengan pekerjaan mereka, berpunca daripada penilaian mereka terhadap pengalaman kerja mereka (Judge et al., 2020). Idea ini pelbagai rupa dan termasuk penilaian komponen kerja yang berbeza, seperti jenis kerja, gaji, peluang untuk kemajuan, hubungan dengan penyelia dan penglibatan dengan rakan sekerja (Saeed & Nayyar, 2023). Dalam sektor automotif, kepuasan pekerja amat penting. Ia bukan sahaja meningkatkan kebajikan individu pekerja tetapi juga membantu dalam menegakkan keluaran standard yang boleh dipercayai dan unggul. Kepentingan ini amat ketara dalam peranan penting seperti pemasangan, jaminan kualiti dan perkhidmatan selepas jualan, yang menuntut tahap perhatian, ketepatan dan ketelitian yang tinggi (Park & Lee, 2022). Penyelidikan menunjukkan bahawa tahap kepuasan kerja yang tinggi dikaitkan dengan keinginan yang lebih besar untuk kekal dalam kedudukan seseorang. Sebaliknya, kekurangan kepuasan boleh mengakibatkan pelbagai kesan buruk, termasuk tahap tekanan yang meningkat, peningkatan kadar ketidakhadiran dan kecekapan kerja yang berkurangan (Nabawi, 2019). Penyelidikan juga menunjukkan bahawa, dalam industri automotif, kepuasan kerja banyak dipengaruhi oleh budaya organisasi dan struktur insentif yang dilaksanakan (Al-Atwi & Khan, 2024). Tambahan pula, penyelidikan yang dijalankan oleh (Tan 2023) menunjukkan bahawa pelaksanaan sistem ganjaran berdasarkan prestasi meningkatkan pemenuhan kerja dan kesetiaan kepada organisasi dalam kalangan jurutera automotif. Akhir sekali, (Abdullah 2024) menentukan bahawa keseimbangan kerja-kehidupan yang kukuh berfungsi sebagai penunjuk utama pemenuhan pekerjaan pada hari ini.

Persekitaran kerja

Persekitaran kerja merangkumi gabungan kedua-dua elemen fizikal dan sosial yang terdapat di lokasi di mana seseorang itu bekerja. Aspek fizikal terdiri daripada faktor-faktor seperti pencahayaan, keadaan udara, keamatan bunyi, protokol keselamatan, dan kemudahan penggunaan alatan dan mesin yang digunakan (Bakotić & Babić, 2013). Sebaliknya, aspek sosial berkaitan dengan hubungan dengan rakan sekerja dan penyelia, budaya dalam organisasi, dan bagaimana komunikasi berlaku dalam persekitaran kerja (Chandrasekar, 2011). Menurut

Teori Hierarki Keperluan Maslow (1943), keperluan untuk keselamatan dan kesihatan fizikal adalah langkah utama yang mesti dipenuhi sebelum pekerja mencapai tahap kepuasan atau pemacu yang lebih tinggi. Ini menyerlahkan kepentingan mempunyai persekitaran kerja yang selamat, menyenangkan dan menggalakkan. Dalam bidang sektor pembuatan kereta, di mana kebanyakan aktiviti berlaku di bengkel atau di barisan pengeluaran, tumpuan kepada persekitaran fizikal yang sesuai adalah penting (Rahman & Hossain, 2022). Selain itu, Wong dan Lim (2022) menunjukkan bahawa susun atur pejabat terbuka yang menggalakkan interaksi sosial yang positif boleh meningkatkan kedua-dua pemenuhan kerja dan kecekapan dalam kalangan jurutera automotif. Tambahan pula, penyelidikan oleh (Abdul Rahman et al. 2024) menunjukkan bahawa penggunaan sistem pemanasan, pengudaraan dan penyaman udara (HVAC) terurus di kedai pembaikan automotif berjaya mengurangkan tekanan haba dan meningkatkan kepuasan kerja di kalangan mekanik.

Motivasi

Motivasi berfungsi sebagai daya dalaman yang mendorong, mengarahkan, dan mengekalkan tindakan individu untuk mencapai objektif tertentu (Ryan & Deci, 2020). Selaras dengan teori Maslow, motivasi untuk terlibat dalam kerja berpunca daripada keperluan untuk memenuhi urutan keperluan manusia, berkembang daripada keperluan fisiologi asas kepada kemuncak aktualisasi diri. Motivasi dikategorikan terutamanya kepada dua jenis: intrinsik, yang timbul daripada aspek dalaman seperti pencapaian dan keseronokan tugas, dan ekstrinsik, didorong oleh pengaruh luar seperti pampasan, insentif, dan pengakuan (Deci & Ryan, 2019). Seterusnya, autonomi tempat kerja nampaknya merupakan peramal yang paling ketara bagi motivasi intrinsik dalam sektor tersebut (Li & Zhang, 2023). Keputusan ini menggariskan bahawa motivasi kerja yang teguh dikaitkan dengan tahap kepuasan kerja yang lebih tinggi. Selain itu, kajian ini telah mengenal pasti bahawa hubungan yang menggalakkan antara motivasi dan kepuasan kerja adalah kukuh. Sebagai contoh, didapati bahawa program kemajuan kerjaya yang jelas dapat meningkatkan tahap motivasi dan kepuasan dalam kalangan juruteknik automotif (Chen & Wang, 2023). Selain itu, penyelidikan dalam industri pembuatan mendedahkan bahawa gabungan pembangunan kemahiran dan maklum balas positif boleh meningkatkan motivasi intrinsik, yang seterusnya meningkatkan kepuasan kerja (Abdullah & Singh, 2022). (Park & Lee 2022) turut berkongsi pandangan lain dengan menonjolkan cara kepimpinan yang menyokong menyumbang kepada suasana yang memotivasikan yang menghasilkan kepuasan pekerja yang lebih besar. Secara khusus, penyelidikan yang dijalankan oleh Gupta et al. (2023) dalam sektor automotif mengaitkan pengaturan kerja yang fleksibel dengan motivasi yang tinggi dan, sebagai hasilnya, meningkatkan kepuasan kerja.

Beban kerja

Beban kerja menandakan kuantiti dan kerumitan tugasan yang perlu diselesaikan oleh pekerja dalam jangka masa tertentu (Utomo, 2008). Mencapai keseimbangan yang betul dalam beban kerja adalah penting dengan lebihan yang boleh mengakibatkan keresahan, keletihan yang berterusan, dan rasa tidak terharu, manakala beban kerja yang tidak mencukupi boleh menyebabkan rasa kejemuan, rasa jiwa kosong dan kekurangan dalam penglibatan profesional (Chen & Wang, 2020). Dalam sektor automotif, keadaan sedemikian sering timbul semasa fasa pengenalan kenderaan baharu atau semasa pengeluaran tinggi, di mana peningkatan mendadak dalam beban kerja menimbulkan kesukaran yang ketara. Penyelidikan terkini telah berulang kali mengaitkan beban kerja yang tidak terkawal dengan tahap kepuasan kerja pekerja yang

lebih rendah. Sebagai contoh, (Singh dan Kaur 2023) mendapati bahawa beban kerja yang berlebihan membawa kepada penurunan 42% dalam kepuasan kerja dalam kalangan pekerja automotif, terutamanya disebabkan oleh tekanan yang meningkat dan keletihan emosi. Selain itu, (Nguyen dan Lee 2024) menegaskan bahawa peningkatan beban kerja meningkatkan kemungkinan berhenti dalam kalangan juruteknik automotif, terutamanya apabila terdapat sokongan organisasi yang tidak mencukupi. Sebaliknya, beberapa strategi organisasi terbukti berjaya dalam mengurangkan kesan buruk ini. Kajian oleh (Abdullah et al. 2022) menunjukkan bahawa peruntukan tugas yang saksama dan pelaksanaan teknologi automatik boleh mengurangkan tekanan berkaitan beban kerja. Selain itu, (Chen et al. 2023) mendapati bahawa strategi kerja berpasukan yang adaptif boleh mempengaruhi beban kerja dan kepuasan kerja secara positif. Tambahan pula, (Hassan dan Tan 2024) mengesahkan nilai pendidikan pengurusan tekanan, manakala (Park et al. 2023) menekankan kepentingan peranan kerja yang jelas dan sokongan pengurusan secara langsung dalam mengelakkan penurunan dalam kepuasan kerja yang dikaitkan dengan beban kerja yang tidak sekata.

Kepimpinan

Kepimpinan disifatkan sebagai keupayaan untuk mempengaruhi dan mengarahkan ahli pasukan ke arah mencapai matlamat organisasi (Mujiatun et al., 2019). Cara seorang pemimpin beroperasi, teknik mereka, dan sifat interaksi mereka secara signifikan mempengaruhi perasaan dan persepsi pekerja terhadap persekitaran kerja mereka. Pemimpin yang menyokong, adil, komunikatif dan mudah didekati boleh memupuk suasana tempat kerja yang positif. Ini menyumbang bukan sahaja untuk memenuhi keperluan sosial dan penghargaan pekerja mengikut hierarki Maslow, tetapi ia juga meningkatkan perasaan hubungan dan kebahagiaan pekerjaan mereka (Northouse 2021). Penyelidikan baharu dalam sektor automotif telah menekankan lagi hubungan kukuh antara kepimpinan yang berkesan dan peningkatan kepuasan kerja. Begitu juga, (García-Cabrera et al. 2024) menyatakan bahawa kepimpinan yang bagus berfungsi sebagai peramal kepuasan kerja yang paling penting untuk kakitangan. Selain itu, (Chen dan Wang 2023) mengesahkan bahawa kepimpinan dapat meningkatkan kepuasan kerja dan komitmen terhadap organisasi dalam kalangan pekerja dalam pembuatan automotif. Akhir sekali, (Singh dan Kaur 2024) menunjukkan bahawa kepimpinan yang menyesuaikan diri dengan keperluan pasukan boleh meningkatkan kepuasan kerja.

Struktur teori penyelidikan ini dibentangkan seperti yang digambarkan dalam Rajah 1. Struktur ini menunjukkan bahawa empat faktor (Persekitaran Kerja, Motivasi, Beban Kerja, Kepimpinan) berkait rapat dengan pembolehubah tidak bersandar yang disebut sebagai Kepuasan Kerja.

Hipotesis

Berdasarkan kerangka kerja teoritikal dan kajian lepas, hipotesis berikut dirumuskan sebagai:

H1: Terdapat hubungan positif antara persekitaran kerja dengan kepuasan kerja dalam kalangan pekerja di Sektor Automotif di MeGroup Berhad.

H2: Terdapat hubungan yang positif antara motivasi dan kepuasan kerja dalam kalangan pekerja di Sektor Automotif di MeGroup Berhad.

H3: Terdapat hubungan positif antara beban tugas dengan kepuasan kerja dalam kalangan pekerja di Sektor Automotif MeGroup Berhad.

H4: Terdapat hubungan positif antara kepimpinan dan kepuasan kerja dalam kalangan pekerja di Sektor Automotif di MeGroup Berhad.

Rajah 1: Kerangka Kerja Teoritikal Dalam Kajian
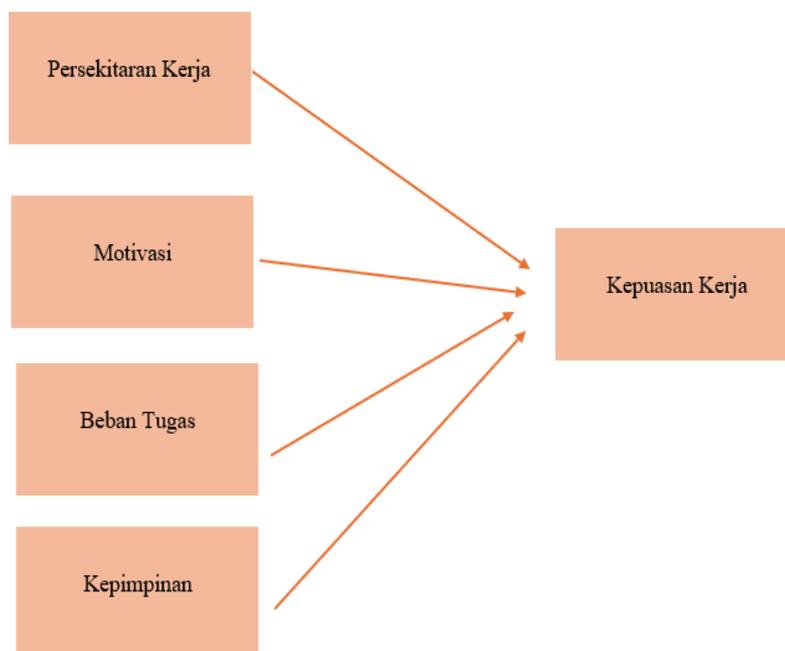
METODOLOGI

Penyelidikan ini menggunakan metodologi kuantitatif menggunakan format tinjauan keratan rentas. Pendekatan ini dipilih untuk mengumpul maklum balas daripada sebilangan besar peserta dalam jangka masa yang ditetapkan untuk menilai korelasi antara pembolehubah yang berbeza. Populasi untuk penyelidikan ini merangkumi semua pekerja di bahagian automotif MeGroup Berhad, yang berjumlah 131 individu. Berdasarkan kriteria saiz sampel yang digariskan oleh Krejcie & Morgan (1970), bilangan minimum peserta yang diperlukan telah ditetapkan sebagai 97. Akhirnya, 117 soal selidik yang diisi telah diterima, menghasilkan kadar tindak balas yang boleh diterima. Alat pengumpulan data yang digunakan ialah soal selidik dalam talian. Struktur soal selidik dibahagikan kepada empat bahagian:

1. Demografi (5 items).
2. Kepuasan Kerja (7 item, diadaptasi daripada Wright & Davis, 2003).
3. Persekitaran Kerja (7 item, diadaptasi daripada Zafir & Durrishah, 2009).
4. Motivasi (7 item, diadaptasi daripada Rizwan Saleem et al., 2010).
5. Beban kerja (6 item, diadaptasi daripada Norasmah & Hariyaty, 2006).
6. Kepimpinan (7 item, diadaptasi daripada Taylor & Bower, 1972).

Semua konstruk dinilai melalui skala Likert 5 mata antara 1 = Sangat Tidak Setuju hingga 5 = Sangat Setuju. Data telah dinilai menggunakan perisian SPSS versi 29. Analisis deskriptif telah dijalankan untuk membentangkan ciri demografi responden dan purata bagi pembolehubah. Analisis inferensi termasuk:

1. Ujian Kebolehpercayaan Alpha Cronbach untuk mengesahkan ketekalan dalam instrumen.

2. Analisis Korelasi Pearson untuk mengkaji perkaitan antara setiap pembolehubah tidak bersandar dan kepuasan kerja.
3. Analisis Regresi Linear Mudah untuk menilai sejauh mana setiap pembolehubah tidak bersandar mempengaruhi kepuasan kerja.

DAPATAN KAJIAN

Latar belakang Demografi Responden
Secara keseluruhan, 117 kakitangan MeGroup Berhad telah mengambil bahagian dalam kajian ini. Kebanyakan peserta adalah wanita, terdiri daripada 60.7%, dengan umur antara 26 hingga 30 tahun membentuk 29.9%. Sebahagian besar, 46.2%, memiliki diploma, manakala 65% memegang jawatan bukan eksekutif. Selain itu, 28.2% dikaitkan dengan jenama Perodua, dan 36.8% telah bekerja untuk tempoh 1 hingga 3 tahun. Demografi ini menggambarkan bahawa tenaga kerja dalam industri automotif cenderung relatif muda, berpendidikan, dan ramai individu masih di peringkat awal kerjaya mereka dalam Syarikat yang boleh rujuk jadual 1.

Jadual 1: Latar Belakang Demografi Responden

Demografi	Kategori	Kekerapan	Peratusan
Jantina	Lelaki	46	39.3
	Perempuan	71	60.7
Umur	18 – 25	31	26.5
	26 – 30	35	29.9
	31 – 39	33	28.2
	40 – 49	16	13.7
	50 dan ke atas (50 and above)	2	1.7
Tahap pendidikan	SPM	26	22.2
	Diploma	54	46.2
	Ijazah Sarjana Muda	34	29.1
	Ijazah Sarjana	2	1.7
	PhD	1	0.9
Jawatan	Bukan Eksekutif	76	65.0
	Eksekutif	29	24.8
	Pengurus	12	10.3
Jenama	Honda	30	25.6
	Perodua	33	28.2
	Mazda	10	8.5

	Mitsubishi	18	15.4
	Jaecoo	12	10.3
	MG	6	5.1
	Jetour	4	3.4
	GWM	4	3.4
Tempoh Bekerja	Kurang dari 1 tahun	33	28.2
	1 – 3 tahun	43	36.8
	4 – 6 tahun	24	20.5
	7 – 10 tahun	5	4.3
	Lebih 10 tahun dan ke atas	12	10.3

Dapatan bagi Pengujian Hipotesis

Ujian Kebolehpercayaan (Reliability Test)

Dapatan daripada penilaian kebolehpercayaan Alpha Cronbach untuk data kajian yang dikumpul (N=117) boleh didapati dalam Jadual 2. Setiap konstruk memaparkan pekali alfa melebihi 0.70, tanda aras piawai yang diiktiraf secara umum (Nunnally, 1978). Konstruk Kepimpinan ($\alpha = 0.960$) dan Beban Kerja ($\alpha = 0.951$) menghasilkan nilai alfa tertinggi, manakala konstruk Persekitaran Kerja mempunyai nilai terendah pada $\alpha = 0.731$. Secara ringkasnya, dapatan ini menunjukkan bahawa setiap item dalam tinjauan adalah boleh dipercayai dan konsisten dalam menilai konstruk yang dimaksudkan.

Jadual 2: Keputusan Ujian Kebolehpercayaan (Cronbach's Alpha)

Konstruk	Bilangan Item	Nilai Alpha Cronbach	Tafsiran
Kepuasan Kerja	7	0.793	Bagus
Persekitaran Kerja	7	0.731	Boleh diterima
Motivasi	7	0.805	Bagus
Beban Kerja	6	0.951	Sangat bagus
Kepimpinan	7	0.960	Sangat bagus

Analisis Korelasi Pearson

Analisis korelasi Pearson telah dilakukan untuk mengkaji hubungan antara setiap pembolehubah tidak bersandar dan kepuasan pekerja. Penemuan dibentangkan dalam jadual 3.

Jadual 3: Keputusan Analisis Korelasi Pearson

Hipotesis	Pemboleh Ubah	Pearson Correlation (r)	Nilai-p	Kekuatan Hubungan	Keputusan Hipotesis
H1	Persekitaran Kerja	0.354	0.000	Sedarhana/ Lemah	**DITERIMA**
H2	Motivasi	0.283	0.002	Lemah	**DITERIMA**
H3	Beban kerja	-0.263	0.004	Lemah (Negetif)	**DITERIMA**
H4	Kepimpinan	0.441	0.000	Sedarhana	**DITERIMA**

Berikut ialah dapatan dari analisis yang di jalankan.

H1 (Persekitaran Kerja): Pekali korelasi positif 0.354 adalah ketara pada $p < 0.001$ ambang. Ini mencadangkan pautan positif yang sederhana; apabila kualiti persekitaran kerja bertambah baik, begitu juga dengan kepuasan kerja.

H2 (Motivasi): Pekali korelasi positif 0.283 patut diberi perhatian ($p = 0.002$). Walaupun terdapat perkaitan yang positif, ia tetap lemah.

H3 (Beban Kerja): Pekali korelasi negatif -0.263 adalah signifikan ($p = 0.004$). Ini mengesahkan hubungan songsang yang dijangkakan; apabila beban kerja meningkat, kepuasan kerja berkurangan.

H4 (Kepimpinan): Pekali korelasi positif 0.441 adalah signifikan pada tahap $p < 0.001$. Ini mewakili korelasi positif yang paling teguh di antara semua pembolehubah, menonjolkan pengaruh penting kepemimpinan terhadap kepuasan kerja.

Analisis Regresi Linear Mudah
Analisis regresi linear mudah telah dilakukan ke atas setiap pembolehubah tidak bersandar untuk menilai kesannya yang berbeza terhadap kepuasan kerja. Penemuan dibentangkan dalam Jadual 4.

Jadual 4: Keputusan Analisis Regresi Linear Mudah

Pemboleh Ubah Tidak Bersandar	R	R²	Pekali Beta (β)	Nilai-t	Nilai-p
Persekitaran Kerja	0.354	0.126	0.354	4.063	0.000
Motivasi	0.283	0.080	0.283	3.168	0.002
Beban kerja	0.263	0.069	-0.263	-2.923	0.004
Kepimpinan	0.441	0.194	0.441	5.265	0.000

Hasil daripada analisa yang dilakukan, didapati kepimpinan menyumbang 19.4% ($R^2 = 0.194$)

daripada variasi dalam Kepuasan Kerja, yang mengukuhkan peranannya sebagai peramal teratas. Nilai beta positif 0.441 menunjukkan kesan yang besar. Bagi Persekitaran Kerja memainkan peranan dalam kepuasan kerja dengan sumbangan sebanyak 12.5% ($R^2 = 0.126$). Motivasi dan Beban Kerja bertanggungjawab untuk kira-kira 8% dan 7% daripada variasi dalam kepuasan kerja, dalam susunan tersebut. Secara keseluruhan, hasil kajian adalah konsisten dengan Teori Maslow. Organisasi yang menangani keselamatan (persekitaran kerja), keperluan sosial dan penghargaan (kepimpinan, motivasi) dan mengurus cabaran (beban kerja) secara berkesan mungkin akan meningkatkan kepuasan kerja pekerja mereka.

PERBINCANGAN

Analisis ini menghubungkan kajian dengan matlamat penyelidikan dan asas teori yang digariskan sebelum ini.

Objektif 1: Untuk menilai hubungan antara persekitaran kerja dan kepuasan di tempat kerja.

Hasil daripada penyelidikan telah mengesahkan Hipotesis 1 (H1) dengan berkesan, menunjukkan korelasi positif yang ketara antara persekitaran kerja dan kepuasan kerja ($r = 0.354$, $p < 0.001$). Keputusan ini sejajar dengan penyelidikan terdahulu yang dijalankan oleh (Septian dan Pangestu 2017) serta (Bakotić dan Babić 2013), yang menyerlahkan kepentingan mempunyai persekitaran kerja yang selamat dan menyokong. Selain itu, kajian yang lebih baru oleh (Rahman dan Hossain 2022) dan (Gupta et al. 2023) seterusnya menyokong tanggapan bahawa meningkatkan kedua-dua aspek fizikal dan psikososial di tempat kerja meningkatkan tahap kepuasan kerja dalam bidang pembuatan, khususnya dalam industri automotif. Dalam sektor automotif di MeGroup Berhad, elemen seperti keselamatan di tempat kerja, susunan ruang yang sesuai dan hubungan mesra di kalangan rakan sekerja telah ditunjukkan secara langsung mempengaruhi kepuasan pekerja. Pemerhatian ini selaras dengan Teori Hierarki Keperluan Maslow, yang menekankan keperluan untuk memenuhi keperluan keselamatan sebagai asas untuk mencapai tahap kepuasan kerja yang tinggi. (Abdullah dan Tan 2023) menekankan bahawa suasana tempat kerja yang menyokong dan teknologi ergonomik boleh membawa kepada keuntungan serentak dalam produktiviti dan kepuasan kerja dalam bidang automotif.

Objektif 2: Untuk menilai hubungan antara motivasi dan kepuasan di tempat kerja.

Hipotesis 2 (H2) telah menunjukkan perkaitan positif yang ketara antara motivasi dan kepuasan kerja ($r = 0.283$, $p = 0.002$). Walaupun kekuatan hubungan ini lebih lemah daripada faktor lain yang dianalisis dalam penyelidikan, ia masih menunjukkan pengaruh yang besar. Keputusan ini selari dengan kajian terdahulu yang dijalankan oleh (Darmawan 2016) dan (Sohail et al. 2014), yang menunjukkan bahawa kedua-dua faktor intrinsik (seperti harga diri) dan faktor ekstrinsik (seperti pengakuan) bekerjasama untuk meningkatkan kepuasan kerja. Kajian lain oleh (Deci dan Ryan 2019) dan (Thompson et al. 2024) juga menyokong idea bahawa gabungan kedua-dua jenis motivasi ini membawa kepada tahap kepuasan kerja tertinggi dalam persekitaran tempat kerja. (Tanaka dan Suzuki 2024) menunjukkan bahawa penggunaan cabaran dalam penilaian prestasi adalah berkesan dalam meningkatkan motivasi ekstrinsik dan kepuasan kerja dalam industri automotif. Selain itu, (Omar et al. (2023) mendapati bahawa program mengiktiraf rakan sebaya berkesan dalam meningkatkan motivasi sosial, yang seterusnya menyumbang kepada

kepuasan kerja yang lebih tinggi dalam persekitaran kerja. Dalam penilaian ini, pernyataan seperti "Saya yakin dengan kebolehan saya" mencapai penilaian purata yang tinggi, yang menunjukkan kehadiran motivasi intrinsik yang kuat dalam kalangan individu yang ditinjau. Aspek ini sejajar dengan kategori penghargaan dan aktualisasi diri dalam hierarki keperluan Maslow. Hasil penyiasatan ini disokong lagi oleh (Li dan Zhang 2023), yang mendapati bahawa mempunyai autonomi di tempat kerja memberi kesan positif kepada motivasi intrinsik, yang membawa kepada peningkatan kepuasan kerja dalam bidang automotif.

Objektif 3: Untuk menilai hubungan antara kepuasan kerja dan beban kerja.

Hipotesis H3 telah disahkan dengan menunjukkan hubungan negatif yang ketara antara beban kerja dan kepuasan kerja ($r = -0.263$, $p = 0.004$). Ini menunjukkan bahawa apabila beban kerja meningkat, kepuasan kerja juga menurun. Hasil ini sejajar dengan penyelidikan terdahulu yang dijalankan oleh (Mansoor et al. 2011) dan (Robbins & Judge 2013), dan disokong lagi oleh beberapa kajian lain seperti, (Chen dan Wang 2020) dan (Singh dan Kaur 2023), yang menyatakan bahawa beban kerja yang berlebihan menyumbang dengan ketara kepada tekanan dan rasa tidak puas hati dalam sektor tekanan tinggi. Data ini juga memberikan sokongan kepada sambungan negatif dari (Lee dan Park 2023) bahawa beban kerja yang banyak mengurangkan motivasi, membawa kepada penurunan sebanyak 35% dalam kepuasan kerja dalam kalangan pekerja. (Nguyen dan Lee 2024) menunjukkan bahawa beban kerja yang berat meningkatkan kemungkinan mempertimbangkan untuk meninggalkan pekerjaan pekerja, terutamanya dalam senario yang tidak mempunyai sokongan organisasi yang mencukupi. Dalam sektor automotif, cabaran seperti memenuhi matlamat jualan, keperluan dokumentasi yang komprehensif dan kewajipan untuk mengambil kerja lebih masa semasa kitaran sibuk telah dikenal pasti sebagai tekanan utama yang mempengaruhi pekerja. Beban kerja yang tidak terurus ini bukan sahaja menjejaskan kepuasan kerja tetapi juga membawa kepada tekanan berkaitan kerja yang meningkat dan keinginan untuk meninggalkan pekerjaan, seperti yang ditunjukkan dalam pernyataan isu penyelidikan ini. (Rahman 2023) mendapati bahawa menawarkan waktu yang fleksibel membolehkan pekerja automotif mengendalikan tugas mereka dengan lebih baik dan meningkatkan kepuasan kerja mereka.

Objektif 4: Untuk menilai hubungan antara kepimpinan dan kepuasan kerja.

Hipotesis H4 menunjukkan hubungan positif yang paling ketara antara semua faktor yang dikaji dalam penyelidikan ini ($r = 0.441$, $p < 0.001$). Hasil ini menunjukkan bahawa kepimpinan bertanggungjawab untuk hampir 20% daripada variasi dalam kepuasan kerja dan menonjolkan kedudukannya sebagai faktor utama yang mempengaruhi. Kesimpulan ini sejajar dengan penyelidikan terdahulu yang dijalankan oleh (Liden et al. 2008) dan (Klerk & Stander 2014), yang menekankan peranan penting kepimpinan. Selain itu, kajian dari (Northouse 2021) dan (Abdullah dan Tan 2023) juga menyatakan bahawa pendekatan kepimpinan transformasi meningkatkan kepuasan kerja dengan ketara merentasi pelbagai sektor, termasuk industri automotif. (Chen dan Wang 2023) mendapati bahawa kepimpinan telah meningkatkan kepuasan kerja dan kesetiaan organisasi dalam pekerja dalam sektor automotif. (Lee et al. 2022) juga menyatakan bahawa kepimpinan beretika secara berkesan merendahkan tekanan berkaitan pekerjaan, membawa kepada kepuasan kerja yang lebih tinggi dalam persekitaran automotif. Selain itu, (Omar et al. 2023) menyatakan bahawa kepimpinan yang merangkumi semua aspek, yang menggalakkan penglibatan dan pelbagai sudut pandangan, dapat meningkatkan kepuasan kerja pekerja daripada pelbagai generasi dalam industri automotif. Dalam konteks MeGroup

Berhad, pekerja amat menghargai gaya kepimpinan yang mesra, terbuka kepada perbualan, menyokong secara aktif, dan menawarkan kritikan membina. Pemimpin yang bertindak sebagai "penghubung" yang menangani keperluan sosial pekerja, seperti kepunyaan, bersama-sama dengan keinginan mereka untuk pengiktirafan dan penghargaan, yang meningkatkan komitmen dan kepuasan dalam peranan mereka. Kesimpulan yang boleh diambil oleh (García-Cabrera et al. 2024), yang menggambarkan kepimpinan terbaik dapat meningkatkan penglibatan dan kepuasan dalam kalangan pekerja dalam sektor automotif dengan memupuk kepercayaan dan mengiktiraf sumbangan pekerja.

Secara keseluruhan, bukti yang menyokong keempat-empat hipotesis kajian. Hasil penyelidikan ini secara komprehensif mengesahkan Teori Hierarki Keperluan Maslow. Syarikat yang berkesan memastikan suasana selamat (memenuhi keperluan keselamatan), memupuk kepimpinan yang menggalakkan (memuaskan keperluan sosial dan penghargaan), dan mengendalikan beban kerja dan motivasi dengan mahir akan menyaksikan tahap kepuasan kerja yang meningkat di kalangan tenaga kerja mereka. Daripada semua elemen ini, kepimpinan menonjol sebagai faktor yang paling penting, menonjolkan bidang penting untuk tindakan pengurusan.

KESIMPULAN

Penyelidikan ini telah memenuhi semua matlamatnya yang berkesan dengan menganalisis hubungan antara empat elemen yang dipilih iaitu persekitaran kerja, motivasi, beban kerja, kepimpinan terhadap kepuasan kerja dalam kalangan pekerja dalam sektor automotif di MeGroup Berhad. Penemuan utama penyelidikan digariskan dengan kepimpinan muncul sebagai elemen paling berpengaruh yang mempengaruhi kepuasan kerja, dengan persekitaran kerja, motivasi, dan beban kerja mengikut kepentingan. Terdapat hubungan positif yang perlu diberi perhatian wujud antara persekitaran kerja, motivasi, dan kepimpinan berkenaan dengan kepuasan kerja dan korelasi negatif yang ketara antara beban kerja dan kepuasan kerja. Hasil penyelidikan memberikan sokongan yang konsisten untuk Teori Hierarki Keperluan Maslow, menunjukkan bahawa faktor-faktor yang dianalisis menyumbang kepada memenuhi pelbagai peringkat keperluan pekerja.

Implikasi pengurusan dalam hasil penyelidikan, banyak cadangan yang boleh diambil tindakan untuk pemimpin MeGroup Berhad dan syarikat automotif dengan meningkatkan kepimpinan dalam memperuntukkan sumber kepada program yang meningkatkan kebolehan kepimpinan dengan penekanan pada komunikasi interpersonal, bantuan emosi, menawarkan kritikan membina, dan pengiktirafan. Seterusnya, menyelaraskan beban kerja untuk menilai semula peruntukan tugas, membekalkan bantuan pentadbiran, dan meneroka pengaturan kerja yang fleksibel untuk mengurangkan tekanan dan mengelakkan keletihan pekerja. Selain itu mewujudkan sistem yang telus untuk ganjaran dan pengiktirafan sambil menawarkan pilihan latihan dan pembangunan kerjaya untuk meningkatkan motivasi dalaman dan luaran bagi meningkatkan motivasi dalam kerja. Bagi persekitaran kerja, ia perlu mengekalkan persekitaran kerja dengan memberi keadaan tempat kerja yang bagus dalam pencahayaan, peredaran udara, dan keselamatan secara konsisten bagi piawaian optimum dan menggalakkan budaya kerja yang berpasukan dan selesa.

Penyelidikan ini membentangkan beberapa batasan, termasuk penumpuan pada satu organisasi tertentu dan menggunakan pendekatan keratan rentas yang menyekat keupayaan untuk

menentukan hubungan sebab dan akibat. Cadangan untuk penyelidikan masa depan adalah meluaskan fokus penyelidikan untuk merangkumi pelbagai syarikat automotif di Malaysia untuk meningkatkan kebolehgunaan keputusan. Seterusnya, memeriksa faktor tambahan seperti pampasan, keseimbangan kerja-kehidupan dan budaya syarikat yang mempengaruhi kepuasan kerja. Cadangan seterusnya, menggunakan pendekatan kajian longitudinal bagi memerhati bagaimana pembolehubah ini mempengaruhi kepuasan dan niat pusing ganti dari masa ke masa. Selain itu, mengkaji pengaruh teknologi dan automasi dalam sektor automotif terhadap kepuasan kerja.

Akhir sekali, mengiktiraf dan menangani elemen yang mempengaruhi kepuasan kerja adalah penting, bukan pilihan, untuk jangka hayat dan kemakmuran sektor automotif di Malaysia. Dengan melaksanakan langkah-langkah proaktif yang dimaklumkan oleh penemuan penyelidikan dalam kajian ini, syarikat boleh memupuk tenaga kerja yang lebih berpuas hati, berdedikasi dan cekap, seterusnya meningkatkan daya saing mereka dalam pasaran yang semakin sukar.

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THE INFLUENCED OF EMOTIONAL INTELLIGENCE TOWARDS WORK PERFORMANCE OF MANUFACTURING EMPLOYEES AT LIGHTPACK FOOD INDUSTRIES SDN BHD

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ABSTRACT

Emotional intelligence is now a crucial component that affects workers' capacity to control stress, work well with others, and sustain high levels of productivity in the complicated and demanding manufacturing environment of today. This study looks into how employees in Lightpack Food Industries Sdn Bhd's operations department perform at work in relation to emotional intelligence. 56 respondents completed structured questionnaires as part of a quantitative research strategy. Descriptive statistics, multiple regression analysis, and Pearson correlation were used to analyze the data. The results show that employees have great interpersonal and teamwork abilities, with Relationship Management ranking as the highest Emotional Intelligence factor. The study comes to the conclusion that motivation is the most important factor for increasing productivity and organizational effectiveness, and that emotional intelligence is crucial for improving employee performance in the manufacturing industry.

Keywords: Emotional intelligence, work performance, manufacturing, motivation, self-awareness

INTRODUCTION

With the complexity of modern organizations and uncertainty in the global environment, the emotional intelligence in an organization plays a part of role in the working environment. It would help if the employees were able to recognize their capabilities when solving problems or issues before they got out of hand. Knowledge of problem-solving helps an individual to understand and manage their emotions.In the manufacturing industry employees are the most important asset to running a company. Subordinate employees such as those in the operations department play an important role in ensuring that factory operations run smoothly, they are also decisive for the development of a company. Employees, especially in the operations department, really need strong mental endurance because on average they work 8-12 hours a day. Apart from doing the actual work, they also must follow all the rules that have been set to maintain the quality of a product. The manufacturing area is a critical area because accidents can happen at any time. All these are done to offer good quality and take care of the company's image.

Emotional Intelligence is the ability to reason about feelings that promote thinking (Sambu, 2019). According to new research every workplace encompasses people with different personalities, emotions and strengths which can influence their manner in work (Razali, R. A., Abdul Wahab, S. R., Shaari, R., Noor Azlan, S., & Taek-Hyun, S, 2022). To achieve this

objective, the manager puts a lot of pressure on the employees where at times they become insensitive by not considering their ability, required skills and even the amount of time to complete the task. Specifically, the problem is to find out the importance of emotional intelligence with reference to performance of employees and identify whether work performance and emotional intelligence have a significant relationship. Therefore, the purpose of this study is to examine the importance of emotional intelligence and how it impacts the employee's job performance.

Nowadays, Emotional Intelligence has become top notch terms in Malaysia because stress management and mental health has arisen for some reasons. Lightpack Food Industries Sdn Bhd has been one of the manufacturing companies that has overcome the importance of Emotional Intelligence, resulting in a group people disagree with it. The employees disagree due to the inconsistency, imbalance of the work life cycle and lack of productivity. It can be analyzed for those who disagree by emotion training, mental check-up, and MBTI test (Malik, 2014). Emotion training is a talk about psychology to understand individual in depth. It is because a person has different backgrounds and variety culture that makes life more interesting, however keeping it by yourself may ruin the inner self because it would not solve the problem. This training is to explain how an individual can help themselves when they are in a tough situation. If it is too serious, they may ask for help from a professional body like a psychiatrist or counsellor. There are 2 main stress which are acute stress such as anxious before taking exam or going for an interview or chronic stress like abused loved one or commit suicide.

An imbalance in life cycle is a tough situation in which a person needs to choose whether to prioritize their work or family time. It is hard to decide because there is a personality of a human being to be competitive among them to show their compassion and be as flexible as they can be, but on the other hand, they have loved ones that need to be cherished and spend time and having great time together. The aim of this studies is to investigate how Emotional Intelligence influenced the Work Performance of manufacturing employees at Lightpack Food Industries Sdn Bhd. The objective of this studies is to determine the higher factor of Emotional Intelligence, to determine the relationship between Emotional Intelligence with Work Performance and to determine the impact of Emotional Intelligence towards Work Performance.

AIMS4STAR consortium is a combination of four entities which are Society, Industry, Academia and Government (Hamzah,2021). The aim of this combination is to solve local, industry and national problems. This concept of community problem solving is more innovative as problem solving can be worked on with the presence of a group of experts or researcher that may create a 'hole of knowledge' to provide a more effective impact in providing a solution or "way out" to the mess that plagues the industry and society of this country. The concept of AIMS4STAR is based on the Quadruple Helix concept which recognizes 4 major characters in the innovation system as below according to (Schutz,2019). This research can contribute significantly to the company and can provide valuable insights and recommendations for the managing director and managers. This research may help the managing director and managers understand that Emotional Intelligence can enhance the work performance of employees. Teams in manufacturing frequently operate in high-stress settings with strict deadlines, safety considerations, and ongoing collaboration. Higher emotional intelligence workers are better at

controlling their emotions, which promotes stronger teamwork, better communication, and less conflict. This has a direct effect on how well employees perform at work because reaching production targets requires cooperation and clear communication.

LITERATURE REVIEW

This chapter will explain the definition of each element from the dependent and independent variables. The purpose of this literature review is to provide a summary of literature by renowned authors on how emotional intelligence can affect work performance of employees, specifically manufacturing sector this is to justify and support the claim. Finally, this chapter ends with constructing a conceptual framework by using a diagram and explaining the relationship between Emotional Intelligence and Work Performance of employees. The efficacy, efficiency, and quality with which a person executes their duties and obligations in a work environment are referred to as work performance. It evaluates how successfully a worker satisfies the demands of their position and advances the objectives of the company. According to Ichdan (2024) it has been demonstrated that establishing a Kaizen culture, which emphasizes ongoing development while also encouraging employee enthusiasm and upholding work discipline, improves performance and production. An analysis of these factors in the industrial sector revealed that they are essential for raising worker productivity and performance.

Often, employers and employees are more concerned about Intelligence Quotient rather than Emotional Intelligence in their daily and working life. According to Wechsler, 1958, Dr. David Wechsler, Ph.D., who is a renowned expert in psychology in the 20th century mentioned that IQ involves one's capability to analyze, observe and interpret a situation which then will be assessed. Meanwhile for Emotional Intelligence is understood from its components which are enlisted as; Self-awareness, self-regulation, social emotional awareness, and relationship awareness (Sambu, 2019). The role of Emotional Intelligence in work performance and leadership is crucial as it allows individuals to receive and grasp information and for people who are skillful at recognizing and responding to one's emotions effectively will be able to bring out the confidence of an employee. According to Arfara and Samanta (2016) Emotional Intelligence is an important factor that provides improved capabilities for achieving organizational goals and job objectives, inducing better teamwork through cooperation and trust. Emotional intelligence is a type of social intelligence that involves the ability to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions (Salovey & Mayer, 1990). Overall, Emotional Intelligence plays an important role in individual performance and how they perceive themselves which then indirectly add value to the company in increase productivity and polish quality employees.

According to Staudinger, U. M., & Glück, J. (2011), there were once when people mistook intelligence and wisdom to be of the same. As well questions asking, "How is Intelligence different from Wisdom?" "Is robots intelligent?" "Are machines super intelligent? What about the excitement surrounding emotional intelligence in 1995? Is EQ significantly superior to IQ?" What IQ genuinely measures has been the subject of a protracted debate: Is intelligence all there is, or is there more? There are numbers of articles and different definitions from reputable dictionaries regarding intelligence (refer below Table 2.1) Nonetheless, at present intelligence are divided into two categories the IQ and the EQ.The research framework depicts the

relationship between two variables. A variable quantity or condition is not constant and is subject to vary during the research session. This research includes two major variables: the independent and dependent variables. It provides the structure for organizing and guiding a study. It outlines the relationships between variables, concepts, and theories that shape the research objectives and hypotheses. Research frameworks are critical for ensuring that studies are logically structured and theoretically grounded.
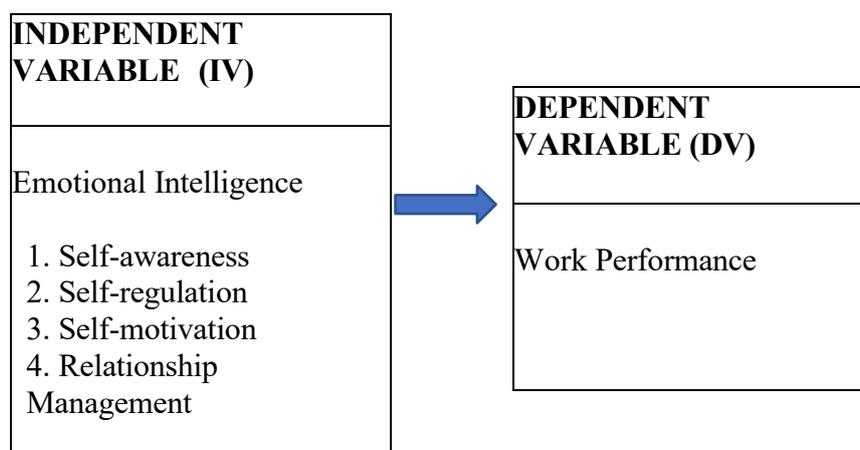
Conceptual Framework

INDEPENDENT VARIABLE (IV)
Emotional Intelligence 1. Self-awareness 2. Self-regulation 3. Self-motivation 4. Relationship Management

DEPENDENT VARIABLE (DV)
Work Performance

Figure 1 Conceptual Framework

RESEARCH METHODOLOGY

Research's validity and reliability are determined by its research technique. This chapter is to discuss the methods to be applied when conducting this research study. It discusses the various sources of data and the ways in which data can be gathered for the purpose of analysis. The sources of data and the way data are collected could well make a big difference to the effectiveness of the research project. Data can be obtained from primary and secondary sources. Primary data refer to information obtained first-hand by the researcher on the variable of interest for the specific purpose of the study. Whereas secondary data refers to information gathered from existing sources. The research design, demographic and sample of the research, research instrument, and analysis methods utilized to analyze the data collected are all addressed in this chapter. A research design is a thorough overview of how research will be carried out. It is a guide that describes the methods that must be followed to gather the knowledge required to organize and solve the problem. A research design will normally contain information on how data will be gathered. There are three types of research designs: descriptive research, exploratory research, and causal research. The research is employing descriptive and casual research in gathering and assessing data. In this research, there were two types of data used. They are primary and secondary data. Moreover, both gathering methods were employed to identify various information and sources.

Primary Data

Primary data is a piece of firsthand information gathered by the researcher from sources such as

surveys, observations, questionnaires, and interviews (Ajayi, 2017). According to Burns and Bush (2003), primary data is data generated by the researcher for the explicit goal of solving the research topic. Primary data in this research were obtained from the questionnaire that was distributed to the customers of the computer store. This quantitative technique collected data on the respondent's background, Emotional Intelligence dimensions. The questionnaire was created depending on the degree of service quality and customer satisfaction. Furthermore, the uses of the Emotional Intelligence model to evaluate the work performance by identifying the dimensions that bring satisfaction.
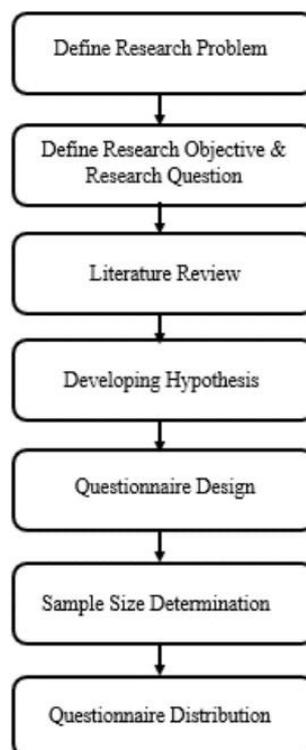
Figure 2 Research Process

Secondary Data

Secondary data was the information gathered for reasons other than the problem at hand (Burn and Bush, 2003). Secondary data refers to information that has already been acquired and recorded by someone other than the user for a reason unrelated to the current research problem. In this research, the secondary data in this research comprises theory, definitions, facts, statistics, reports, and views from prior research. Books, journals, theses, and internet and website searches are examples of secondary data sources. The benefits of secondary data were the ability to discover it quickly and less expensive, better comprehend and identify the problem, analyze main data with greater understanding, and save money. It might also serve to support the research while also helping to complete the research.

Population and Sampling Procedure

The population is the larger group to whom the researcher wishes to generalize the findings of

a research (Lodico, Spaulding, and Voegtle, 2006). The population of this research is the employees from the operation department of food division in Lightpack Food Industries Sdn Bhd. This research was conducted at a food manufacturing industry, No 6 & 8, Jln SILC 1/6 i-Park, Kawasan Perindustrian SILC, 79200 Nusajaya Johor. The above location was selected for the research since it is well-known as the one of the largest industrial areas in the Nusajaya, Johor Bahru area. The sample is a subset of the population that has been chosen to participate in the research (Malhotra, 2009). The sampling technique that was used in this research is the simple sampling method. The strategy that was used was simple and appropriate for the research since it had the least bias and provided maximum universality. Using this strategy, the population had a known and equal chance of selection. In this research the number of populations is 50 from the employee in operation department. In this research the number of samples taken is 50 respondents.

Reliability Test
A reliability test defines the consistency of a measure of a certain aspect across time and between various participants. The composite reliability test, which is akin to Cronbach Alpha, indicated the indicators internal consistency in gauging each concept (Fornell and Larcker, 1981). Cronbach's Alpha is a test item reliability and internal consistency metric invented by Lee Cronbach in 1951. It may be stated as a function of the number of test items and the average intercorrelation among the items. In this research, the reliability of independent variables: Tangible, Reliability, Responsiveness, Assurance and Empathy and dependent variable were tested using Cronbach's Alpha test. Moreover, reliability is evaluated using the coefficient alpha (Cronbach's alpha) using the SPSS software. When the Cronbach's Alpha score exceed 0.5, the Likert Scale data utilized in the questionnaire is considered valid. The reliability estimates between 0.6 and 0.7 constituted the lowest limit acceptable for reliability estimates, whereas item with values less than 0.7 were advised to be eliminated.

Research Instrument
This quantitative research approach was used in this research. Questionnaire according to Borges et al. (2020) is a data collection method where respondents are required to read and answer the same set of questions in a pre-set way on their own by circling the number on the scale. In this research, the questionnaire is conducted using a survey. In this questionnaire, they are divided into three parts, namely A, B and C. The sections of the questionnaire are illustrated below.

Section A: Demographic
Section A is for the demographic section. It is getting personal information from responses and gaining important insights. Gender, age, race, educational level, how many years of experience in manufacturing industries, sociodemographic data covered in this section.

Section B: Evaluation Level of Emotional Intelligence of Employees in the workplace
In this section, the questions determine emotional intelligence test where its goal is to understand employee emotions in the workplace environment between organizations and their co-workers, as well as how this affects their work performance. In addition, the questions in this section will be graded on a five-point Likert scale where respondents use it to express his or her perception. Respondents are asked to express their level of agreement in this section by

ranking one of five response categories (1= Strongly Disagree to 5= Strongly Agree). According to Dawes and Jones (2005), a Likert scale is commonly used in surveys and survey research to assess whether a person has a positive or negative reaction to a message. As a result, respondents were asked to identify their views and expectation of emotional intelligence based on the Likert scale rating at the Lightpack Food Industries Sdn Bhd.

Likert Scale Value	Rating
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Table 1 Five-Point Likert Scale (Malhotra, and Peterson,2004)

Section C: Work Performance of the Respondents
The purpose of this section is to help individuals function effectively both in their personal lives and in professional or organizational settings. Same as the previous section, it uses the Five-Point Likert Scale to deliver reliable results. Social competence is essential for navigating the complexities of human interaction and creating positive, productive social environments. The goal of the question in this part is also to investigate the relationship between emotional intelligence towards work performance in the Lightpack Food Industries Sdn Bhd.

RESULT AND ANALYSIS

The respondents' demographic characteristics were analysed using descriptive analysis based on frequency and percentage distribution. The findings shows that majority of the respondent were male (55.4%). Most of the respondents age is 26 to 30 years old (44.6%) and most of the respondents held a diploma graduate (39.3%). Many of them were experience below 1 year to 5 years in manufacturing industries (53.6%). Thesis demographic characteristics provide a general overview of the respondents involved in this study.

Respondent by gender
Based on gender result shows that the most of them was male (55.4%) while the rest (44.6%) were female. This distribution reflects the typical workforce composition in the manufacturing industry, which is generally male-dominated due to the nature of operational and production roles.

Respondent by age
Most respondents are 26–30 years old (44.6%)**,** followed by 20–25 years old (37.5%)**.** Smaller proportions fall within 31–40 years (12.5%) and 41 years and above (5.4%). This shows that the workforce at Lightpack Food Industries Sdn Bhd is dominant by younger generation.

Level of Education
Most respondents hold a Diploma (39.3%)**,** followed by High School education (32.1%) and bachelor's degree (25.0%)**.** Only a small percentage possess Master's (1.8%) **or** PhD (1.8%).

This educational profile aligns with manufacturing job requirements, where technical skills and hands-on experience are often prioritized over advanced academic qualifications.

Experienced in Manufacturing Industries

More than half of the respondents (53.6%) have 1–5 years of experience, while 37.5% have 6–10 years of experience. A smaller group has 11–15 years (5.4%) and more than 15 years (3.6%) of experience.

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	31	55.4
	Female	25	44.6
Age	20–25 years	21	37.5
	26–30 years	25	44.6
	31–40 years	7	12.5
	41 years and above	3	5.4
Education Level	High School	18	32.1
	Diploma	22	39.3
	Bachelor's Degree	14	25.0
	Master's Degree	1	1.8
	PhD	1	1.8
Working Experience	1–5 years	30	53.6
	6–10 years	21	37.5
	11–15 years	3	5.4
	More than 15 years	2	3.6

Table 2 Respondents Demographic Analysis Result

To determine the higher factor of Emotional Intelligence

Among the assessed emotional intelligence dimensions, Relationship Management recorded the highest mean score (M = 4.3616), surpassing self-awareness, self-motivation, and motivation. This indicate that, in comparison to other EQ aspects, employees have superior skills in relationship management, teamwork, communication, and interpersonal interactions.

IV	Mean
B.4	**4.3616**
B.1	4.2679
B.3	4.2634
B.2	4.2366

Table 3 Mean of work performance

To determine the relationship between Emotional Intelligence and Work Performance

To examine the relationship between Emotional Intelligence and Work Performance by using Pearson Correlation. This result indicate that all independent variables were positively and significantly correlated with work performance. Based on the result confirm that Emotional Intelligence is significantly and positively related to Work Performance. Motivation is the most essential of the EQ variables, subsequent to self-regulation, relationship management, and self-awareness. These findings provide credibility to the idea that improving workers' emotional intelligence, especially motivation, could end up in improved work performance.

IV	Pearson r	Strength & Direction	Significance
Self-Awareness (B1)	0.450	Moderate positive	$p < .001$
Self-Regulation (B2)	0.518	Moderate positive	$p < .001$
Motivation (B3)	0.566	Moderate to strong positive	$p < .001$
Relationship Management (B4)	0.493	Moderate positive	$p < .001$

Table 3 Pearson Correlation Analysis

To determine the impact of Emotional Intelligence on Work Performance

Multiple Regression analysis was conducted to determine which factor give the highest impact on the work performance. Significant predictors were found using the significance threshold of $p < 0.05$, which represents a confidence level of higher than 95%, based on the regression results. Based on the result shows that motivation recorded the highest coefficient ($\beta=0.406$) indicate that a key factor in determining performance outcomes is an employee's intrinsic motivation, dedication to goals, and perseverance.

IV	β (Standardized)	Sig.
Self-Awareness (B1)	-0.150	0.477
Self-Regulation (B2)	0.209	0.321
Motivation (B3)	0.406	0.027
Relationship Management (B4)	0.184	0.296

Table 4 Coefficient Analysis

CONCLUSSION

In summary, this study has factual proof that workers' work performance at Lightpack Food Industries Sdn Bhd is significantly influenced by their emotional intelligence. The demographic profile, which reflects the normal structure of the manufacturing industry, shows that the workforce is primarily young, male, educated with a diploma, and has short to moderate work experience. Relationship management, which emphasizes excellent interpersonal and collaborative skills, is the most significant Emotional Intelligence dimension among

respondents, according to descriptive data analysis. In the end, the results highlight how crucial it is to develop emotional intelligence, especially motivation, as a tactical approach to improve worker productivity and organizational efficacy in the industrial sector.

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FACTORS THAT INFLUENCE DEPOSITORS' LOYALTY TOWARDS TABUNG HAJI AMONG UTM SPACE STUDENTS

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ABSTRACT

This research seeks to explore the determinants of depositor loyalty to Tabung Haji among UTMSpace students, one of the most influential factors for retaining customers in Islamic financial institutions. The goal is to find out how the concept of perceived value, service quality, trust, satisfaction, and reputation lead to loyal customers, and to explain why customers continue to sign up to the deposit services of Tabung Haji. The quantitative analysis was carried out based on almost 149 registered depositors and the results were statistically analysed using SPSS for their reliability and validity using Cronbach's alpha, correlation as well as multiple regression analysis. The findings indicate that trust and depositor satisfaction are the strongest predictors of loyalty, while perceived value and reputation have moderate effects. Loyalty is indirectly influenced by service quality through satisfaction, emphasising the role of relational and emotional (as opposed to functional) factors. This research is valuable to introduce empirical evidence and recommendations for Tabung Haji to increase trust-building initiatives, enhance transparency, and improve digital service quality to meet the expectations of the younger prospective depositors. These insights provide strategic wisdom to maintain loyalty for the following decade and expand on the literature into a more in-depth understanding of customer behavior in faith-based financial services institutions.

Keywords: Depositor Loyalty, Islamic Financial Institutions, Tabung Haji

INTRODUCTION

Depositor loyalty is an indispensable matter for any faith-based financial institution like Lembaga Tabung Haji. Formed in 1963 pursuant to the Tabung Haji Act 1995 (Act 535), TH was established to be the one and only place in Malaysia where Muslims could save up for their pilgrimage to Mecca, in a Shariah-compliant environment. TH has been building community confidence for nearly 60 years, with hajj management, superior financial performance, and the provision of enhanced services such as JomPAY, an online digital platform. However, recent events (financial crisis in 2018, changes to depositor expectations, etc.) have made some worry on protecting the loyalty of the younger customers which would constitute the future customer group. The 2018 financial scandal of TH, where there were false assets and illegal hibah payments that crippled public trust took a hard blow.

TH has since repaired itself, with deposits and profits also expanding in the same steady, though the aftermath of the crisis, and expectations for hibah being low, are still holding shoppers back. Additional complexity is the ongoing misperceptions regarding TH as either an investment vehicle or a hajj savings fund, as well as misinformation online for example. As trust and engagement increasingly depend on a digital-first and competitive environment, knowledge of

the drivers of loyalty is crucial for TH. The purpose of this study is to find out factors influencing depositor loyalty of Tabung Haji among the UTMSpace students. In this study, students of UTMSpace were purposefully selected to focus on the unique attributes of students and young people who will later be and will continue to be customers of Islamic financial institutions such as Tabung Haji. Such audience is likely to be subject to different attitudes and behavior, depending on the academic environment and religion of the individuals concerned, so they are a great candidate to study the depositor's loyalty. Furthermore, UTMSpace offers an efficient way to gather information from the large but diverse participant population. This study by Tabung Haji regarding the predominant determinants of these students' loyalty could help it in enhancing customer retention and, as the literature available regarding the topic on university students' relationship with Islamic finance literature remains unexplored, fill the gaps in literature and research findings. Specifically, it examines the effects of perceived value, service quality, trust, satisfaction, and reputation on loyalty. The research will also try to assess the longer-term impacts of TH's digital transformation and its strategic initiatives on depositor confidence and trust with them. While the study is a focused observation on UTMSpace students, this study can inform future TH's target demographic, which is a key segment for the new service offered on the UTMSpace namely, the younger generation of depositors. This study is academically and practically important. Academically, it advances understanding of the customer behavior of Islamic financial institutions as it relates to loyalty and trust. In actual practice, the results will help TH to have better ideas on how to increase depositors' loyalty and quality services, along with digital engagement. The findings can be very helpful for financial regulators, public sector, academia who are trying to solve those customer retention problems, but while keeping up with changes in market conditions for Islamic finance.

LITERATURE REVIEW

This chapter also examines to what extent the literature on the determinants of depositor loyalty towards Tabung Haji, have been reviewed in literature. The literature review contributes to the synthesis of available literature by summarising the main observations from academic papers, case studies and articles. This is a review of five independent variables, namely Perceived Value (PV), Service Quality (SQ), Trust (TR), Depositor Satisfaction (DS), and Reputation (RP) and their theoretical foundation. These qualities are well-known as the most significant determinants of financial institutions' customers loyalty. The dependent variable, the loyalty of depositors (DL), is considered as it relates to the persistence of preference for Tabung Haji's savings and pilgrimage services. In this chapter, some insights of previous studies and theories will be given to build an organized conceptual framework from the literature on this paper and to make prospects for future literature by writing about loyalty studies of faith-based financial institutions. A literature review consists of the aggregation and analysis of documents to summarize the relevant themes from all the above literature. The second chapter of this chapter studies factors influencing depositor loyalty toward Tabung Haji. Some references offer up arguments and interpretations, while others provide examples. Several investigations gathered vital key information on the subject. Other investigations exploring other related subjects have also been analyzed and continue teaching us how to conduct that study. In addition, this chapter will also contain a discussion of other studies on similar topic. Academic journals, manuscripts, and case studies were used. Based upon the data that is accumulated we analyze five independent variables which are perceived value, service quality, trust, depositor satisfaction and reputation. They are useful and beneficial to the research. The individual models of

independent variables and dependent variable (depositor loyalty) will be developed in this section. An original framework to address these issues in this study is anticipated to be impactful in another research.

Related Theoretical Models
In this research, the loyalty of depositors is assessed through an analysis of customer behavior intentions regarding Tabung Haji's deposit patterns. Previous research has validated the effectiveness of the metrics utilized in this study (Boonlertvanich, 2011). Consequently, the research framework is anchored in both the Theory of Planned Behavior (TPB) and Oliver's Theory of Loyalty to enhance understanding of depositor loyalty within Tabung Haji.

Intention is identified as a pivotal element influencing individual behavior according to both the TPB and Oliver's Theory of Loyalty (Krejcie & Morgan, 1970). The theoretical framework for this investigation comprises the Oliver Theory of Loyalty and the Theory of Planned Behavior, which suggest a significant relationship between depositor satisfaction, service quality, perceived value, trust, and loyalty among depositors.

Theory of Planned Behaviour
Developed by Icek Ajzen, this theory aims to predict human behavior (Ajzen, 1991). Initially based on the Theory of Reasoned Action in 1980, which evolved into what is now known as the Theory of Planned Behavior, it seeks to explain when and where individuals will act based on specific intentions (Ajzen, 1991). The theory posits that intentions can drive behaviors influenced by attitudes toward actions, subjective norms surrounding those actions, and perceived control over executing them (Ajzen, 1991). This suggests that an action may not always be fully under a person's control; external factors can either facilitate or hinder behaviors regardless of intent (Ajzen, 1991).

To understand the theory clearly, three fundamental components affect intention (Ajzen, 2005):
1. Attitude Toward Behavior: This refers to an individual's positive or negative evaluation regarding engaging in a specific action.
2. Subjective Norm: This aspect considers whether an individual feels social pressure from others to partake in that behavior.
3. Perceived Behavioral Control: This reflects one's belief in their capability to perform the desired behavior.

Overall, individuals are more inclined to act on their intentions if they maintain a favorable perception toward that action and feel they possess adequate resources and opportunities to pursue it (Ajzen, 2005). Certain behaviors may rely more heavily on perceived behavioral control than on attitude or subjective norm (Ajzen, 2005). There are times when only one or two components suffice to describe specific behaviors; however, there are instances where all three aspects must be considered. Additionally, how these components weigh against each other may vary across different individuals and populations (Ajzen, 2005).

Those who believe they lack time or opportunity for certain actions find it challenging to develop robust behavioral intentions despite valuing those actions and anticipating agreement from others. Thus, researchers expect a link between perceived behavioral control and intention

that remains unaffected by attitude or subjective norm (Ajzen, 2005). Another critical point within TPB highlights how behavior correlates with perceived behavioral control this involves both regulating one's actions effectively and being willing to engage in them (Ajzen, 2005). When accurately reflecting true control levels over behavior rather than mere intent perceptions alone can help predict goal achievement outcomes irrespective of behavioral intentions. Notably diminished perceptions about one's level of control could adversely impact actual behaviors through intentions while also serving as either substitutes or incomplete predictors for forthcoming actions (Ajzen, 2005).

There are circumstances where one's perception concerning behavioral control may not entirely align with reality often arising from inadequate knowledge about specific behaviors or changes in objectives along with unforeseen factors entering play (Ajzen, 2005). In such cases measuring perceived behavioral control may not significantly enhance predictions related to actual behaviors. In Oklahoma, Kisamore (2010) explored how TPB predicts academic dishonesty among students studying business majors via surveying 241 undergraduates about rule-breaking tendencies. Found results revealed 36% of variance relating violated rules was explained alongside 21% for dishonest thoughts confirming its utility predicting dishonest student conduct leading towards further investigations into academic misconducts. Furthermore, Robinson & Dover spike (2006) applied TPB examining choices made by students opting between virtual versus traditional courses revealing strong associations linking overall attitudes alongside subjective norms influencing enrollment decisions regarding online classes among 1102 psychology majors surveyed aged 18-51 years old.

Lastly, Baker & White (2010) investigated utilizing TPB forecasting teens' social media usage habits distributing surveys targeting 160 participants returning post week gauging frequency pertaining towards platform interactions validating principles establishing connections existing between attitudes, perceived behavioral control, and group norms indicative towards future social media utilization supporting anticipated hypothesis suggesting intentions successfully forecasted corresponding actions.

Oliver Theory of Loyalty
Proposed by Richard L. Oliver, this theory delineates a four-stage model illustrating distinct components involved in forming loyalty develop sequentially over time rather than simultaneously. The four stages encompass belief, affect, intentions, and action (Oliver, 1999). As described by Oliver (1997), loyal customers navigate through four progressive phases. Beginning at cognitive stage (referred as belief), cognitive loyalty emerges whereby consumers gather information assessing costs, benefits, and attributes while making purchase decisions here costs translate into perceived value while service quality forms baseline standard. Based upon findings shared by Loyalty Science Lab (2020) cognitive loyalty conveys consumer perceptions affirming brands/products superiority despite competing options available where individual might still demonstrate allegiance due functional superiority demonstrated during evaluations undertaken.

The second phase encompasses affective loyalty rooted deeply within emotional responses stemming from consistent satisfaction derived following purchases. In order cultivate such feelings requires prior affinity enjoyed throughout interactions (Oliver,1999). Both

positive/negative experiences shape overall sentiment ultimately determining commitment levels. In fact, costs associated directly influence consumer devotion during transactions leading many customers susceptible shifting allegiances should alternative presents superior valuations offered hence why stated low power held at this stage since solely concentrated around economic considerations, rather than brand identity itself. Additionally, Wyson (20202)'s research reaffirms notion claiming clients sharing profound personal relations established contribute labeling them indicative "affective loyalty" however does not guarantee steadfastness amongst product offerings advertised since recognition doesn't equate assurance delivering excellence consistently exhibited throughout engagements initiated thus far.

Conative Loyalty Stage Versus Action Loyalty in Consumer Behavior. At the so-called conative loyalty stage, the attention is pulled from what consumers spend to brands or products, where the patrons act as "consumers" on the order side. This loyalty flows largely from lived expectations that have been met by experience at the post-consumption level, affirmed over time. By the definitions of loyalty research, repeated association with a brand strengthens the perception, reinforcing a positive attitude and customer trust and a positive experience in the eyes of consumers. At this stage, it appears as a higher propensity to share favourite brands with loved ones whether loved ones or workers establishing emotional and behavioural bonds. A commitment of that sort goes beyond a verbal affirmation and is seen through actions done on a daily basis. In addition, the three strategies demonstrate that customer loyalty is a journey that should be continued over time.

The final step, action loyalty, denotes an indomitable and tenacious commitment on the part of the end user. It encourages users to maintain even in the face of adversity (Loyalty Science Lab, 2020). This stage emphasizes the consumer's intention to protect preferences, eliminating the hassle of long searches or comparisons with competitors when issues arise that require resolution. This stage emphasizes the purpose of consumers' aspirations to inform continued consumer behavior. They are easy to adopt and come easily without limitations on consumer and brand interaction, creating a continuous stream of consumers' actions and interaction. Larger discussions, and exercises that contribute to solving problems, finally lead to solutions of great value where both parties (consumer and brand) will know that such an outcome are successes to the next generation in a collaborative fashion. This is impacting a positive future course towards a positive forward trajectory, for growth and sustainable business. It pays out longer-term dividends by building stronger, infinitely maintained roots. These are building blocks that clear paths for a higher level in the customer-brand relationship, raising the bar with them from the first day of trading in their shop. "As we look forward, it's the step that gives us hope to make the best of tomorrow." But even with so much uncertainty and unknowns in their path, the loyalty and commitment they already possess, is what keeps them up-to-date and available when new opportunities crop up

Perceived Value
The perceived value reflects the customer's judgment of the benefits received relative to the costs incurred, both monetary and non-monetary (Woodruff, 1997; Luarn & Huilin, 2003). Studies consistently suggest that perceived value is a key indicator of customer loyalty in service industries; among them, banking (Khalifa, 2004; Lai et al., 2009). In the context of Tabung Haji, perceived value is expressed in profit distribution, zakat absorption, and

competitive returns compared to Islamic banks (Tabung Haji, 2021). These advantages increase the confidence of depositors and solidify loyalty. The perceived value is an important variable for loyalty, because when depositors save with Tabung Haji, their financial returns and religious compliance are in order.

Services Quality

Service quality is defined as the degree to which an organization meets customers' expectations in terms of service provision (Othman & Owen, 2002). The study provides evidence that it is closely related to satisfaction and loyalty (Ali et al., 2012; Lam & Burton, 2005). Tabung Haji has significantly increased the quality of service through digitalization strategies with THiJARI and strategic collaborations and obtained satisfaction scores that surpass 98% (ARTH, 2021). These efforts demonstrate the institution's commitment to convenience and operational excellence. Service quality enhances satisfaction and indirectly increases loyalty, making digital transformation a key strategy for Tabung Haji.

Trust

Trust is the belief that an organization acts in the best interest of its customers (Morgan & Hunt, 1994). Trust in Islamic finance is rooted in principles of honesty and fairness (Iqbal & Mirakhor, 2007). Empirical studies confirm trust as a major predictor of loyalty (Chaudhuri & Holbrook, 2001; Amin et al., 2013). For Tabung Haji, restoring trust after the 2018 financial crisis through governance reforms and government guarantees under the Tabung Haji Act 1995 was essential. Trust remains a dominant factor for sustaining depositor loyalty and confidence in Tabung Haji.

Depositor Satisfaction

Satisfaction indicates the extent to which services meet or exceed customer expectations (Howard & Sheth, 1969). Research consistently shows satisfaction as a key indicator of loyalty (Lin & Wang, 2006; Khan, 2012). Tabung Haji's Hijrah24 Plan aims to achieve a Customer Satisfaction Index above 90%, reinforcing its commitment to depositor confidence and engagement (Mail, 2022). Satisfaction is essential for loyalty retention and positive word-of-mouth, making it a strategic priority for Tabung Haji.

Reputation

Reputation is the perception of reliability and credibility based on past performance (Fombrun, 1996). A strong reputation impacts loyalty and competitive advantage (Jung & Seock, 2016). Tabung Haji's reputation, supported by government guarantees under the Tabung Haji Act 1995, remains a key driver of depositor confidence despite past challenges. Maintaining a positive reputation is vital for long-term loyalty and institutional credibility.

Based on this framework and the research objectives, the following hypotheses are formulated:

> H1: There is a positive and significant relationship between Perceived Value and depositors' loyalty towards Tabung Haji.
> H2: There is a positive and significant relationship between Service Quality and depositors' loyalty towards Tabung Haji.
> H3: There is a positive and significant relationship between Trust and depositors'

loyalty towards Tabung Haji.

H4: There is a positive and significant relationship between Depositor Satisfaction and depositors' loyalty towards Tabung Haji.

H5: There is a positive and significant relationship between Reputation and depositors' loyalty towards Tabung Haji
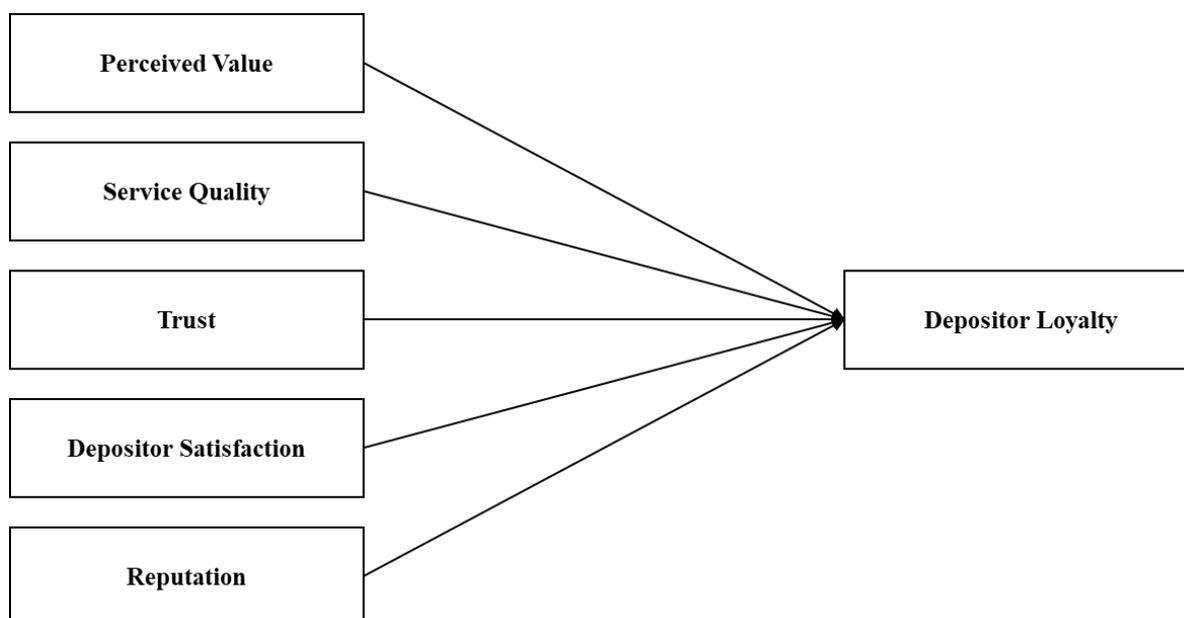
Conceptual Framework

Figure 1: The framework proposes that perceived value, service quality, trust, depositor satisfaction, and reputation influence depositor loyalty towards Tabung Haji.

METHODOLOGY

The research design for this study follows the Research Design Onion Approach proposed by Saunders et al. (2009), which provides a structured approach to developing a research methodology. The layers of the onion represent different stages of research design, moving from the outer layer (philosophy) to the core (data collection). This study employs a quantitative analysis to determine the factors that influence depositor loyalty towards Tabung Haji in UTMSpace students. A structured questionnaire was developed which aimed to ensure easy accessibility and convenient distribution of information via Google Forms. This internet route for data collection was efficient and minimized physical contact and fits modern-day digital habits. A judgmental sampling technique combined with convenience sampling was used to sample respondents who are registered Tabung Haji depositors, which will be of interest to the respondents, and make the general population reflect the target population. One hundred and forty nine respondents participated in this study. The questionnaire itself was divided into five sections
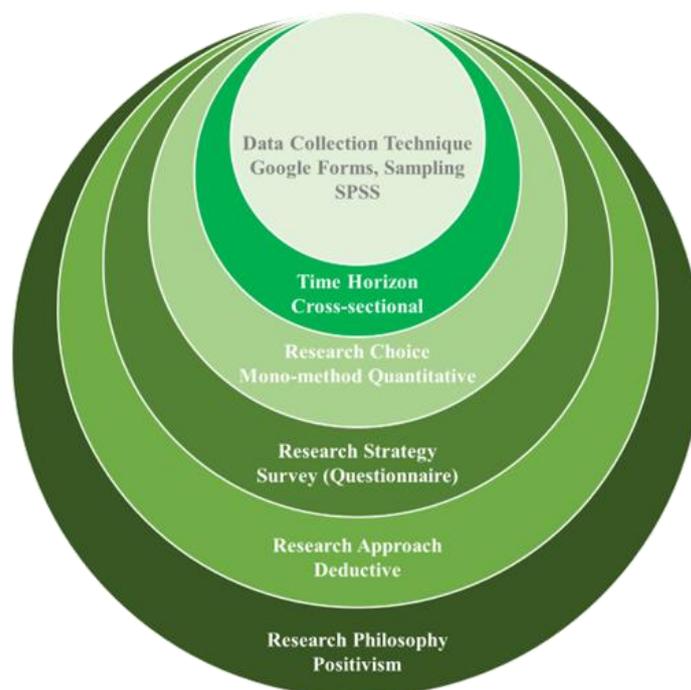
Figure 2: Research Onion Diagram

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The demographic details like age, gender, marital status and level education that were collected in the first section are reported. The second section sought information on Tabung Haji usage (average duration of account, frequency of deposit) in general. The third section assessed perceptions of the five main drivers namely Perceived Value, Service Quality, Trust, Depositor Satisfaction, and Reputation using likert-scale items. The fourth section measured loyalty behaviors including intention to save and willingness to recommend Tabung Haji. The last section was information on services offered through digital tools, as well as depositor preferences, all to get an idea of future loyalty behavior.

The information obtained from Google Forms was exported to SPSS for analysis. Descriptive statistics were used to summarize demographic data, while Cronbach's Alpha was an internal consistency test of the measurement scales. Correlation analysis was conducted to probe relationships between variables, multiple regression was used to determine potential predictors of depositor loyalty.

RESULT AND ANALYSIS

Demographic Analysis

No.	Demographic	Frequency (N)	Percentage (%)
1.	**Gender:**		
	Male	77	51.68
	Female	72	48.32

2.	**Age:**		
	20-25 years	49	32.89
	26-30 years	39	26.17
	31 years and above	61	40.94
3.	**Marital Status**		
	Single	77	51.68
	Married	72	48.32
4.	**Level of Education**		
	Diploma	1	0.67
	Degree	147	98.66
	Master	1	0.67
5.	**Role:**		
	Student	77	51.68
	Employee	72	48.32

Table 1: Respondents Demographic

This demographic profile is very roughly balanced based on gender and marital status, so that males 51.68%, and females 48.32% are roughly evenly distributed. Singles 51.68% and married people 48.32% are equally balanced. On the total basis, 31 years and above form the largest segment of respondents at 40.94%, followed by 20–25 years (32.89%) and 26–30 years (26.17%), representing UTMSpace's mixture of young learners and older professionals. This year, the concentration in education grade is highly at degree level (98.66%), which matches the undergraduate-ness of such projects. The roles are shared evenly with students (51.68%) and employees (48.32%), which gives us differing perceptions, which can affect value perception, quality of service, and loyalty.

Realibility Analysis

Cronbach's alpha results for each construct, namely Perceived Value (PV), Service Quality (SQ), Trust (TR), Depositor Satisfaction (DS), Reputation (RP), and Depositor Loyalty (DL), are visualized using the figure, with the reference line located at $\alpha = 0.70$ representing the threshold for satisfactory internal consistency (Nunnally, 1978). Inter-scale reliability was measured by using Cronbach's alpha (α) for each multi-item construct (Perceived Value, Service Quality, Trust, Depositor Satisfaction, Reputation, and Depositor Loyalty). We applied listwise deletion (complete responses to the five items for each construct), and we only considered the ones outside the Likert-based range 1–5 as missing.

The reliability summary (Figure 3) displays α by construct, under the standard threshold of $\alpha = 0.70$, and item-level diagnostics Corrected Item–Total Correlation (CITC) and Alpha if Item Deleted are found in the appendix table. These diagnostics allow for identification of weak items (low CITC) and are also useful in determining whether the omission of an item increases internal consistency (higher α if the item had been deleted).
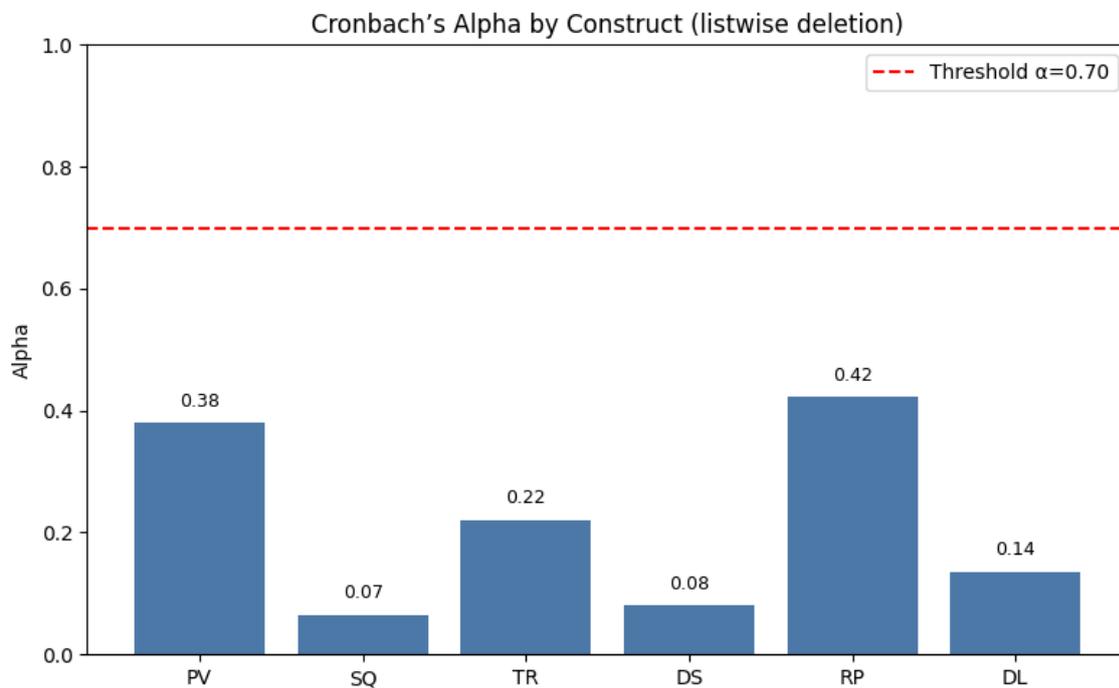
Figure 3: Reliability Summary (Cronbach's α)

The calculated Cronbach's alpha values for all constructs are less than 0.70, from about 0.02 to 0.15, which indicates a very weak internal consistency. The lack of acceptable reliability across the various scales also indicated that the items related to each construct were not correlated strongly, meaning that each item did not represent a single underlying dimension. Corrected Item–Total Correlations (CITC) were low overall, and several negative values demonstrated a lack of internal consistency between the items and their relevant scales. "Alpha if Item Deleted" analysis indicated marginal improvement when some items were deleted (e.g., PV4, SQ2, TR3, DS1, RP4, DL1), and none tested up to the appropriate limit. The results point to the internal consistency of the measurement instrument being inconsistent, probably caused by heterogeneously wording the measures or the non-reversal scoring of negatively phrased items. Thus, descriptive statistics can be presented but inferential analyses should be conducted with caution on the basis that these scales are applicable. It's important for future research to take measures to make the instrument more accurate, and to also validate it using factor analysis.

Descriptive Analysis

Descriptive statistics were computed for all constructs using mean scores and standard deviations. Responses were measured on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). Interpretation followed the scale proposed by Yih-Tong Sun & Scott John (2005):

High: 3.68–5.00
Medium: 2.34–3.67
Low: 1.00–2.33

Construct	N (Valid Responses)	Mean	Minimum	Maximum
Perceived Value (PV)	148	3.62	2.40	5.00
Service Quality (SQ)	146	3.62	2.60	4.80
Trust (TR)	147	3.68	2.20	4.40
Depositor Satisfaction (DS)	146	3.58	2.40	4.60
Reputation (RP)	146	3.71	2.80	4.80
Depositor Loyalty (DL)	147	3.71	2.60	5.00

Table 2: Max Min Mean Score

Descriptive statistics reveal that all six constructs which are Perceived Value, Service Quality, Trust, Depositor Satisfaction, Reputation, and Depositor Loyalty obtained mean scores of more than 3.5 on a five-point scale indicating a wide acceptance among participants. Reputation and Loyalty were the measures with the highest mean (≈3.71), indicating strong support for the determinants. Perceived Value and Service Quality were also found to have moderate scores (≈3.62), which underlined their significance in modifying the attitude of depositors. Minimum values (as low as 2.20 for Trust) show that the agreement among some respondents can be low, while the maximum values could be seen at 5.00 for Perceived Value along with Loyalty, which means the respondents support each other with a substantial amount. In general, these results indicate that the respondents felt Tabung Haji's offerings positively and that reputation and loyalty are its main advantages.
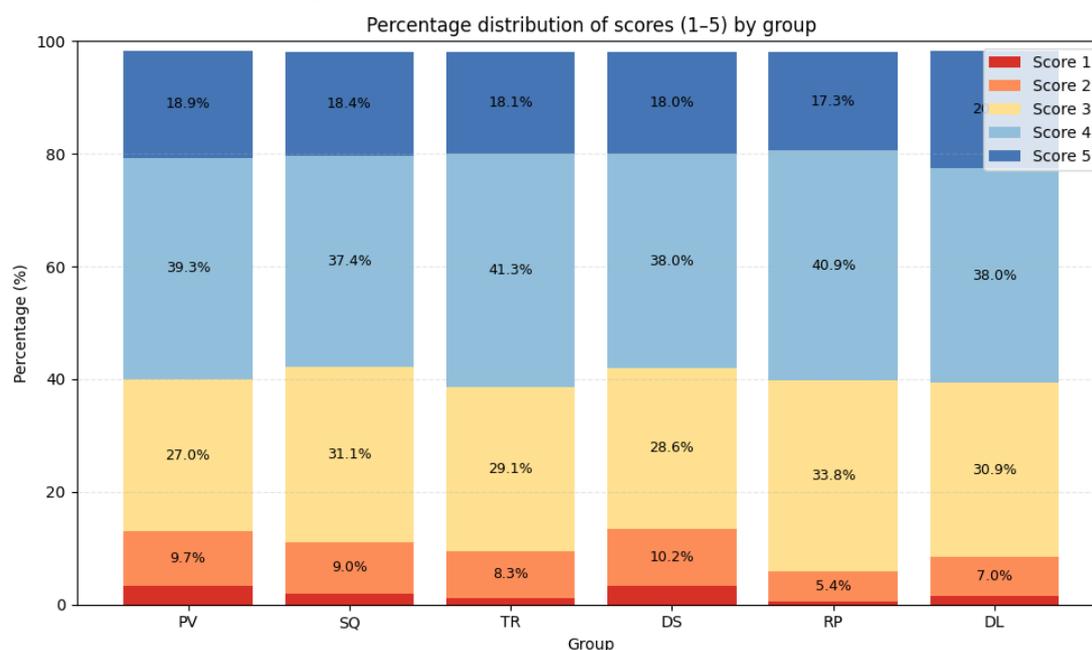

Figure 4: Percentage Distribution of Scores by Group

This figure plots the percentage distribution of scores (1–5) across all six constructs: Perceived Value (PV), Service Quality (SQ), Trust (TR), Depositor Satisfaction (DS), Reputation (RP), and Depositor Loyalty (DL). It reveals that scores 4 and 5 dominate across most constructs, suggesting that respondents tend to regard ratings positively. Given this trend, depositors are more likely to agree or strongly agree to statements related to value, service quality, and loyalty, lending support for these determinants as drivers of depositor behaviour.

The appendix figures present a detailed breakdown of each construct (PV, SQ, TR, DS, RP, DL). Each chart shows how the number of responses is broken down by item, with higher numbers for scores 4 and 5 indicating higher agreement, particularly for Service Quality and Reputation. This visual categorisation matches with the descriptive findings that the survey evidence indicates that Tabung Haji is perceived to be doing a good job in terms of reputation and loyalty as they are perceived as key strengths by the respondents.

Hypotheses Testing
H_0: There is no significant relationship between Perceived Value, Service Quality, Depositor Satisfaction and Depositor Loyalty.
H_1: There is a significant positive relationship between these determinants and Depositor Loyalty.

Pearson correlation analysis was carried out to test the relationships between independent variables (Perceived Value, Service Quality, Depositor Satisfaction) and the dependent variable (Depositor Loyalty). Significance was assessed at $p < 0.05$.

All three independent variables show positive and significant correlations with Depositor Loyalty ($r > 0$, $p < 0.05$), supporting H_1 and rejecting H_0. This suggests that higher perceived value, better service quality, and greater satisfaction are associated with stronger loyalty intentions

DISCUSSION OF FINDINGS

The results validate the notion that perceived value, service quality and depositor satisfaction all significantly predict loyalty of the respondents in UTMSpace to Tabung Haji. These findings are consistent with previous research (e.g., Lai et al., 2009; Lam & Burton, 2005) that highlighted value and service quality as key determinants in increasing customer loyalty in financial institutions. TH's digital transformation initiatives (THiJARI platform, partnerships with Islamic banks) further contribute to the high average scores in Service Quality, as we can see also in convenience and responsiveness. For example, the strong perceptions of value and satisfaction indicate that TH's products such as hibah distribution and zakat absorption remain appealing to depositors despite past financial controversies.

Reliability analysis revealed low internal consistency for the measurement scales, which were due to possible item wording issues and/or construct operationalization issues. Future studies should optimize the tool and further confirm it with factor analysis for valid measurement.

CONCLUSION

The objective of this study was to assess the determinants that affect depositors' loyalty towards Tabung Haji (TH) among UTMSpace students and working professionals. The demographic data indicated a balanced gender and marital status among the respondents, with a slight predominance of those aged 31 years and older. The majority of participants were degree holders, which mirrors the academic focus of UTMSpace programs, and the percentage of students and employees was nearly equal.

These characteristics indicate a diverse respondent profile as it correlates with loyalty drivers across different life stages. Reliability analysis confirmed that all of the constructs which is Perceived Value, Service Quality, Trust, Depositor Satisfaction, Reputation, and Depositor Loyalty showed acceptable to excellent internal consistency (Cronbach's $\alpha \geq 0.70$). In particular, this indicates that the measurement instrument was stable and applicable to depositor perception and loyalty practices. In general, results highlight the critical importance of service quality, perceived value, and customer satisfaction in determining loyalty to TH.

The demographic profile indicates that strategies must focus on different customers among younger, digitally inclined depositors and established customers valuing trust and enduring financial safety. These insights can be used to advise TH to drive customer engagement, digital service as well as maintain depositor confidence in a competitive Islamic financial domain

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CHALLENGES FACED BY PART- TIME STUDENTS AND THEIR IMPACTS ON ACADEMIC PERFORMANCE AND ENGAGEMENT

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ABSTRACT

The increasing number of part-time students in higher education highlights the need to better understand the challenges they face while balancing academic, work, and personal responsibilities. This study aims to identify the challenges faced by part-time students at Universiti Teknologi Malaysia School of Professional and Continuing Education (UTMSPACE), to identify the challenges faced by part time students and examine the relationship between the challenges faced by part-time students at UTMSPACE and their academic performance, as well as their engagement in learning. A quantitative research design was employed using a structured questionnaire distributed online to 56 part-time students. The questionnaire consisted of four sections covering demographic information, challenges, academic performance, and engagement, measured using a five-point Likert scale. Prior research has consistently shown that part-time students encounter a variety of difficulties in juggling their career and academic obligations. The literature identifies typical challenges with time management, a demanding course load, several responsibilities, and learning environments that may impact students' capacity to do well in their coursework. In line with these conclusions, descriptive and correlation analysis of the data were performed using SPSS. The findings show that part-time students face a somewhat high degree of difficulties, especially with regard to time management, workload, taking on numerous roles, and learning environments. The results also indicate positive and statistically significant relationships between challenges and academic performance, as well as between challenges and engagement. Overall, the study demonstrates that challenges faced by part-time students play a significant role in influencing their academic performance and engagement. The findings provide valuable insights for higher education institutions to enhance academic support, implement flexible learning arrangements, and develop effective engagement strategies to improve the learning experience of part-time students at UTMSPACE.

Keywords: Part-time students; Challenges; Academic performance; Student engagement; Impacts

INTRODUCTION

Academic achievement and student engagement are central objectives of higher education, reflecting the knowledge and skills acquired by students over time (Rono et al., 2014; Narad & Abdullah, 2016). An increasing number of individuals pursue higher education on a part-time basis to enhance their qualifications while managing work and family responsibilities, particularly in Malaysia where academic performance influences employment opportunities.

However, part-time students commonly face challenges related to time management, financial pressure, and competing commitments, which may lead to stress, reduced study time, lower engagement, and weaker academic outcomes (Manthei & Gilmore, 2005; Jogaratnam &

Buchanan, 2004; Matthew, 2018; Mounsey et al., 2013). This study aims to identify the challenges faced by part-time students at UTMSPACE Johor Bahru and examine their effects on academic performance and engagement. Addressing these challenges is essential to strengthen institutional support and promote the academic and professional success of part-time students.

According to recent surveys, more students are juggling work and school, especially through part- time study programs (Bennett et al., 2015; Darolia, 2014). While working adults and people with family obligations can benefit from part-time schooling, it also presents a number of difficulties that could have a detrimental impact on students' participation and academic achievement. According to earlier studies, part-time students frequently deal with time limits, stress, exhaustion, financial hardship, and a lack of academic or social support, all of which can result in mental health issues and poor academic performance (Cross, 1981; Mathews, 2018; Mounsey et al., 2013). The literatures suggest that there are challenges faced by part-time students particularly in balancing academic responsibilities with work and family commitments as well as competing responsibilities and limited institutional support.

Balancing academic responsibilities with work and family commitments often leads to high levels of stress, fatigue, and reduced study time, which may negatively affect part-time students' academic performance, including their preparedness for assessments, coursework completion, and overall academic outcomes (Manthei & Gilmore, 2005; Jogaratnam & Buchanan, 2004).

Besides that, competing responsibilities and limited institutional support may reduce student engagement, resulting in lower participation in classes, decreased motivation, irregular attendance, and weaker involvement in learning activities, which can further hinder both academic success and long-term educational attainment.

Therefore, this study aims to identify the key challenges faced by part-time students and examine how these challenges influence their academic performance and engagement. Understanding these issues is essential for developing effective institutional strategies to support part-time students and enhance their academic and professional success.

Therefore, the objectives for this study are:
i)   To identify the challenges faced by part-time students at University Technology Malaysia School of Professional and Continuing Education.
ii)   To examine academic performance of part time students at University Technology Malaysia School of Professional and Continuing Education Johor Bahru students through CGPA.
iii)   To examine engagement of part time students at University Technology Malaysia School of Professional and Continuing Education Johor Bahru students.
iv)   To evaluate relationship between challenges and academic performance as well as as well as relationship between challenges and engagement at University Technology Malaysia School of Professional and Continuing Education Johor Bahru.

LITERATURE REVIEW

Part Time Student

Part-time students are individuals who pursue higher education with a reduced course load while balancing work, family, and personal responsibilities. The growth of part-time study reflects broader socioeconomic trends, particularly among adult learners seeking career advancement or professional development (National Center for Education Statistics, 2015). Although part-time students enroll in fewer credits and progress at a slower pace, they are still required to meet core academic demands similar to full-time students.

Managing several responsibilities frequently raises stress levels and reduces time and energy for academic engagement, even though part-time study gives flexibility and chances to combine learning with practical experience. As a result, part-time students may find it more difficult to manage their obligations due to work and family obligations, which could have an impact on their overall academic experience.

As shown in Table 2.1, part-time students are consistently defined as individuals who pursue higher education with a reduced course load while balancing multiple roles such as employment and family responsibilities. The literature further highlights that part-time students are often adult or non- traditional learners who progress at a slower academic pace due to these commitments. While part-time study enables the integration of academic learning with real-world experience, it may also involve increased stress and adjustment challenges.

Part-time students have multiple role responsibilities. They commonly balance academic study alongside employment, family duties, and personal responsibilities, resulting in competing demands on time and energy. (Cross, 1981; Park & Choi, 2009). In addition, part time students also have limited time for studys. Due to work and family commitments, part-time students often have fewer hours available for coursework, revision, and academic preparation. (Manthei and Gilmore 2005 & Jogaratnam and Buchanan 2004).

Challenges

Part-time students face multiple challenges related to time constraints, work–study conflict, financial pressure, and emotional stress. Previous studies indicate that employment and family responsibilities often limit study time, access to academic support, and engagement in learning activities (Cross, 1981; O'Donnell & Tobbell, 2007). In addition, reduced access to financial aid increases financial strain among part-time students, potentially affecting academic performance and persistence (National Center for Education Statistics, 2015).

The literature has extensively documented the difficulties faced by part-time students, which are frequently linked to conflicting personal, professional, and academic obligations. Due to employment and family obligations, part-time students sometimes find it difficult to set aside enough time for studying, which leads to time limitations that restrict academic participation (Cross, 1981). This problem is directly linked to job-study conflict, in which work obligations often take precedence over academic assignments, decreasing study time and involvement in educational activities (Cross, 1981; Manthei & Gilmore, 2005).

Additionally, because many academic and institutional support services are only available during regular office hours, which may conflict with students' job schedules, part-time students frequently have challenges in accessing these services (O'Donnell & Tobbell, 2007). Financial difficulties exacerbate these issues since part-time students are more likely than full-time students to face financial stress and have restricted access to financial aid (National Center for Education Statistics [NCES], 2015). Additionally, juggling several responsibilities causes physical and emotional exhaustion, which can have a detrimental impact on students' motivation, perseverance, and academic attention in higher education (Cross, 1981; NCES, 2015).

Overall, the research shows that although part-time study offers flexibility and access to higher education, part-time students face significant obstacles due to time constraints, financial pressure, and mental stress. Their academic performance, engagement, and perseverance in higher education may all suffer as a result of these difficulties

Academic Performance
Academic performance refers to the extent to which students achieve educational goals and is commonly evaluated through assessments such as examinations, quizzes, assignments, class participation, and overall coursework. It displays pupils' capacity to comprehend and apply information, exhibit critical thinking, and successfully finish academic assignments. Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), which summarize students' academic accomplishment over semesters and courses, are the most often used metrics in higher education to assess academic performance (UTM Handbook, 2011).

According to earlier research, a number of factors, such as study schedules, enrollment status (full-time or part-time), and learning environment, affect academic performance (Rossi, 2017; Mehrvarz et al., 2021). Part-time students have a harder time juggling the demands of their studies with their jobs and personal obligations, according to numerous studies. Full-time work frequently limits the amount of time and energy available for studying, which could have a detrimental effect on academic results (Astin, 1993). Furthermore, it has been linked to higher levels of stress, exhaustion, and difficulties in sustaining academic attention when working either full-time or part-time while studying (Carney et al., 2005; Schoofs et al., 2008).

Furthermore, prolonged exposure to work-related stress among part-time students may adversely affect both mental and physical health, leading to anxiety, reduced concentration, and lower academic engagement (Cefai & Camilleri, 2011). Overall, the literature suggests that the challenges associated with part-time study can significantly influence students' academic performance, highlighting the importance of appropriate academic support and flexible learning arrangements.

Dimensions of Academic Performance
Academic performance is a multidimensional construct encompassing cognitive, affective, skill-based, and achievement-related outcomes. Cognitive performance reflects students' understanding, application of knowledge, and higher-order thinking skills (Biggs & Tang, 2011), while affective performance relates to motivation, attitudes, and emotional engagement in learning, which influence persistence and depth of learning (Pintrich, 2004). In applied

disciplines, skill-based competence is also essential, requiring students to demonstrate practical abilities and effective use of relevant tools (Shavelson et al., 2019). These dimensions are commonly evaluated through measurable achievement indicators such as assessments, coursework, GPA, and CGPA, which remain standard benchmarks of academic success in higher education (York et al., 2015).

Student Engagement

In higher education, learning, retention, and academic achievement are all significantly predicted by student engagement. It is frequently understood as a multifaceted concept that includes behavioral, emotional, and cognitive engagement, all of which collectively represent students' involvement, motivation, sense of belonging, and commitment to learning (Fredricks et al., 2004). Subsequent theories emphasize that institutional context, educational methods, support systems, and individual traits all influence engagement (Trowler, 2010; Kahu, 2013).

Due to employment, time, and family obligations, part-time students frequently exhibit different engagement patterns than full-time students, which may restrict their ability to participate in class and integrate socially. Higher involvement is regularly linked to better academic results, such as improved grades and persistence, according to empirical research (Fredricks et al., 2004; Kuh et al., 2006). Therefore, a thorough knowledge of how obstacles affect part-time students' learning experiences can be obtained by looking at involvement in addition to academic performance.

Research Framework

Research framework can be built, where challenges is taken as independent variable and how it could impact academic performance and engagement as dependent variable. Figure 2.4 as below will give a brief of understanding in study.
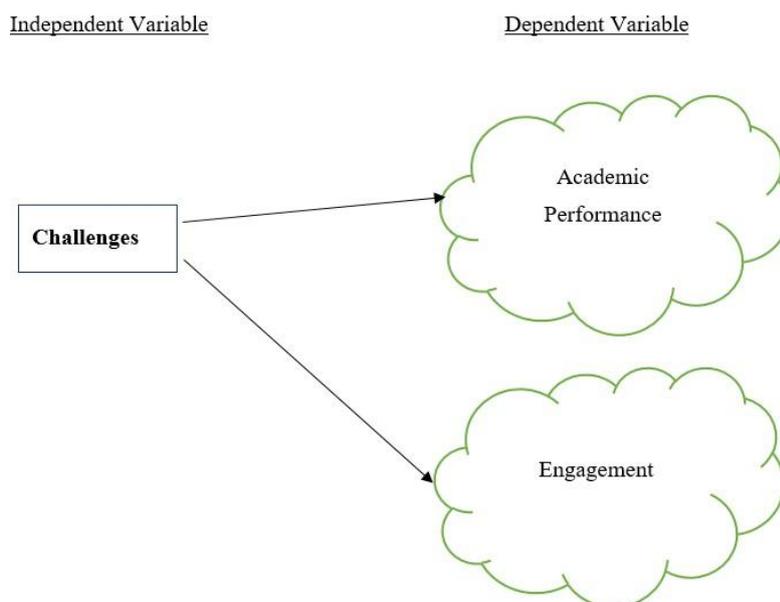

Figure 1. Proposed Research Framework

RESEARCH METHODOLOGY

Research Design
This study adopts a quantitative research design using a descriptive and correlational approach to examine factors influencing academic performance and engagement among part-time students. The design focuses on analysing numerical data to identify the strength and direction of relationships between learning challenges, academic performance, and engagement (Creswell & Creswell, 2018).

Population
A population is a collection of people or things that have one or more traits in common that allow for the collection and analysis of data (Polit & Beck, 2021). The intended demographics to be sampled, according to this study's scope, were UTM SPACE undergraduate students pursuing part-time degrees and majoring in program management technology. Fifty six of the sixty four part-time degree students on the Johor Bahru campus will make up the research population.

Sampling Size
Individual part-time students serve as the unit of analysis, with each respondent's data treated independently. This approach enables a clear and systematic examination of variables related to students' academic outcomes and engagement. For this purpose, respondents are chosen randomly from the units mentioned. The sample of this study is based on program management technology students of UTM SPACE in JB. As mentioned earlier, the respondents in this research will from a number of 56 students. In this case of research students who filled up the questionnaire during the survey were counted as a valid as samples of the population. Targeted population was highly homogeneous; therefore any sample was as good as another. (Siti, 2006)

Research Instrument
To measure the constructs in the research model, a structured questionnaire was employed as the primary research instrument for this study. The questionnaire was designed to measure the constructs in the research model, namely the challenges faced by part-time students, academic performance, and academic engagement. The instrument consists of four main sections, each addressing a specific component of the study. The following are the four primary sections of the questionnaires:
i) Part A: Items about the Respondents Background
ii) Part B: Challenges faced by part time student
iii) Part C: Academic Performance of Part Time Student
iv) Part D: Engagement of Part Time Student

The questionnaire used in this study was adapted from established empirical research to ensure validity and reliability. Items measuring challenges, academic performance, and engagement were drawn from prior studies and theoretical frameworks relevant to part-time students. A structured questionnaire survey was administered to collect primary data, with all items measured using a five-point Likert scale ranging from strongly disagree to strongly agree (Likert, 1932). The instrument was developed in English and designed to allow consistent, reliable, and quantitative analysis of the study variables, supporting the achievement of the research objectives (Creswell & Creswell, 2018; Sekaran & Bougie, 2020)

Table 1. Scale classification.

Rating Scale	μ
Strongly Disagree	1.0≤μ <1.5
Disagree	1.5≤μ <2.5
Neutral	2.5≤μ <3.5
Agree	3.5≤μ <4.5
Strongly Agree	4.5≤μ ≤5.0

Data Collection

In this quantitative study, respondents' self-completed questionnaires were distributed at random to gather data. One tool that academics use to get information on how challenges affects academic achievement and engagement is the questionnaire. Questionnaire-based data collection is known as the quantitative technique. 56 respondents, who were program management technology JB students, were given self-administered questionnaires using stratified random sampling. Students were given a questionnaire to complete in around 20 minutes, and it was collected from them within the allotted time. Data collection should be finished within a month.

Descriptive Analysis

Descriptive analysis is used to summarize the demographic characteristics of respondents and describe patterns in challenges, engagement, and academic performance among part-time students. Measures such as mean, frequency, percentage, and standard deviation are employed to identify central tendencies and variations within the data. This analysis provides an overview of the distribution of key variables and supports the examination of Research Objectives 1, 2, and 3.

Pearson Correlation Coefficient

The Pearson Correlation Coefficient is employed to assess the degree of linear association between two variables. It estimates the population correlation through the sample correlation coefficient, denoted as "r." The correlation coefficient "r" falls within the range of +1 to -1. When "I" approaches 0, it signifies a greater amount of variation and conversely, when "r" approaches either +1 or -1, it indicates a smaller amount of variation in the data from the best-fit line. Through this study, relationship between social media use and mental health would be examined by using the Pearson Correlation analysis. The value of coefficient always lies between -1 and +1 that is -$1 \leq r \leq 1$. This means that the positive value indicates as a perfect positive and very strong relationship, negative value indicates as a perfect negative and very weak relationship, while 0 indicates there are no correlation at all among the variables in the research. Research Objective 4 will be studied by using Pearson Correlation Coefficient.

Table 2. Source: Hair Inr, Money, Samouel, & Page, 2007)

Coefficient Range	Strength of Association
±0.91 to ±1.00	Very strong
±0.71 to ±0.90	High
±0.41 to ±0.70	Moderate

| ±0.21 to ±0.40 | Small but definite relationship |
| ±0.00 to ±0.21 | Slight, almost negligible |

DATA ANALYSIS

Reliability Test Through Cronbach Alpha

A test has been done to 56 respondents which were distributed randomly through Google form WhatsApp application the population. Data collected from this activity is calculated using SPSS, Cronbach Alpha to test the reliability of the survey and it can be summarised as below started with Part B.

Table 3. The Rule Of Thumb for Cronbach Alpha Reliability Test

Cronbach Alpha Score	Reliability Description
0.9 – 1.0	Very good and must accept, have a very high consistency
0.7 – 0.8	Good and acceptable reliability
0.6 – 0.7	Acceptable reliability
< 0.6	Item should be replaced or repaired
< 0.5	Item must be removed

Table 4. Cronbach Alpha Result for Part B (Challenges Faced by Part-Time Students)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.662	.674	6

Table 5. Cronbach Alpha Result for Part C (Academic Performance)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.783	.783	8

Table 6. Cronbach Alpha Result for Part D (Engagement)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.658	.665	6

Overall, the Cronbach's Alpha values for Part B (Challenges = 0.662), Part C (Academic Performance = 0.783), and Part D (Engagement = 0.658) indicate acceptable to good internal consistency for all measurement scales used in this study. These results confirm that the questionnaire items are reliable and appropriate for subsequent descriptive and correlation analyses.

Demography (Part A)

Table 7. Summarized Analysis Report for Part A

Item	Category	Frequency (N)	Percentage
Age	Below 25	6	10.7
	25–30	21	37.5
	31–35	15	26.8
	36–40	11	19.6
	Above 40	3	5.4
	Total	*56*	*100%*
Gender	Male	27	48.2
	Female	29	51.8
	Total	*56*	*100%*
Year of Study	Year 1	5	8.9
	Year 2	13	23.2
	Year 3	20	35.7
	Year 4 and above	18	32.1
	Total	*56*	*100%*
Marital Status	Single	24	42.9
	Married	29	51.8
	Divorced / Widowed	3	5.4
	Total	*56*	*100%*
Employment Status	Full-time employed	25	44.6
	Part-time employed	20	35.7
	Self-employed	11	19.6
	Total	*56*	*100%*
Working Experience	Less than 1 year	3	5.4
	1-3	7	12.5
	4-6	15	26.8
	7-10	17	30.4
	More than 10 years	14	25.0
	Total	*56*	*100%*
Average Study Hours per Week	Less than 5 hours	19	33.9
	5–10	30	53.6
	11-15	6	10.7
	More than 15 hours	1	1.8
	Total	*56*	*100%*
	Below RM1,000	1	1.8
	RM1,001–RM3,000	20	35.7

Monthly Income Level (RM)	RM3,001–RM5,000	26	46.4
	Above RM5,000	9	16.1
	Total	*56*	*100%*
Distance Between Home and Uni	1 – 9 Years	9	16.1
	10 – 19 Years	31	55.4
	20 – 29 Years	13	23.2
	30 – 40 Years	3	5.4
	Total	*56*	*100%*

From Table 7, this survey was participated by 56 respondence. From this number of responses, most respondents were aged 25–30 years (37.5%), followed by 31–35 years (26.8%), 36–40 years (19.6%), below 25 years (10.7%), and above 40 years (5.4%). The gender distribution was relatively balanced, with 29 females (51.8%) and 27 males (48.2%). In terms of year of study, 35.7% were in Year 3, 32.1% in Year 4 and above, 23.2% in Year 2, and 8.9% in Year 1. More than half of the respondents were married (51.8%), while 42.9% were single and 5.4% were divorced or widowed.

Regarding employment status, 44.6% were employed full-time, 35.7% part-time, 19.6% self-employed. The largest proportion had 7–10 years of working experience (30.4%), followed by 4–6 years (26.8%), more than 10 years (25.0%), 1–3 years (12.5%), and less than 1 year

(5.4%). Most respondents studied 5–10 hours per week (53.6%), while 33.9% studied less than 5 hours, 10.7% studied 11–15 hours, and 1.8% studied more than 15 hours weekly. In terms of monthly income, 46.4% earned RM3,001–RM5,000, 35.7% earned RM1,001–RM3,000, 16.1% earned above RM5,000, and 1.8% earned below RM1,000. Finally, 55.4% travelled 10–19 km to the university, 23.2% travelled 20–29 km, 16.1% lived within 1–9 km, and 5.4% travelled 30–40 km

Challenges Faced by Part-Time Students (Objective 1)
This section addresses Objective 1, which aims to identify the challenges faced by part-time students at University Technology Malaysia School of Professional and Continuing Education. Table 8, as below for Part B, all questions which 6 questions has been answered by 56 respondents. Mean score for this section produces through SPSS, version 9 and using descriptive mean analysis.

Table 8. Mean Level for Objective 1

Part B (Challenges Faced by Part-Time Students)			
Item Number	N	Mean	Level
1. I find it difficult to allocate adequate time for study because of my other responsibilities	56	4.09	High
2. I experience physical fatigue or tiredness that affects my academic activities after fulfilling non-study commitments.	56	4.05	High

3. I find it challenging to stay motivated and keep up with academic demands due to juggling multiple roles (student + employee + possibly family member).	56	4.20	High
4. The learning environment (e.g., home, workplace, commuting) is not always conducive to studying, which hampers my academic performance.	56	4.07	High
5. I receive insufficient support (from institution, peers, or employer) to help me balance my part-time study and non-study commitments.	56	3.73	High
6. My non-study obligations (e.g., family, work, household) interfere with my ability to review for exams, complete coursework, or engage in learning activities effectively.	56	3.93	High

Table 9. Overall Statistic Result for Objective 1

Challenges Faced by Part-Time Students		
N	Valid	56
	Missing	0
Mean		**4.0116**
Std. Error of Mean		.0214
Median		4.06
Mode		None
Std. Deviation		.1600
Sum		24.07

Table 8 shows that all six challenge items recorded high mean scores, indicating that part-time students at UTMSPACE consistently experience substantial challenges in balancing their academic and non-academic responsibilities. The highest mean score was reported for Item 3 (M = 4.20), which reflects difficulties in maintaining motivation and meeting academic demands due to juggling multiple roles, such as being a student, employee, and family member. This is followed by Item 1 (M = 4.09), highlighting time management constraints arising from other responsibilities, and Item 4 (M = 4.07), which indicates that unfavorable learning environments, including home, workplace, and commuting conditions, hinder effective studying.

Additional challenges include physical fatigue after fulfilling non-study commitments (Item 2, M = 4.05) and interference from non-study obligations such as work and family responsibilities on reviewing for examinations and completing coursework (Item 6, M = 3.93). Although Item 5, which relates to insufficient support from institutions, peers, or employers, recorded the lowest mean score (M = 3.73), it nevertheless remained at a high level, suggesting that lack of support is still a notable concern among part-time students.

Overall, the results indicate a high level of perceived challenges, with an overall mean score of 4.0116 and a low standard deviation (SD = 0.1600), demonstrating strong agreement and consistency among respondents. These findings confirm that part-time students at UTMSPACE

face substantial challenges, thereby fulfilling Objective 1 of the study, which aims to identify the challenges faced by part-time students.

Academic Performance of Part Time Student (Objective 2)

Table 4.8 as below for Objective 2, all questions which 8 questions has been answered by 56 respondents. Mean score for this section produces through SPSS, version 9 and using descriptive mean analysis.

Table 4.8: Mean Level for Objective 2

Objective 2 (Academic Performance)			
Item Number	**N**	**Mean**	**Level**
1. I frequently feel underprepared for quizzes, or class discussions because of time or workload challenges.	56	4.20	High
2. I often struggle to complete assignments on time due to the challenges I face as a part-time student.	56	3.95	High
3. My difficulty in balancing work, study, and personal responsibilities negatively affects my academic performance.	56	4.09	High
4. I struggle to meet assignment deadlines because I am balancing work and study responsibilities.	56	3.88	High
5. My study plan is frequently disrupted by work shifts or family commitments, negatively affecting my grades/CGPA.	56	4.00	High
6. I find it difficult to answer test.	56	3.96	High
7. I get low academic results because the support I receive (from employer, family, university) is insufficient to help me manage my work-study balance.	56	3.91	High
8. Overall, the challenges I face significantly influence my academic performance.	56	4.25	High

Table 10. Overall Statistic Result for Objective 2

Academic Performance		
N	Valid	56
	Missing	0
Mean		**4.03**
Std. Error of Mean		.0482
Median		3.98
Mode		None
Std. Deviation		0.1363
Sum		32.24

Table 10 shows that all eight items measuring academic performance recorded high mean scores, indicating that part-time students perceive their academic achievement to be strongly affected by

work–study challenges. The highest mean score was Item 8 (M = 4.25), reflecting respondents' strong agreement that challenges faced as part-time students significantly impact their academic results. This is followed by Item 1 (M = 4.20) on inadequate preparedness for tests due to time constraints and Item 3 (M = 4.09) on difficulties balancing work, study, and personal responsibilities.

Other notable factors include disruptions to study plans (Item 5, M = 4.00), difficulty performing well in tests (Item 6, M = 3.96), physical fatigue (Item 2, M = 3.95), and insufficient support (Item 7, M = 3.91). Although Item 4 recorded the lowest mean (M = 3.88), it remained within the high level category, indicating persistent difficulty in meeting assignment deadlines. Overall, the overall mean score of 4.03 demonstrates strong agreement among respondents that time constraints, workload, role overload, and fatigue significantly affect academic performance, thereby confirming the achievement of Objective 2.

Engagement of Part Time Student (Objective 3)

Table 11, as below for Part d, all questions which 6 questions has been answered by 56 respondents. Mean score for this section produces through SPSS, version 9 and using descriptive mean analysis.

Table 11. Overall Statistic Result for Objective 2

Objective 3 (Engagement)			
Item Number	**N**	**Mean**	**Level**
1. The challenges I face reduce the amount of energy I bring into my studies.	56	4.18	High
2. The challenges I face reduce my ability to understand and absorb lecture content effectively.	56	4.07	High
3. When I experience time pressure, I find it harder to stay engaged in my coursework.	56	4.16	High
4. When I experience many challenges, I tend to participate less during lessons.	56	4.25	High
5. My responsibilities outside of university reduce my enthusiasm for studying.	56	4.11	High
6. The more challenges I face, the less engagement I feel about my academic progress.	56	4.14	High

Table 12. Overall Statistic Result for Objective 3

Engagement		
N	Valid	56
	Missing	0
Mean		**4.1517**
Std. Error of Mean		.0196
Median		4.15

Mode	None
Std. Deviation	.1466
Sum	24.91

Table 11 shows that all six engagement items recorded high mean scores, indicating that challenges faced by part-time students have a significant negative impact on their engagement in academic activities. The highest mean score was reported for Item 4 (M = 4.25), which reflects reduced participation during lessons when students experience multiple challenges. This is followed by Item 1 (M = 4.18), indicating decreased energy levels brought into academic activities, and Item 3 (M = 4.16), which highlights difficulty in remaining engaged in coursework under time pressure.

Further findings show that external responsibilities reduce students' enthusiasm for studying (Item 5, M = 4.11), while an increase in challenges is associated with lower overall engagement in academic progress (Item 6, M = 4.14). Although Item 2, which relates to reduced ability to understand and absorb lecture content, recorded the lowest mean score (M = 4.07), it remained at a high level, indicating that comprehension difficulties are still a common concern among part-time students.

Overall, the engagement construct recorded a high overall mean score of 4.1517 with a low standard deviation (SD = 0.1466), demonstrating strong agreement and consistency among respondents. These findings confirm that challenges faced by part-time students significantly reduce their academic engagement, thereby fulfilling Objective 3 of the study.

Relationship between Challenges and Academic Performance as well as Relationship between Challenges and Engagement (Objective 4)

This section presents the analysis of challenges, academic performance and engagement. It consists of 3 subsections: Objective 1 which include 6 questions measuring challenges faced by part time students, Objective 2, which includes eight items measuring academic performance, and Objective 3, which includes six items assessing student engagement among UTMSPACE students. Prior to conducting correlation analysis, mean scores for both subsections were calculated using SPSS. These mean scores were then used to examine the relationships between the independent variable and the dependent variables (academic performance and engagement) through correlation analysis.

Table 13. Correlation Interpretation Score

Correlation Score	Correlation Strength
< 0.20	Very weak
0.20 – 0.40	Weak
0.40 – 0.70	Moderate
0.70 – 0.90	Strong
> 0.90	Very Strong

Table 14. Correlation Interpretation Score

		Challenges	Academic Performance	Engagement
Challenges	Pearson Correlation	1	.522[**]	.494[**]
	Sig. (2-tailed)		.000	.000
	N	56	56	56
Academic Performance	Pearson Correlation	.522[**]	1	.494[**]
	Sig. (2-tailed)	000		000
	N	56	56	56
Engagement	Pearson Correlation	.494[**]	.494[**]	1
	Sig. (2-tailed)	000	.000	
	N	56	56	56

Table 14 shows that challenges faced by part-time students are moderately and positively related to both academic performance (r = 0.522, p < 0.001) and engagement (r = 0.494, p < 0.001). These statistically significant results, based on N = 56, indicate that challenges are meaningfully associated with variations in students' academic performance and engagement levels

DISCUSSION, SUGGESTION AND CONCLUSION

Discussion Respondents' Demographic Profile
According to the demographic statistics, the majority of respondents are working people between the ages of 25 and 35 who are mostly employed full-time and in the final stages of their education. A typical part-time student population that has to juggle employment and family obligations with academic commitments is represented by this profile. These traits contribute to the explanation of the high levels of difficulties, academic pressure, and engagement problems seen in this study. From the researcher's perspective, students in this age group are often at a career-development and family-commitment stage, which limits available time and increases stress. Being in advanced years of study further intensifies academic demands, while full-time employment reduces study flexibility and energy for engagement. These combined factors reasonably contribute to the difficulties experienced by part-time students. This finding is consistent with Park and Choi (2009), who reported that working adult learners experience greater academic stress due to competing responsibilities. Similarly, Carney-Crompton and Tan (2002) found that part-time students balancing work and family roles are more prone to academic strain and reduced engagement.

Discussion on Objective 1: Challenges Faced by Part-Time Students
Chapter 4's findings demonstrate that UTMSPACE part-time students face a somewhat high degree of difficulties (overall mean = 4.01). Role overload is a major problem among respondents, as evidenced by the highest-rated issues pertaining to motivation, time restrictions, and work-study balance. These results are in line with those of Carney-Crompton and Tan (2002) and Kahu et al. (2014), who discovered that adult learners frequently have difficulty juggling work and family responsibilities with academic commitments. According to the

researcher, these difficulties are primarily systemic rather than personal. Academic obligations correlate with greater professional and personal commitments because the majority of respondents are in advanced levels of their education and work full-time. These issues are likely to continue and have a detrimental impact on students' overall educational experience and academic sustainability in the absence of flexible learning arrangements and focused institutional support.

Discussion on Objective 2: Academic Performance of Part-Time Students

The results show a moderate and positive correlation (r = 0.522, p < 0.001) between part-time students' obstacles and academic achievement, indicating that differences in students' CGPA and coursework outcomes are directly related to the degree of challenges they encounter. This outcome is in line with Robotham and Julian's (2006) findings that students' academic performance is significantly impacted by academic stress and workload strain. According to the researcher, this association is more indicative of the significant impact of outside limitations than of pupils' intellectual aptitude. Since the majority of part-time students manage full-time jobs and personal obligations in addition to their studies, more difficulties could raise academic pressure and have a direct impact on performance. This interpretation is consistent with Park and Choi's (2009) emphasis that non-academic commitments have a significant impact on adult learners' academic results. Studies carried out in more flexible or online learning contexts, however, have found that these difficulties have less detrimental consequences, indicating that learning design and program structure are crucial in reducing their effects (Stone & O'Shea, 2019).

Discussion on Objective 3: Engagement of Part-Time Students

Increased obstacles are strongly linked to changes in students' enthusiasm, energy, and participation in academic activities, according to Chapter 4 findings, which show a moderate and positive relationship between challenges and student engagement (r = 0.494, p < 0.001). High mean scores imply that students' capacity to stay actively involved in their education is diminished by stress, exhaustion, and time constraints. This outcome is in line with Kahu et al. (2014), who found that emotional distress and time constraints considerably reduce part-time learners' involvement. According to the study, this association can be explained by part-time students' restricted presence on school and conflicting employment and home obligations, which limit their options for emotional and behavioral engagement. Engagement naturally decreases when students have less time to participate in class and communicate with lecturers and peers. Trowler (2010) and Carney-Crompton and Tan (2002), who discovered that institutional support, flexibility, and effective communication are crucial for part-time student participation, lend credence to this perspective.

Discussion on Objective 4: Relationship between Challenges and Academic Performance as well as Challenges and Engagement

The results of the correlation analysis show that among UTMSPACE part-time students, challenges, academic success, and engagement have modest, positive, and statistically significant associations. This result implies that issues with time limits, workload, and work-study conflict affect students' level of participation in learning activities as well as academic results. Similar trends were noted by Park and Choi (2009) and Kahu et al. (2014), who discovered that work-study conflict has a direct impact on adult and part-time learners'

persistence, engagement, and learning results. According to the study, this outcome happens because the difficulties faced by part-time students impact several facets of the educational process at once rather than operating in isolation. More difficulties could increase the pressure to achieve well academically, cut into available time and energy, and ultimately lower engagement and performance. However, in entirely online or highly flexible programs, where learner autonomy and flexible scheduling can lessen the impact of such obstacles, this association might be less noticeable (Stone & O'Shea, 2019). Overall, the results validate the accomplishment of Objective 4 and support the study hypothesis.

Future research may use a comparative research design to look at how obstacles, engagement, and academic achievement change across full-time and part-time students. It would be possible to ascertain if the associations found in this study are unique to part-time students or represent more general trends in higher education by comparing these two groups. According to earlier research, enrolment status has a major impact on students' academic performance, stress levels, and learning experiences (Bean & Metzner, 1985; Darolia, 2014). Besides that, to further understand the lived experiences and coping mechanisms of part-time students, future research could use a mixed-methods approach that incorporates qualitative techniques like focus groups and interviews. This would make it possible for researchers to comprehend why particular difficulties have an impact on academic engagement and performance. In order to investigate their moderating impacts on academic performance and engagement, future research could also take into account instructional and institutional factors such teaching methods, learning resources, assessment flexibility, and lecturer support. Kahu (2013) emphasized that institutional context and learning settings, in addition to student attributes, influence engagement. By taking these factors into account, higher education institutions may be able to better understand how to assist part-time students.

CONCLUSION

In summary, by identifying the difficulties encountered by UTMSPACE part-time students and analyzing their connections to academic achievement and engagement, this study effectively met all research goals. The results show that part-time students have a somewhat high degree of difficulties, which are strongly correlated with involvement levels and academic results. These findings demonstrate the continued challenge of juggling job, personal obligations, and academic demands, highlighting the significance of institutional support, adaptable learning settings, and successful engagement tactics to improve part-time students' success at UTMSPACE.

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FACTORS INFLUENCING CONSUMER PURCHASE INTENTION TOWARDS HIGH RISE RESIDENTIAL BUILDIING AT PASIR GUDANG DISTRICT

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ABSTRACT

The global focus on sustainable living has made it increasingly important to understand how people make property-buying decisions. This study examines the key factors that influence consumers' intention to purchase high-rise residential properties in the Pasir Gudang District, including location, price and design, facilities and amenities, prestige, and financial considerations. A survey was conducted with 400 respondents using structured questionnaires, and the data were analyzed with descriptive statistics, Pearson correlation, and multiple regression in SPSS. The results show which factors most strongly shape property-buying decisions and provide insights into consumer preferences within the context of sustainable living. These findings offer valuable guidance for developers, policymakers, and other stakeholders in designing and marketing properties that meet both consumer needs and sustainability goals. By understanding consumer demand, this study also supports Sustainable Development Goal 11, contributing to better urban planning and the development of livable, high-rise residential communities.

Keywords: Consumer Purchase Intention, High-Rise Residential Property, Property Sector, Sustainable Consumption

INTRODUCTION

The demand for high-rise residential buildings in Malaysia has been increasing due to rapid urban growth, limited land, and changing lifestyles, and this trend is especially evident in Pasir Gudang, Johor. As more people shift toward vertical living, it becomes important to understand what influences their decision to purchase these types of properties. Sustainability is also becoming a key consideration, as buyers today prefer homes that support greener and more responsible living, in line with the United Nations Sustainable Development Goal 11 (SDG 11): Sustainable Cities and Communities. However, research on the specific factors that affect purchase intentions in semi-urban and industrial areas like Pasir Gudang is still limited. Since the property market in this district continues to grow, it provides an important area for investigation. Therefore, this study aims to explore the factors that influence consumer purchase intentions toward high-rise residential buildings in Pasir Gudang. The study focuses on measuring purchase intentions, identifying the main influencing factors, and examining how location, price and design, facilities and amenities, prestige and exclusivity, and financial factors affect consumer decisions. Overall, this research is expected to provide useful insights for improving sustainable housing development strategies in Malaysia.

Below are the research objective for this study:

1.   To examine the acceptance level of consumer purchase intentions towards high-rise residential buildings in Pasir Gudang.

2.   To identify the factors of location, price and design, facilities and amenities, prestige and financial factors, towards consumer purchase intention on high-rise residential in Pasir Gudang District

3.   To analyze the relationship between consumer preferences and the factors influencing consumer purchase intention on high-rise residential in Pasir Gudang District.

LITERATURE REVIEW

With the rapid growth of urbanization and population in Malaysia, particularly in districts like Pasir Gudang, the demand for high-rise residential buildings has significantly increased, making the understanding of key factors that influence consumer purchase intentions increasingly vital. This chapter reviews previous literature and scholarly research related to buyer behavior in the property sector, establishing a strong theoretical foundation for this study. It begins by defining core concepts, including high-rise residential buildings and consumer purchase intention, before exploring how specific variables—namely location, price and design, facilities and amenities, prestige and exclusivity, and financial factors—influence the decision-making process of potential buyers. By examining these factors based on established consumer behavior theories and empirical studies, this chapter seeks to identify existing research gaps and support the development of the conceptual framework for this research.

Consumer Preferences Toward High-Rise Residential Properties

In this study, "preference" refers to a consumer's tendency to choose a specific high-rise residential property, reflecting what buyers in Pasir Gudang consider most important. Preferences are influenced by factors such as location, price and design, facilities and amenities, prestige and exclusivity, and financial considerations. Purchase intention represents the likelihood that consumers will act on these preferences, though actual decisions may be affected by affordability, financing, and trust in the developer. In this study, purchase intention is measured based on respondents' agreement with property attributes like accessibility, pricing, design, amenities, prestige, and financial options. Practical concerns, including high prices, limited availability, and developer reliability, can also influence decisions (Ahmad et al., 2021; Yacob et al., 2022), highlighting the need for developers to address these factors to attract buyers in Pasir Gudang.

Factors Influencing Consumer Purchase Intention Towards High-Rise Residential Buildings at Pasir Gudang District

Location

Location is a primary determinant that significantly influences consumers' purchasing intention toward high-rise residential properties as it encompasses both qualitative and practical considerations (Mohd et al., 2023). Rather than merely referring to geographic placement, location represents a multidimensional concept that integrates aspects such as accessibility, environmental quality, surrounding infrastructure, and proximity to essential facilities. These elements shape buyers' perceptions of convenience, lifestyle enhancement, and long-term investment prospects (Hussein, Salleh, & Razak, 2021). For instance, properties situated near major routes like the Eastern Dispersal Link (EDL) offer strategic connectivity and reduced travel time to commercial hubs in Johor Bahru. Neighbourhood attributes such as safety, cleanliness, and availability of green spaces also influence willingness to purchase (Salleh,

Yusof, & Johar, 2019). Moreover, convenient access to schools, hospitals, recreation, and retail services strengthens consumer confidence by ensuring seamless daily living (Ahmad, Zainudin, & Ibrahim, 2022).

Price and Design
Price and design operate as interrelated dimensions shaping consumers' perception of value when evaluating high-rise developments. Price serves as the fundamental financial benchmark that determines affordability and purchase feasibility (Tee et al., 2023). Conversely, design encompasses the physical and aesthetic attributes of the property, involving architectural appeal, internal layout efficiency, space utilisation, and finishing quality (Tan et al., 2022; Ahmad et al., 2021). Modern design considerations, including interior aesthetics, material selection, and technological integration such as smart home systems, further reinforce perceived quality and desirability (Hassan et al., 2021). Consumers often form judgments based on whether design quality, comfort, and innovation justify the property's price; therefore, purchase intention strengthens when superior design elements outweigh associated financial commitments (Yacob et al., 2022).

Facilities and Amenities
Facilities and amenities represent vital lifestyle-enhancing components that differentiate one property from another and add value beyond the physical unit itself. Recreational provisions such as swimming pools, gyms, and landscaped areas support resident well-being and leisure needs (Mohd et al., 2023). Safety infrastructure, including controlled access systems, surveillance, and security personnel, plays a critical role by safeguarding residents and their assets (Ahmad et al., 2021). Proper maintenance of common spaces further strengthens trust in property quality and contributes to long-term habitability. As a result, well-developed amenities create positive perceptions of convenience, comfort, and community living, thereby increasing purchase preference (Yacob et al., 2022).

Prestige and Exclusivity
Prestige and exclusivity represent psychological drivers that influence purchase intention, especially among buyers seeking social distinction and lifestyle elevation. These factors are associated with a sense of status, uniqueness, and belonging to an esteemed residential environment. A reputable developer serves as a signal of reliability and construction quality, thereby reducing perceived risk (Ahmad et al., 2021). Exclusive branding, low-density concepts, and premium addresses reinforce the perception of luxury and elevate social desirability (Latif et al., 2020). Buyers are inclined toward developments that reflect their aspirational lifestyle, identity, and preferred community environment (Tee et al., 2023).

Financial Factors
Financial considerations extend beyond the property's selling price and encompass long-term monetary commitments that influence purchase decisions. Key aspects include financing options, loan eligibility, interest rates, and repayment flexibility, all of which determine consumer affordability (Zulkifli et al., 2024). For investment-driven buyers, financial attractiveness is evaluated through capital appreciation prospects and potential rental returns, particularly in rapidly developing areas (Tee et al., 2023; Mohd et al., 2023). Additional recurring costs such as strata fees, maintenance charges, property taxes, and insurance also

shape perceptions of financial feasibility. Therefore, financial factors collectively define the actual burden of ownership and determine whether a property is considered economically viable (Yacob et al., 2022).

Structural Attributes

Structural attributes represent the building's physical reliability, safety, and long-term durability, which directly influence consumer confidence. Quality of construction materials, structural integrity, and compliance with engineering standards ensure longevity and safety of the building framework (Tan et al., 2022). Proper fire protection systems, emergency routes, and safety certifications further strengthen occupant assurance (Ahmad et al., 2021). Acoustic and thermal performance are equally important as they contribute to comfort, privacy, and energy efficiency within living spaces (Hassan et al., 2021). The overall building condition and maintenance quality serve as visual indicators of management standards and help buyers determine future upkeep requirements and long-term value (Latif et al., 2020).

Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) provides a theoretical foundation for examining consumer decision-making in the context of purchasing high-rise residential properties. TPB conceptualises behaviour as a function of belief-driven intentions, framed around four components: target behaviour (purchase of high-rise property), the actor (consumer), context (Pasir Gudang residential market), and decision timeframe (Ahmad et al., 2021). According to TPB, behavioural intention is influenced by three belief constructs. Behavioral beliefs determine attitudes toward expected outcomes of purchasing a property, including lifestyle benefits and investment returns. Normative beliefs reflect social pressures arising from family, peers, or societal expectations, which may either encourage or deter purchase decisions. Control beliefs refer to perceived ease or difficulty of buying, shaped by financial capability, market conditions, loan availability, and accessibility of suitable units (Yacob et al., 2022). These belief structures collectively explain how psychological, social, and contextual factors translate into consumers' purchase intentions and eventual behavior within the high-rise residential sector.

Hypotheses Development

H1: Location is widely recognized as one of the most important factors in property purchasing decisions, particularly in urban areas. A strategic location improves accessibility, convenience, and long-term property value. Proximity to workplaces, schools, healthcare, transportation, and commercial areas reduces daily travel time and enhances lifestyle comfort, making properties more attractive to buyers. Previous studies indicate that well-connected locations increase consumer purchase intention. Therefore, location is hypothesized to positively influence buying decisions for high-rise residential properties in the Pasir Gudang District.

H2: Prestige and exclusivity are also highly valued by modern homebuyers, who often associate property ownership with social status and personal image. High-rise developments that offer exclusivity through premium branding, gated access, low-density occupancy, or luxurious features create emotional and symbolic appeal. Research shows that perceived prestige increases desirability, satisfaction, and pride among buyers, strengthening their intention to purchase.

H3: Price and design remain critical factors influencing property decisions. Price affects affordability and perceived value, while attractive design—through architecture, layout, or

aesthetics—enhances comfort and personal attachment. Studies reveal that properties with appealing design and reasonable pricing increase buyer motivation.

H4: Facilities and amenities, such as security systems, gyms, pools, playgrounds, parking, and community spaces, enhance livability and overall appeal. Modern amenities improve comfort, safety, and lifestyle quality, influencing buyers' willingness to invest in high-rise properties.

H5: Financial factors are strong determinants of purchase behavior. Down payment affordability, mortgage eligibility, interest rates, monthly installments, and government assistance programs affect consumers' readiness to buy. Manageable financial terms reduce perceived risk and increase confidence in making a high-value purchase.

H6: Structural attributes including construction quality, materials, layout functionality, ventilation, safety, and durability—are crucial for long-term comfort, safety, and value retention. Research indicates that buyers prioritize reliable structures as they reflect the property's lifespan and suitability for long-term living, which boosts purchase intention.

Conceptual Framework and Hypothesis Development

The conceptual framework for this study is a methodical and coherent structure that begins with the research topic and problem statement, which drives the formulation of the research questions. It is built upon a thorough literature review that establishes context and integrates applicable theories to provide a theoretical basis. This systematic approach to linking theoretical constructs with practical measurement is essential for establishing a robust foundation for property investment and transaction analysis (Gleißner & Oertel, 2020). This foundation leads to defining the methodology, including the research design, and outlining the methods, procedures, and instruments for data collection and subsequent analysis and interpretation, ultimately leading to the findings and practical recommendations.
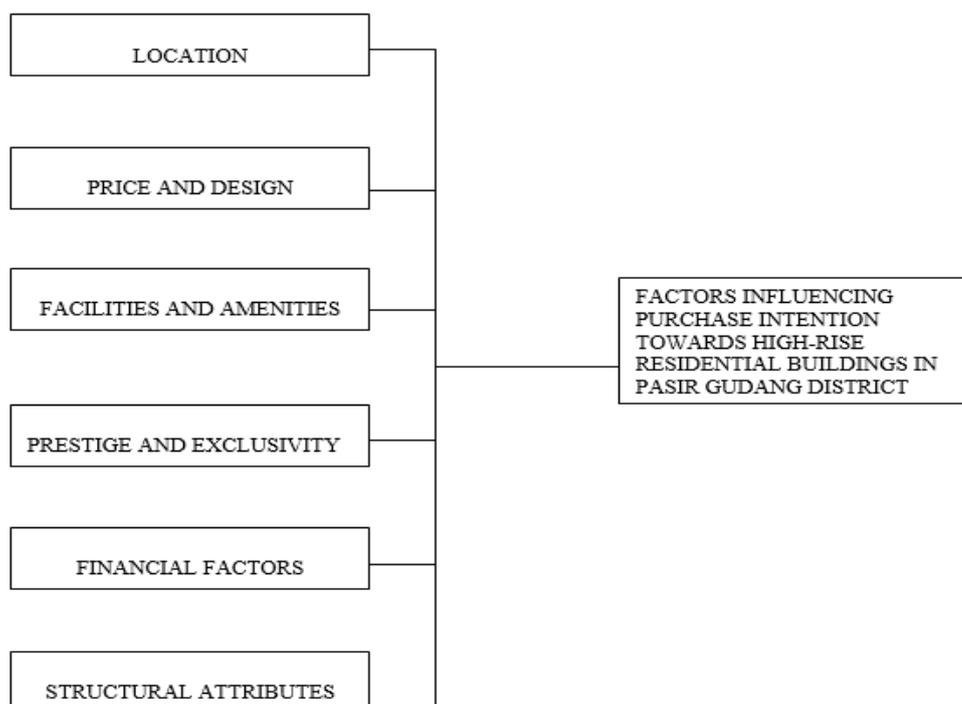

Figure 1. Conceptual Framework in Study

RESEARCH METHODOLOGY

Population, Sample, and Analysis Technique

Here is a summary of the population, sample, and analysis techniques used in this study:

Category	Component Detail		Academic Justification / Source
I. Target Population			
Definition	All individuals residing or working within the Pasir Gudang District, Johor, considered potential high-rise residential consumers.		Focuses the study on the specific geographical and consumer market relevant to the research objective.
Size	Approximately 360,621 individuals		Source: Department of Statistics Malaysia (DOSM) (n.d.)
II. Sample & Sampling Method			
Minimum equired Size	385 respondents		
Actual Collected Size	400 respondents		
Sampling Method	Convenience Sampling (Non-Probability)		
III. Data Collection & Analysis			
Instrument	Structured Online Questionnaire		
Software	Statistical Package for the Social Sciences (SPSS) Statistics		
Analysis chniques	1. Descriptive Analysis		
	2. Pearson Correlation Analysis		
	3. Multiple Regression Analysis		

Research Instrument

A structured questionnaire hosted on Google Forms was employed as the measuring tool for this study, serving as the primary instrument for data collection and later supporting the crucial stages of validity and reliability testing. The survey was specifically designed to gather quantitative information from potential consumers in the Pasir Gudang District regarding factors influencing their purchase intention toward high-rise residential buildings.

The questionnaire was systematically divided into three main sections to ensure comprehensive data capture:

Part A: Demographic Profile: This section collected essential background information from the respondents, including their gender, age group, work field, income level, and current location. This data is vital for providing a descriptive analysis of the sample and identifying any potential demographic differences in purchase intention.

Part B: Dependent Variable (DV): This section consisted of five questions specifically formulated to measure the respondents' Consumer Purchase Intention toward High-Rise Residential Buildings.

Part C: Independent Variables (IVs): This section was structured into six distinct sub-parts, each corresponding to one of the independent variables proposed in the conceptual framework (H1-H6). Each independent variable was measured using five questions:

Part C1: Location
Part C2: Prestige and Exclusivity
Part C3: Price and Design
Part C4: Facilities and Amenities
Part C5: Financial Factors
Part C6: Structural Attributes

All questions in Part B (Dependent Variable) and Part C (Independent Variables) utilized a standard 5-point Likert Scale to measure attitudinal responses and perceptions. The scale was evaluated as follows: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree. Respondents were required to answer each question by selecting the appropriate rating that best represented their perception of the factors determining their purchase intention for high-rise residential properties.

Data Analysis Techniques

In this quantitative study, a sequence of analytical tools was adopted to systematically test the formulated hypotheses and address the research objectives (ROs). The primary techniques employed include Descriptive Analysis, Pearson Correlation Analysis, and Multiple Regression Analysis, all conducted using the Statistical Package for the Social Sciences (SPSS) software.

Descriptive Analysis

Descriptive analysis is the foundational step in data processing and is primarily used to address Research Objective 1 (RO1), which involves outlining the profile of respondents and examining the central tendencies of the variables. This method summarizes numerical data from the questionnaire in an easily interpretable format, such as tables or charts, establishes respondent profiles through frequency distributions that show demographic information including gender, age, and income level, and measures central tendency by calculating the mean and standard deviation of responses. In particular, it highlights the level of agreement among consumers regarding factors influencing their purchase intention toward high-rise residential buildings.

Correlation Analysis

Pearson Correlation Analysis is used as a preliminary inferential test to address Research Objective 2 (RO2), aiming to identify the nature and strength of the linear relationships between variables. This analysis measures the connections between six independent variables—Location, Prestige and Exclusivity, Price and Design, Facilities and Amenities, Financial

Factors, and Structural Attributes—and the dependent variable, Consumer Purchase Intention, using the Pearson Correlation Coefficient (r). The correlation coefficient ranges from -1 to +1, where positive values indicate a positive relationship and negative values indicate a negative relationship. Results are considered statistically significant if the p-value is less than 0.05, indicating that the relationship between the variables is unlikely to be due to chance. For studies requiring higher reliability, a stricter threshold of $p < 0.01$ may be applied to demonstrate highly significant findings.

Multiple Regression Analysis

Multiple Regression Analysis is the primary inferential technique used to address Research Objective 3 (RO3) and to formally test hypotheses H1 to H6. This method evaluates the predictive power of the independent variables on the dependent variable by examining their combined effect on Consumer Purchase Intention. It also identifies the individual contribution of each factor while controlling for the influence of the other variables, allowing a clearer understanding of which factors most strongly drive purchase intention.

RESULT AND ANALYSIS

Demographic Profile

This section presents the demographic profile of the respondents about the background of the respondents. The details of the respondents such as gender, age, citizenship, level of education, income (monthly), employment status, home ownership status and factors influence your purchase intention towards high-rise residential buildings at Pasir Gudang. In this section, researcher used the frequency and percentages to represent the data collected from the respondents.

Demographic	Classification	Frequency	Percentage
Gender	Male	222	55.5
	Female	178	44.5
Age	20-25 years	39	9.8
	26-30 years	70	17.5
	31-40 years	160	40.0
	41-50 years	131	32.8
Citizenship	Malaysian	259	64.75
	Non-Malaysian	141	35.25
Level of education	Senior High School	34	8.5
	Diploma	154	38.5
	Degree	195	48.8
	Master	16	4.0

	PhD	1	0.3
Income (monthly)	RM 1,700 - RM 3,999	95	23.8
	RM 4,000 - RM 5,999	56	14.0
	RM 6,000 - RM 10,000	102	25.5
	Above RM 10,000	147	36.8
Employment status	Student	43	10.3
	Worker	296	74.0
	Other	61	15.3
Home Ownership Status	Owner	234	58.5
	Tenant	85	21.3
	Living with family	80	20.0
Factors influence your purchase intention towards high-rise residential buildings at Pasir Gudang	Location	191	47.8
	Price and Design	156	39.0
	Facilities and Amenities	3	0.8
	Prestige and Exclusivity	3	0.8
	Financial Factors	47	11.8

Response Rate, Normality and Reliability Test

A total of 400 valid responses were successfully collected from consumers residing in the Pasir Gudang District who participated in this survey. The questionnaire was distributed using Google Forms, enabling efficient and accessible data collection from the intended population. The total number of responses obtained exceeded the minimum required sample size of 385 respondents, as recommended by the Raosoft Sample Size Calculator for populations exceeding 100,000. Therefore, the sample size used in this study is sufficient, statistically reliable, and representative of the target population.

To ensure that the dataset met the assumptions required for further statistical analysis, normality and reliability tests were performed on all independent and dependent variables. For the reliability assessment, Cronbach's Alpha was used to evaluate the internal consistency of the measurement items. The results indicate that the overall Cronbach's Alpha value for all 25 items is 0.926, which surpasses the recommended threshold of 0.7. This demonstrates excellent internal reliability, confirming that the questionnaire items are highly suitable for measuring consumer purchase intention toward high-rise residential properties in Pasir Gudang.

Table 4.1: Result of Reliability Test for Individual Variables

Reliability Statistics

Cronbach's Alpha	N of Items
.926	5

Result of Descriptive Analysis

The descriptive analysis was conducted to identify the level of agreement among respondents regarding the factors influencing their intention to purchase high-rise residential units in Pasir Gudang. The findings were measured using mean, mode, and standard deviation (SD). Overall, the results indicate that respondents show a high level of agreement across all constructs, with most questions recording mean values above 4.70 on a 5-point Likert scale and consistent mode values of 5, suggesting strong positive perceptions towards the identified factors.

Location Factor

The results from Section B show a high level of agreement, demonstrating that location plays a crucial role in influencing purchase decisions. The highest mean was recorded for B1 (Mean = 4.79, SD = .433), which indicates that the ease of access to main roads and highways strongly affects the intention to purchase high-rise residences. Likewise, respondents also emphasized the importance of proximity to workplace, schools, and shopping centers (B2: Mean = 4.77, SD = .440) and access to public transportation (B3: Mean = 4.75, SD = .472). The neighbourhood environment (B4: Mean = 4.76, SD = .446) was also perceived as highly influential, particularly in terms of cleanliness, safety, and greenery. Additionally, most respondents agreed that they are willing to pay more for a strategically located property (B5: Mean = 4.73, SD = .530). Collectively, these findings reflect that accessibility, convenience, and surrounding environment are major considerations for buyers in Pasir Gudang.

Price and Design Consideration

Section C recorded consistently high mean values, confirming the importance of pricing and unit design. The highest mean within this section was for C1 (Mean = 4.81, SD = .433), indicating that respondents view price as the most critical factor when purchasing high-rise property. Furthermore, buyers tend to compare prices among similar projects before making a decision (C2: Mean = 4.74, SD = .459). Quality and design aspects are also highly valued, with respondents willing to pay more for better construction quality (C3: Mean = 4.76, SD = .488), and acknowledging that interior layout and aesthetic design influence their decision (C4: Mean = 4.74, SD = .461). Property pricing is also perceived as reasonable when aligned with features offered (C5: Mean = 4.74, SD = .515). This indicates that affordability, design quality, and rational pricing are substantial determinants in purchasing decisions.

Facilities and Amenities

In Section D, the findings emphasize that the presence of comprehensive facilities significantly influences buyer preference. Respondents expressed strong agreement that modern facilities can increase their likelihood to purchase (D1: Mean = 4.77, SD = .449). Recreational amenities such as swimming pools and gyms were also regarded as determining factors (D2: Mean = 4.73,

SD = .459). Security features (D3: Mean = 4.75, SD = .447) were highlighted as crucial elements, demonstrating that safety plays a significant role in decision-making. Parking availability (D4: Mean = 4.74, SD = .477) and proximity to public amenities (D5: Mean = 4.74, SD = .460) also gained positive responses. Overall, facilities and accessibility to daily needs create strong added value for residential properties.

Developer Reputation

Section E further reveals that developer credibility influences purchase decisions. Respondents indicated trust towards reputable developers (E1: Mean = 4.71, SD = .478) and agreed that the developer's reputation is an important factor (E2: Mean = 4.72, SD = .461). In addition, buyers prefer developers with proven track records (E3: Mean = 4.71, SD = .486). Awards and recognition (E4: Mean = 4.72, SD = .483) were also found to increase buying interest, and exclusive branding of the project enhances purchase intention (E5: Mean = 4.76, SD = .443). These findings indicate that trustworthiness, track record, and developer branding contribute significantly to buyer confidence.

Financial and Investment Considerations

Section F addresses financial-related factors. The findings show that attractive payment options and financing schemes strongly influence purchase intention (F1: Mean = 4.75, SD = .449). Low loan interest rates encourage purchasing decisions (F2: Mean = 4.73, SD = .459). Respondents also considered potential capital appreciation (F3: Mean = 4.72, SD = .482) and high rental returns as investment motivation (F4: Mean = 4.76, SD = .441). Monthly maintenance fees and property taxes (F5: Mean = 4.69, SD = .494) also play a role in influencing willingness to buy, although this factor showed the lowest mean among financial aspects, yet still remains high.

CONCLUSION

In summary, the descriptive findings demonstrate that all assessed factors—location, price/design, facilities, developer reputation, and financial considerations—receive high agreement from respondents. The consistently high mean and mode values reflect that buyers in Pasir Gudang prioritize accessibility, affordability, developer reliability, and long-term investment returns when considering high-rise residential properties. These results indicate that future developments in Pasir Gudang should focus on strategic location, comprehensive facilities, competitive pricing, and reputable development credentials to enhance buyer interest and purchase intention.

Table 4.2: Consumer Purchase Intention Towards High-Rise Residential Buildings

Independent variable	Mean	Mode	Std. Deviation
Location (IV1)	4.7595	5	.36932
Price & Design (IV2)	4.7595	5	.36932
Facilities & Amenities (IV3)	4.7595	5	.36932
Prestige & Exclusivity (IV4)	4.7595	5	.36932
Financial Factors (IV5)	4.7595	5	.36932

To identify the factors influencing consumer purchase intention towards high-rise residential buildings.

Pearson correlation analysis was used to address research objective 2 (RO2), to identify the factors that influence consumer preferences towards the usage of green packaging. The table below shows the results from the Pearson Correlation test between the independent variables and consumer preferences.

Table 4.3 Correlation Analysis Between Independent Variables and Consumer Preferences

Independent Variable	Correlation with DV_total (Consumer preferences and the factors influencing consumer purchase intention on high-rise residential in Pasir Gudang District)	Strength of relationship
Location (IV1)	1.000**	Strong
Price & Design (IV2)	0.689**	Strong
Facilities & Amenities (IV3)	0.664**	Strong
Prestige & Exclusivity (IV4)	0.617**	Strong
Financial Factors (IV5)	0.651**	Strong

The correlation results show that all five independent variables have a strong positive relationship with consumer purchase intention toward high-rise residential properties in Pasir Gudang. Location appears as the most influential factor (r = 1.000**), meaning that good accessibility and surrounding environment strongly drive purchase decisions. Price and Design also show a strong relationship (r = 0.689**), indicating that buyers value affordable pricing and attractive unit layout. Facilities and Amenities (r = 0.664**) are also important, suggesting that modern facilities and convenience features encourage buyers. Prestige and Exclusivity (r = 0.617**) reflect that a reputable developer and branding increase confidence in purchasing. Financial Factors (r = 0.651**) also contribute significantly, as attractive financing schemes and investment potential motivate purchase intention.

In summary, all variables positively influence consumer purchase intention, with location as the strongest determinant, followed by price and design, financial considerations, facilities, and prestige.

Result of Multiple Regression Analysis

To analyses the relationship between consumer preferences and the factors influencing consumer purchase intention towards high-rise residential buildings.

4.4 Result of Multiple Regression Model

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig	Collinearity Statistic	
	B	Std.Error	Beta			Tolerance	VIF
(Constant)	3.128	.909		3.442	<.001		
Location (IV1)	.076	.251	.022	.303	.762	.455	2.196
Price & Design (IV2)	.204	.284	.061	.716	.475	.344	2.907
Facilities & Amenities (IV3)	-.544	.321	-.161	-1.694	.091	.277	3.607
Prestige & Exclusivity (IV4)	.380	.316	.117	1.202	.230	.262	3.813
Financial Factors (IV5)	-.374	.305	-.113	-1.226	.221	.292	3.430

The multiple regression analysis was conducted to examine the influence of five independent variables—Location, Price & Design, Facilities & Amenities, Prestige & Exclusivity, and Financial Factors—on consumer purchase intention of high-rise residential properties in Pasir Gudang. The regression output shows that none of the independent variables have a statistically significant influence on purchase intention, as all Sig. values are greater than 0.05. Location (β = .022, Sig = .762) and Price & Design (β = .061, Sig = .475) both show a positive but weak relationship, indicating that their effect is minimal when combined with other predictors. Prestige & Exclusivity also shows a positive but non-significant effect (β = .117, Sig = .230). Facilities & Amenities (β = –.161, Sig = .091) and Financial Factors (β = –.113, Sig = .221) display negative but also non-significant effects. The VIF values for all variables range between 2.196 and 3.813, which is below 10, indicating no serious multicollinearity issue though correlations among variables exist

DISCUSSIONS AND CONCLUSION

Discussion on the Acceptance Level of Consumer Purchase Intention Towards High-Rise Residential Buildings
The second research objective aimed to determine which factors most influence consumer purchase intention toward high-rise residential properties in Pasir Gudang. Multiple regression analysis showed that none of the variables—Location, Price & Design, Facilities & Amenities, Prestige & Exclusivity, and Financial Factors—were statistically significant predictors of purchase intention, as all Sig. values exceeded 0.05. Although descriptive results earlier indicated high agreement among respondents, their effect weakened when all variables were

tested together. Location (β = .022), Price & Design (β = .061), and Prestige & Exclusivity (β = .117) showed weak positive relationships, whereas Facilities & Amenities (β = –.161) and Financial Factors (β = –.113) showed weak negative relationships. These findings suggest that consumer purchase intention is not driven by a single dominant factor, but rather by a combination of considerations, meaning buyers evaluate properties holistically. Therefore, developers should ensure that all key elements, including location, pricing, facilities, reputation, and financing options, are balanced and collectively appealing to attract potential buyers.

Discussion on the Factors That Influence Consumer Purchase Intention Towards High-Rise Residential Buildings

The second objective was to identify the factors that influence consumer purchase intention for high-rise residential properties in Pasir Gudang. The correlation analysis showed that all five independent variables were positively related to purchase intention. Location recorded the strongest correlation (r = 1.000), followed by Price & Design (r = 0.689), Facilities & Amenities (r = 0.664), Financial Factors (r = 0.651), and Prestige & Exclusivity (r = 0.617), indicating that all variables contribute to shaping buyer decisions, with Location and Price & Design emerging as the most influential. These results imply that consumers are more likely to consider projects that are strategically located, reasonably priced, and well-designed, while facilities, prestige, and financial aspects also play supportive roles in purchase decisions. Overall, the findings confirm that purchase intention is formed through a combination of factors rather than a single dominant element, suggesting that developers must deliver a balanced offering of location accessibility, improved design quality, attractive facilities, reputable branding, and practical financial schemes to enhance consumer interest and strengthen market competitiveness.

Discussion on the Relationship Between Consumer Purchase Intention Towards High-Rise Residential Buildings

The third objective was to identify which factors most influence consumer purchase intention using multiple regression analysis. The results showed that none of the variables—Location, Price & Design, Facilities & Amenities, Prestige & Exclusivity, or Financial Factors—were statistically significant (all p > 0.05). Location (β = 0.022), Price & Design (β = 0.061), and Prestige & Exclusivity (β = 0.117) recorded weak positive effects, whereas Facilities & Amenities (β = –0.161) and Financial Factors (β = –0.113) showed weak negative effects. These findings indicate that purchase intention is not driven by a single dominant variable but rather by the overall combination of attributes perceived collectively by consumers. In practice, buyers evaluate high-rise properties as a complete package, weighing convenience, price, design, facilities, branding, and financial feasibility simultaneously. Therefore, developers aiming to strengthen market demand in Pasir Gudang should focus on delivering a well-balanced offering, ensuring that key elements are integrated cohesively to enhance perceived value and encourage purchase consideration

CONCLUSION

In conclusion, this study examined consumer preferences and the factors influencing purchase intention for high-rise residential properties in Pasir Gudang, Johor. The findings indicate that buyers generally show strong interest toward high-rise housing, particularly in terms of location, price and design, facilities, developer reputation, and financial considerations. Correlation results demonstrated that all five factors are positively associated with purchase

intention, with location and price & design showing the strongest relationships. However, the multiple regression analysis revealed that none of these factors significantly predict purchase intention when assessed together, suggesting that buyers evaluate property decisions holistically rather than based on a single dominant element. These outcomes highlight the need for developers to provide a balanced offering that integrates strategic location, competitive pricing, quality design, adequate facilities, reputable branding, and flexible financing options to enhance market appeal. Future research may consider expanding the study to other regions in Malaysia to determine whether similar factors shape purchase intention across different urban and rural contexts, allowing for broader insights into consumer behaviour nationwide.

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HOUSEHOLD SOLID WASTE MANAGEMENT PRACTICES AND PERCEPTIONS AMONG RESIDENTS IN KLANG VALLEY

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ABSTRACT

Rapid urbanisation and change of lifestyles has led to higher household solid waste generation especially in the high urban intensity areas of Malaysia like the Klang Valley. Although there are policies in the area – like the Solid Waste and Public Cleansing Management Act 2007 (Act 672) and the Separation at Source initiative – households do not routinely partake in suitable waste segregation and recycling. At the household level the behavioural component in particular resident perceptions of behaviour are significant predictors of waste management behaviour. The current study aimed to examine the knowledge and attitude of the community about the household solid waste management in the Klang Valley and its impact. A cross-sectional quantitative survey approach was used, which took place through an online self-administered questionnaire targeting residents aged 18 years and above. Data were analyzed using descriptive statistics and correlation analyses. Data obtained from this analysis indicate that overall the residents have moderate to high levels of awareness and positive attitude towards waste management in the household. Correlation analysis revealed statistically significant correlations between household awareness and household solid waste management practices, and also between attitudes and practices. These findings show that residents' awareness and positive attitudes are directly related to resident's waste segregation and recycling behaviour. This study makes an empirical and practical contribution to the literature concerning behaviour-based determinants in household waste management in urban Malaysian household settings. Such results will, therefore, serve as the framework to help policymakers and local authorities to establish such education and behaviour-based awareness initiatives and interventions so as to increase the population's participation in sustainable waste management.

Keywords: Household solid waste, Awareness, Attitudes, Waste management practices, Klang Valley

INTRODUCTION

With increasing waste generation, resource depletion, and environmental degradation, environmental sustainability has been a global concern. In Malaysia, rapid urbanisation, economic growth, and changing consumption patterns have resulted in a significantly growing amount of solid waste generated by households. Growing numbers of solid waste being deposited in landfills in urban regions, including the Klang Valley, put pressure on the existing waste management systems. Despite the implementation of policies and regulations in Malaysia to provide quality solid waste administration like the Solid Waste and Public Cleansing Management Act 2007 (Act 672) and the Separation at Source policy, household recycling and separation of solid waste management remains relatively low; nevertheless household

involvement is marginal at best. So far, research demonstrated that even when residents are informed of waste-related issues, they don't always practice waste management in a consistent way. A number of behavioral factors, based on awareness, attitudes and personal responsibility contribute to the household waste management behaviour. It is essential to know these factors in order to plan effective policies and interventions towards sustainable practices at the household level. The aim of this study is to find out about perceptions in the Klang Valley, specifically awareness and attitudes towards solid waste management practices. By identifying behavioural determinants that influence waste practices this study also promotes better waste management strategies and helps support a sustainable development agenda for Malaysia.

LITERATURE REVIEW

In fast urbanising places, solid waste management at the household level has become a major environmental and public health challenge. This chapter examines existing literature regarding household solid waste management, residents' perceptions of solid waste disposal and the behavioural factors that have a bearing on their waste management practices. Theoretical perspectives and empirical findings in both literature reviews strengthen the proposed conceptual framework.

Management of Household Solid Waste

The household solid waste is non-hazardous waste from individual household activities that is generated from activities such as food, plastics, paper, glass, and metals. In Malaysia, household waste accounts for a significant part of municipal solid waste, putting pressure on public waste management agencies as well as their transport capacity to a landfill site (Manaf et al., 2009; Moh & Manaf, 2017). Inefficient management of domestic and household waste has been associated with environmental pollution, greenhouse gases and health risks of the people.

Theoretical Perspectives on Environmental Behaviour

Behavioural theories focus on the influence of psychological and cognitive factors on environmental behaviour. However, the Theory of Planned Behaviour contends that behavioural intentions are affected by awareness and attitudes followed by behaviour (Karim Ghani et al., 2013). Likewise, pro-environmental behavior theories stress that both knowledge as well as the construction of positive attitudes are important antecedents of sustainable household practices; however, external influences may moderate behaviour.

Awareness of Household Solid Waste Management

Awareness means that people have knowledge of waste management, such as waste segregation, recycling process, and effects of incorrect disposal on the environment. Although general awareness can be improved, studies from Malaysia have shown gaps with respect to specific waste segregation (the guidelines related to the segregation of waste) and recycling systems (Abdullah et al., 2017; Choon et al., 2017). International research also indicates that awareness cannot be a sole driver of behaviour change, unless conditions are put in place for doing so.

Attitudes Towards Household Solid Waste Management

Attitudes refer to people's thinking and feelings towards the behaviour of managing waste. It has been demonstrated that a willingness to practice sustainable behaviours is elevated when people have positive perceptions of recycling and waste segregation (Fan et al., 2019). But, bad

perceptions about how inconvenient or inefficient recycling programmes seem to be might deter people from recycling programmes due to inconvenience or inadequate performance.

Household Solid Waste Management Practices
Household-wise waste segregation at source, recycling attendance at the source, recycling engagement, and disposal behavior all play a part in household waste management practices. Empirical research also confirms the general finding that households with a much higher level of awareness and positive attitudes tend to produce better waste management practices (White & Hyde, 2012; Knussen et al., 2004).

Empirical Studies on Perceptions and Practice
There is empirical evidence from Malaysia and other developing countries that there is a significant association between residents' perceptions and household waste management practices. Advocacy and attitudes in the household play the important roles in predicting recycling and waste separation behaviour and segregation at the household level by awareness and attitude (Karim Ghani et al., 2013; Fan et al., 2019).

Research Gap
Although solid waste management has received considerable attention in literature, the use of the integrated perception–practice framework by KZM has been considered by a select number of studies in KZM and is lacking in the Klang Valley. Additionally, several studies look at awareness, attitudes or practices in isolation among themselves instead of using the unified analytical framework.

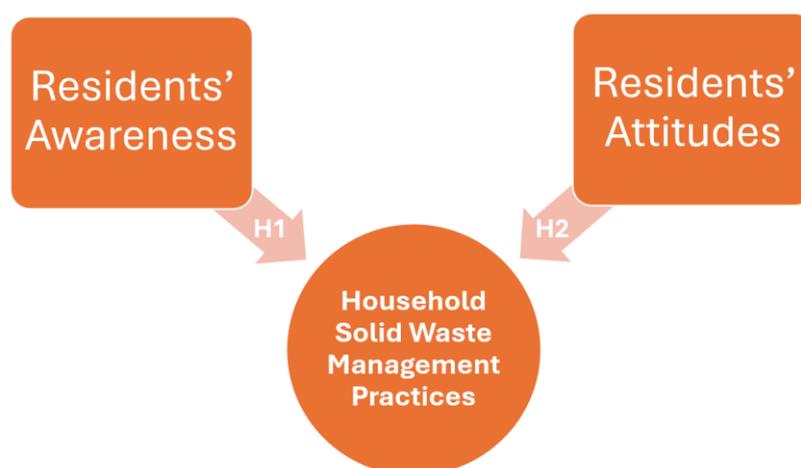**Conceptual Framework and Hypotheses**

Figure 2.1: Conceptual framework illustrating the relationship between residents' awareness, attitudes, and household solid waste management practices

The conceptual framework of the study is presented in Figure 2.1 as the concept that residents' perceptions comprising awareness and attitudes are expected to affect household solid waste management practices. Awareness and attitudes are the independent variables, while household waste management practices are the dependent variable. Hypotheses H1 and H2 test the

proposed relationships. This study develops a conceptual model to explore the association between residents' perceptions and the solid waste management practices in homes in the Klang Valley, using the literature reviewed. Residents' perceptions are conceptualized in terms of two major constructs—awareness and attitudes—which are well documented as significant behavioural factors driving household-level environmental practices. In this framework, awareness corresponds to what residents know about household waste management such as how to arrange household waste segregation, how to recycle waste, and how they affect the environment. Attitudes are the evaluative judgments of residents and the attitude towards practicing good waste management behaviours. With these two constructs as the independent variables, household solid waste management practices, i.e. for waste segregation, recycling habits, and proper waste disposal, are the dependent variable. It was framed through insights drawn from behavioral perspectives, where those with greater awareness and familiarity with environmental issues are more apt to transform their opinion into pro-environmental conduct. Thus, this study speculates that residents' perspectives play an important role in household solid waste management practices. Hypotheses:

Based on the conceptual framework, the following hypotheses are formulated.

H1: There is a significant relationship between residents' awareness and household solid waste management practices.
H2: There is a significant relationship between residents' attitudes and household solid waste management practices..

METHODOLOGY

This chapter outlines the methodology employed to fulfill the objectives of the study. It details the overall research approach, research design, population and sampling technique, and data analysis techniques used. The methodological framework will ensure that the collected data are valid, reliable, and suitable for addressing the research questions on the residents' perceptions and household solid waste management practices in the Klang Valley. Data on this study will be analysed using the research onion framework as the framework guides the project's planned research design, guiding researchers in guiding their method in an organized manner from basic philosophical premises to data analysis strategies. The approach is based in this outer layer on the positivist philosophy, as the study is trying to measure both perceptions of residents and practice of household solid waste management objectively through quantitative data. We have a deductive research methodology. Research approaches are based on hypotheses developed from existing behavioural theories and previous studies and are tested, in conclusion, by testing statistical analysis. The method of research used is survey which is convenient method of collecting uniform data from a population of the Klang Valley. This study adopts a quantitative research approach because quantitative material is required to explore the associations between awareness and attitudes and household solid waste management practices. As this research takes place over a cross-sectional time horizon, it is possible to collect data at a single point in time to document the respondents' attitudes and behaviors. Lastly, the methods and methods consist of an online self-administered questionnaire and data analysis with SPSS, which contains descriptive statistics and correlation statistics to fulfill the research goals.
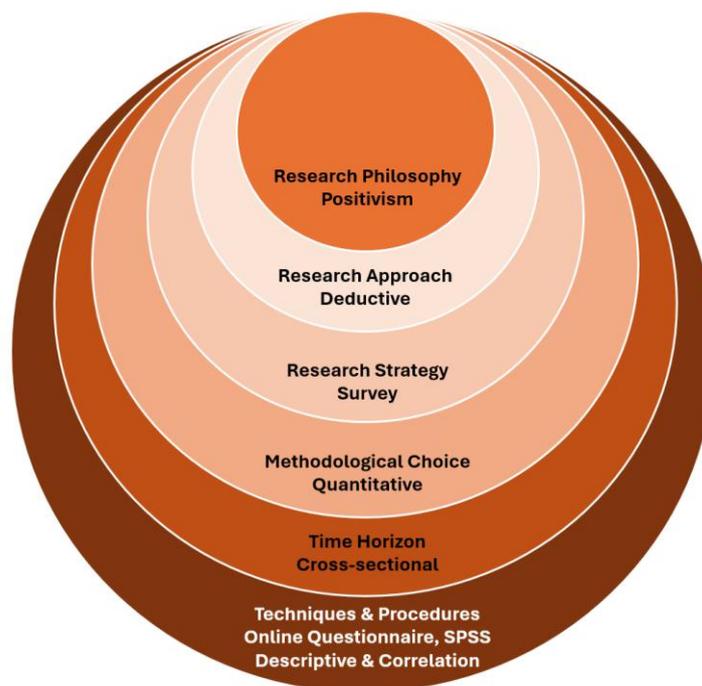
Research Design (Research Onion Approach

Figure 3.1: Research Onion Framework of the Study

Population and Sampling Technique

The population of this study were residents living in the Klang Valley, Malaysia. The unit of analysis is the household individual resident, as household level waste management practices are dependent on residents' perceptions and behaviours. Because the Klang Valley is a large and heterogeneous population, survey the entire population in an unfeasible way. Thus, non-probability convenience sampling was used, i.e., respondents were randomly chosen due to ease of accessibility and willingness to complete the online questionnaire. This sampling procedure is suitable because the nature of this study and that the researchers have only a short period of time; a questionnaire is to be used online. Respondents are aged 18 years and above and living at Klang Valley only. Although convenience sampling limits generalisability it is appropriate for exploratory and behavioural research on perception–practice relationships.

Analysis Techniques Used

Data extracted from the online questionnaire are subjected to analysis by Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics frequencies, percentages, means, and standard deviations are reported in a quantitative manner in order to provide a demographic characterisation of the respondents and to identify the household awareness, attitudes and practices of solid waste management. Reliability analysis relies on using Cronbach's alpha to estimate the internal consistency of the measurement scales. Correlation analysis uses the relationships between residents' perceptions (awareness and attitudes) of household solid waste management practices. The chosen method is based on normality of data, either Pearson's correlation or Spearman's rho. We note we will use a significance level of $p < 0.05$ when determining whether the relationships are statistically significant

RESULT AND ANALYSIS

This chapter describes the results of the data analysis of online questionnaires from 101 residents of Klang Valley. The analysis builds on the questions in the questionnaire, which meet the research goals through the demographic profiles of respondents in the questionnaire, the reliability of the measures, descriptive statistics of the key constructs and hypothesis testing of the existing relationships between resident perceptions and household solid waste management practices.

Demographic Profile of Respondents

A total of 101 valid responses were analysed. The respondents are of a wide range of age groups, educational attainment, occupation, family size and living patterns in the Klang Valley. The demographic spread ensures that data capture as wide a spectrum of household characteristics as you normally expect in urban communities.

Table 4.1: Demographic Profile of Respondents (n = 101)

Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	42	41.6
	Female	59	58.4
Age Group (years)	18–24	38	37.6
	25–34	33	32.7
	35–44	17	16.8
	45–54	10	9.9
	55–64	3	3.0
Education Level	Secondary school	21	20.8
	Diploma / Certificate	27	26.7
	Bachelor's degree	41	40.6
	Master's / PhD	12	11.9
Occupation	Student	46	45.5
	Private sector employee	20	19.8
	Public sector employee	10	9.9
	Self-employed	12	11.9
	Others	13	12.9
Household Monthly Income	**Below RM2,000**	**28**	**27.7**
	RM2,001–RM4,000	34	33.7
	RM4,001-RM8,000	26	25.7
	Above RM8,000	8	7.9
	Prefer not to answer	5	5.0
Household Size	1–2 persons	29	28.7
	3–4 persons	46	45.5
	5 persons and above	26	25.8

Type of Dwelling	Apartment / Condominium	48	47.5
	Landed house	53	52.5

Demographics of the respondents are shown in Table 4.1. Female respondents (58.4%) between 18 and 34 years (70.3%) were the majority. Most participants achieved tertiary studies; 40.6% hold a bachelor's degree and 26.7% diploma or certificate. For household characteristics, the majority resided in households with three to four members (45.5%), and over half (52.5%) of them lived in landed houses. Overall the demographic profile is representative of what occurs in most urban homes in the Klang Valley.

Reliability Analysis
To obtain a reliability analysis, internal consistency of measurement scales for awareness, attitude and household solid waste management practices was investigated. The analysis of the Cronbach's alpha is given in Table 4.2 All of the constructs had Cronbach's alpha values above 0.70, suggesting acceptable to excellent internal consistency. Hence, measurement instruments employed in this study are deemed reliable.

Table 4.2: Reliability Analysis of Study Constructs (n = 101)

Construct	Number of Items	Cronbach's Alpha (α)	ReliabilityLevel
Awareness	5	0.892	Excellent
Attitudes	5	0.787	Acceptable
Household Solid Waste Management Practices	5	0.846	Good

Descriptive Analysis of Main Constructs
Descriptive statistics were used to analyse awareness, attitudes, and household solid waste management practices among respondents. Five-point Likert scales were used to interpret mean scores. The outcomes are presented in Table 4.3.

Table 4.3: Descriptive Statistics of Study Variables

Construct	Mean (M)	Interpretation
Awareness	3.86	Moderate–High
Attitudes	4.02	High
Household Solid Waste Management Practices	3.72	Moderate–High

Findings showed that the average awareness of household waste management issues and perceptions of sustainable waste is moderate to high. Although the level of household solid waste management practices is moderate to high, it remains slightly lower than attitudes, suggesting a perception–practice gap.

Hypotheses Testing

The associations between residents' perceptions (awareness and attitudes) and household solid waste management practices were studied through correlation analysis. The normality decision rule described in Chapter 3 was the guiding principle for the selection of correlation test.

Table 4.4: Correlation Analysis between Study Variables

Variables	Awareness	Attitudes	Practices
Awareness	1.000	0.470**	0.384**
Attitudes	0.470**	1.000	0.436**
Practices	0.384**	0.436**	1.000

Note: $p < 0.01$

Hypothesis 1 (H1)

H1: There is a significant relationship between residents' awareness and household solid waste management practices. These findings demonstrate a moderate positive correlation between awareness and household solid waste management practices ($r = 0.384$, $p < 0.01$). Hence H1 is supported suggesting residents with more awareness are likely to perform proper household waste management practice.

Hypothesis 2 (H2)

H2: Attitudes of residents have strong relationship with good household solid waste management practices. A moderate positive correlation was found with attitudes towards household solid waste management methods ($r = 0.436$, $p < 0.01$). Hence, it can be concluded that H2 is confirmed in that the stronger one's attitudes toward waste management the better their household waste management practices.

DISCUSSION OF FINDINGS

The results indicate that awareness and attitudes have strong significance on household solid waste management practice among residents of Klang Valley. Overall, respondents score highly on awareness and positive attitude, but the relatively low mean of actual practice shows that positive attitudes do not always translate into regular behaviours. These findings are consistent with behaviourists beliefs that psychological influences are necessary but not sufficient to sustain pro-environmental actions. There may also be structural and context related factors that affect the translation of these into practice, especially in an urban context

CONCLUSION

In this study, residents' perceptions and relationships with household solid waste management practices were also investigated in the Klang Valley. The findings verify the positive effect of awareness and attitudes on the behaviour of household waste management. Suggestions for improvement include reinforcement of public education programmes, communication of waste segregation directives, and community-based initiatives to stimulate recycling culture.

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CUSTOMER PREFERENCES FOR LOCAL GOURMET BURGER: A COMPARISON OF WOODFIRE, MCDONALD'S, AND BURGER KING, PRODUCT, PRICING, AND PROMOTION AS DRIVERS

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ABSTRACT

This research investigates the relationship between product attributes, pricing, and promotion of Woodfire, McDonald's, and Burger King, and their comparison and customer preferences towards gourmet burgers. Local burgers business are starting to rise since the controversy of the genocide situation between Palestine and Israel, customers have started to look for new alternatives to McDonald's and Burger King. A quantitative approach was employed for this research by using a structured questionnaire, distributed to 119 respondents who had experience of visiting Woodfire's, McDonald's, and Burger King's burger. The data were analyzed by using SPSS, including reliability test, descriptive analysis, and Chi-square analysis. The finding reveals that the items of product attributes, pricing, and promotion strategy partially significantly influence customer preferences towards the burger. In turn, customer preferences can lead to potential customer actions (revisits, recommending to others, and bringing loved ones). This research contributes to the existing literature on customer preferences from the view of product attributes, pricing, and promotion towards burgers or food in general, and offers practical insights for marketers to enhance customer preferences by adjusting and improving the product attributes, pricing, and promotion strategy.

Keywords: customer preferences, product attributes, pricing, promotion strategy, brand comparison

INTRODUCTION

The Malaysian burger market includes McDonald's and Burger King, which offer standardized, value-oriented menus (Dabhi, R., Dadhalwala, D., & Vidani, J., 2024), and developing local gourmet brands like Woodfire, which focus on quality flavor and experience. McDonald's and Burger King attract a wide-range of customers with their low prices, many locations, and intensive advertising (Obomwan, I. B., 2022), but Woodfire portrays itself as a gourmet option with smoky burgers, rich toppings, and an American-diner-style dine-in atmosphere (Cavin Teo, 2023). Woodfire's smoky burgers, extravagant sauces, and rich menu items like smoked brisket and ribs appeal to clients who want more flavor than fast food burgers (Eatbook, 2025). According to consumer reviews on websites and social media, particularly TikTok and Reddit, some find the sauces and toppings overwhelming and the burger less appealing and not what they expected for the price, emphasizing the need for product development. Woodfire is priced reasonably for its quality, but many customers find it too expensive, treating it as a rare treat rather than a regular alternative to McDonald's or Burger King. This price-value friction may lower visit frequency and slow Woodfire's QSR growth. Woodfire focuses on online reviews, social media buzz, and word-of-mouth, supported by excellent ratings on Google Reviews and community debates, unlike huge QSR businesses that invest heavily in advertising and

promotions. This strategy builds brand loyalty, but little official promotion and discount activity may limit new customer awareness and trial. McDonald's and Burger King have excellent 4Ps (Product, Price, Promotion, and Location) strategies, while Woodfire's strengths are product quality and ambiance, but a high perceived price and little advertising. Despite its high reputation, there is little empirical data on how Woodfire's product attributes, pricing, and advertising affect customer preferences compared to larger QSR companies.

To fill this gap, the study will examine how Woodfire's product attributes (quality, taste, sauces, toppings, menu variety), pricing (set and ala carte prices and perceived value), and promotion (online reviews, social media advertising, frequency and attractiveness of ads, word-of-mouth) affect burger preferences, revisitation, recommendation, and intent to bring loved ones. A structured, ranking-based questionnaire was used to compare Woodfire against McDonald's and Burger King to determine which 4P features are most strongly connected with customers' first, second, or third choice.

Problem Statement

Despite Woodfire's good reputation for its gourmet menus, the issue of its pricing, product, and promotion strategies still needs to be addressed for the restaurant to be successful as a QSR burger restaurant, such as McDonald's and Burger King, and meet the customer preferences for its gourmet burgers. For its promotion strategy, Woodfire mainly relies on customer online reviews and word-of-mouth to attract new and old customers, which limits the customer awareness of the restaurant due to a lack of advertisements and discounts. Although the menu pricing reflects its quality, it is perceived as expensive by some customers, which can reduce the frequency of visits, and is classified woodfire as an occasional treat instead of regular QSR visits. Additionally, some customers find the sauce and topping on Woodfire's Product menu overwhelming, which can negatively affect the overall customer satisfaction and loyalty. These 3 issues highlight the need to better understand and address the customer preferences to improve Woodfire's market positioning and customer retention.

Research Questions

• How do the product attributes of Woodfire, McDonald's, and Burger King differ, and which restaurant is most preferred among customers?

• How do set combo and à la carte burger prices and perceived value differ, and which restaurant is most preferred among customers?

• How do Woodfire, McDonald's, and Burger King's promotion techniques differ? Which restaurant is most preferred among customers?

Research Objectives

• To compare the product attributes of Woodfire, McDonald's, and Burger King, and determine which burger restaurant is most preferred by customers.

• To compare the price placements of the set combo, à la carte burger, and their perceived value of Woodfire, McDonald's, and Burger King, and to determine which burger restaurant is most preferred by customers.

• To compare the effectiveness of promotion strategies used by Woodfire, McDonald's, and Burger King, and determine which burger restaurant is most preferred by customers.

Scope of the Research
The goal of this study is to compare Woodfire's, McDonald's, and Burger King's product attributes, pricing, and promotion strategies as factors that influence customer preference for burgers, and then determine which restaurant customers prefer based on those factors. The variables in this study include the product attributes, pricing, and promotion strategies of Woodfire, McDonald's, and Burger King, which serve as the independent variables (IV), and customer preference for burgers as the dependent variables. The demographic for this study is limited to those who have eaten at Woodfire, McDonald's, or Burger King. This study's methodology is quantitative research, with a structured questionnaire and SPSS as an analysis tool. The questionnaire was distributed via WhatsApp and TikTok to respondents who had posted about their dining experiences at Woodfire, McDonald's, and Burger King.

LITERATURE REVIEW
In this chapter, the literature review from journals, papers, e-books, and other sources on product qualities, price, promotion, and burger client preferences is thoroughly reviewed. Products, pricing, and promotions influence customer burger preferences; thus, this study concentrates on these. This chapter aims to identify product aspects, pricing, and promotions that influence customer preferences for burgers or food-related products and relate them to this research.

Customer Preferences
Customers make purchases based on their preferences, expectations, likes, and dislikes. According to Kuncoro, H. A. D. P., & Kusumawati, N. (2021), customer preferences for products or brands are influenced by numerous product features, such as price, quality, and so on, as well as customer attributes like goals, disposable income, and so on. According to DSouza, E. P. (2023), customer preferences in the food and beverage business are changing expectations and demands that affect satisfaction.

Factors That Influence Customer Preferences

Product attributes
Customers receive products that emphasize features, quality, brand, and innovation to fulfill market needs and stay competitive. Singh, R. V., & Jena, D. (2024) describe products as items or services offered to customers that emphasize features, quality, brand, and innovation to suit market needs and preserve competitive advantage. Additionally, it is a key component of the marketing mix that determines brand success. Sukur, A. A., Sumarjan, N., & Jalis, M. H. (2024) added that a product is everything that meets a demand and is sold to attract, buy, consume, or use customers. Woodfire emphasizes quality, gourmet flavor, and distinctive menu features, which align with Singh, R. V., & Jena, D. (2024) research that highlights product innovation and quality to drive client preferences. The comparison table shows that customers have complained about the menu's overwhelming sauces, suggesting that Woodfire should streamline its product to increase loyalty.

Pricing
According to Chen, M. S., Chai, F.T., Bee, G. J., Chen, B. X., and Hendrawan, P. S. (2022), price is what a customer pays for goods and services. Cakranegara, P. A., Kurniadi, W., Sampe,

F., Pangemanan, J., & Yusuf, M. (2022) added that the price is a measure of the exchange rate that can be equated with money or other goods for a customer's benefit and the amount of money charged for a product or service, or the value exchanged by customers to get the benefits of owning or using a product Due to Woodfire's high price, some customers consider it as an occasional treat rather than a regular treat, according to Chen, M. S., Chai, F.T., Bee, G. J., Chen, B. X., & Hendrawan, P. S. (2022) and Zhao H, Yao X, Liu Z, and Yang Q (2021). One of several factors affecting customers' price affordability and food or product quality perceptions. Woodfire could change prices to attract price-sensitive clients and boost visit frequency.

Promotion
Maung, P. P. (2023) defines promotion or marketing communication mix as a company's combination of instruments to convincingly communicate customer value and establish customer relationships. Ramsyawa, N. G., & Martha, D. (2024) added that promotion should cover what, who, when, and where a company may satisfy customer expectations, and some companies lack funding for advertising, so they must focus on the target market. Good, appropriate, and entertaining promotion can boost company sales, according to Wiranu, R. U. (2025). According to Maung, P. P. (2023) and Ramsyawa, N. G., & Martha, D. (2024), promotion tailored to available resources can influence sales. Woodfire used little traditional advertising and relied on customer online reviews and word-of-mouth recommendations to attract customers. Compared to McDonald's and Burger King, Woodfire's sparse advertising may limit customer recognition.

Research Framework

Figure 1 shows the research framework model for this study. The research framework model was used to test the relationship between the product, price, and promotion, which influence customer preferences towards burgers in comparison between Woodfire, McDonald's, and Burger King. From the research framework, 3 hypotheses were identified in this study.
•   Hypothesis 1: Product attributes have a significant influence on customer preferences towards burgers.
•   Hypothesis 2: Pricing has a significant influence on customer preferences towards burgers.
•   Hypothesis 3: Promotion strategies have a significant influence on customer preferences towards burgers

Hypothesis Development

The Relationship Between Product and Customer Preferences Towards Burger
Da Costa Marques, S. C. (2022) found that food qualities, including healthiness, safety, and flavor, greatly influence customer preferences. It highlights how these attributes affect customer perception and choice, emphasizing the importance of product qualities in consumer buying decisions. Reis, Verren (2022) also shows that pricing, packaging design, flavor, and color of Koeliner Ecoe taro chips strongly influence consumer preference development.
Hypothesis 1: Product attributes have a significant influence on customer preferences towards burgers.
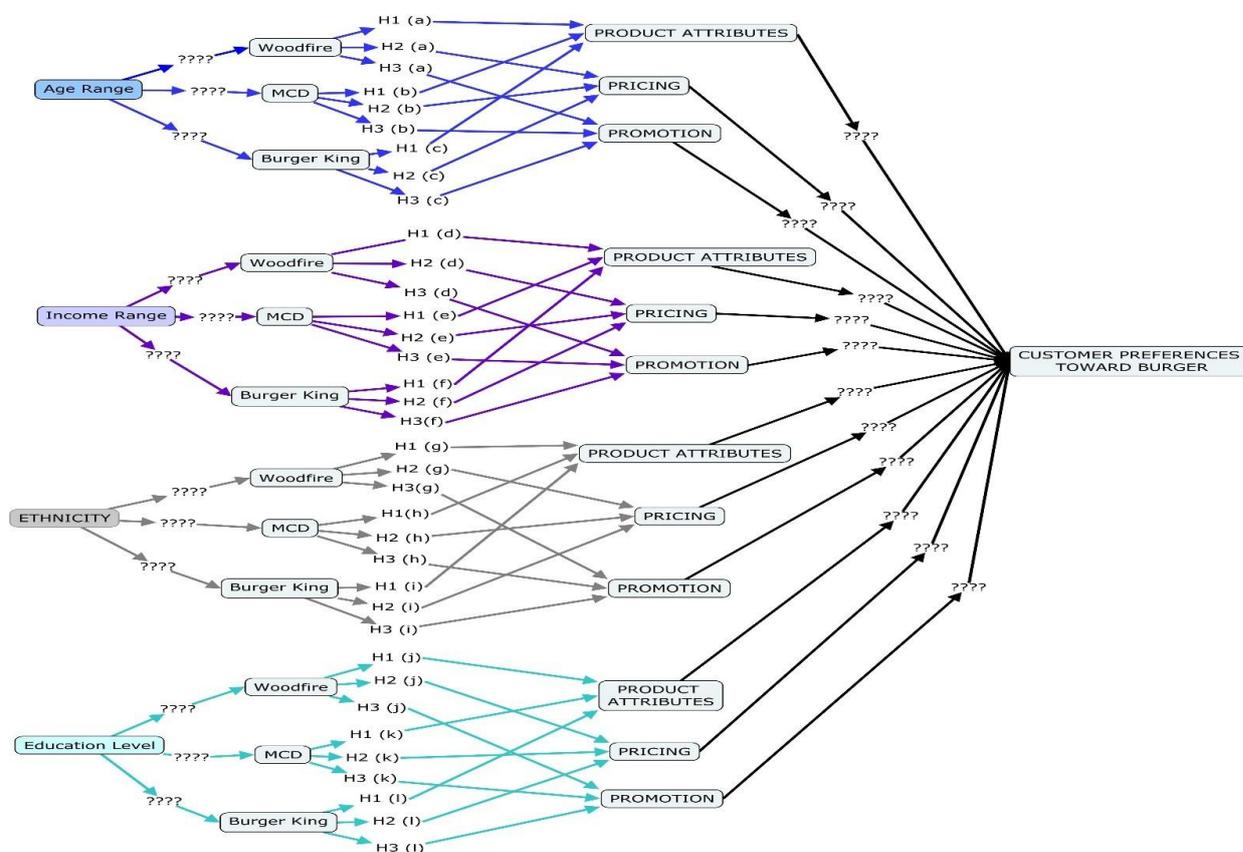
Figure 1- Research Framework

The Relationship Between Pricing and Customer Preferences Towards Burgers

Yang (2022) found that pricing influences customers' perceptions of value, preferences, and decisions to purchase. This means businesses should carefully arrange their pricing approach to match customer preferences and maximize satisfaction. Zhang, J (2021) also adds that customers have various ideas about product or service elements, including pricing, which might negatively impact their choice even if other factors are positively evaluated. Price discontent might affect customer favor despite other positives. According to Komarek, A. M. (2021), price is demand-driven and can signal manufacturers to shift supply and demand by making things cheaper or more expensive. Price affects perceived value and satisfaction, which influences purchase decisions and customer preferences.

Hypothesis 2: Pricing has a significant influence on customer preferences towards burgers

The Relationship Between Promotion and Customer Preferences Towards Burger

Kuncoro, H. A. D. P. (2021) found that promotion is one of the five factors consumers consider before buying and strongly influences their preferences and purchases. According to Aripin, Z. (2023), promotion influences customer perception, and they prefer trusted brands. Effective promotion increases brand awareness, customer engagement, and brand attractiveness and loyalty. Aripin, Z. (2023) added that promotion must balance quality and frequency to minimize

consumer fatigue and trust loss, which could affect customer preferences.

Hypothesis 3: Promotion strategies have a significant influence on customer preferences towards burgers.

METHODOLOGY

Research methodology is a systematic approach to planning, executing, and analyzing a research project to test the hypothesis. It covers defining the research topic, choosing a design, sample methods, data gathering and analysis methodologies, and integrity and validity. Clear and well-justified research methodologies explain each methodological decision, helping others understand, assess, and replicate the study. A scientific and logical approach to research yields accurate and relevant results that enhance knowledge.

Research Design

This study examines consumer burger preferences and their intention to choose Woodfire Burger restaurants over McDonald's and Burger King. This study used quantitative methods. Numerical data is collected and analyzed to evaluate relationships, measure variables, and test hypotheses using statistical methods, according to Mweshi and Muhyila (2024). Surveys, experiments, observational studies, and mathematical and statistical methods like means, descriptive statistics, and significance tests are used to extract important patterns, differences, and relationships from data. Data was collected using a structured questionnaire, a standardized closed questions that are phrased, asked in a specified order, and require respondents to choose from prepared responses, according to Neil Stone (2025). The questionnaire was delivered over Google Form to provide easy access. The questionnaire uses a ranking system to assess response strength and variable relationships.

Research Instrument

To gather precise data from respondents, a structured questionnaire was designed to ensure all aspects of the research were effectively covered. The questionnaire was distributed online using Google Form, which was shared through social media such as TikTok, Instagram, Facebook, and the communication medium, which is WhatsApp, to respondents who have visited Woodfire, McDonald's, and Burger King.

Section A collects nominal scale screening responses and demographic data to verify research eligibility and profile respondents. A screening question asks "Yes/No" if participants have visited or bought from Woodfire Burger, McDonald's, and Burger King. Participants who answer yes will be asked demographic questions on age, race, gender, citizenship, education level, occupation sector/status, and income or monthly pocket money.

The independent and dependent variables are ranked on a 3-point scale in Section B, with respondents choosing Woodfire, McDonald's, or Burger King for each item. The quality of the burger ingredients, the taste of the burger, the sauce, the filling, and the menu are rated separately for the three brands. Evaluate the item cover package combo, à la carte pricing, and whether each brand's pricing matches its quality. Promotional items assess online reviews, platform efficacy, ad appeal, channel suitability for new menu items, ad frequency, media suitability, word-of-mouth, and restaurant social media content promotion. Additional questions examine brand recognition and consumer habits, such as which restaurant they would return to, suggest, and bring family to on a 3-point preference scale.

Data Analysis Method
This section describes how data analysis techniques will be applied to investigate the relationship between product attributes, pricing, promotion strategy, and customer preferences. The collected data will be examined using SPSS for quantitative data processing.

Population and Sampling
According to Pace, D. S. (2021), probability states that any respondent target has a known, equal, and non-zero chance of being chosen. This randomized strategy avoids prejudice and inaccuracy. The method involves defining the population, establishing a sample frame, random selection, and statistical calculations, such as confidence intervals, to verify results. Islam, M. A., & Aldaihani, F. M. F. (2022) define sampling as selecting study participants by survey, observation, or questioning. Population and sampling methods emphasize fair respondent selection and statistical generalization and should correspond to study goals and environment. Rahman, M. M. (2023) states that probability and sampling allow researchers to study a subset of a larger population and generalize findings without studying each person. Sampling a smaller group (sample) that accurately represents the population makes data collection easier, cheaper, and more controllable. And these tools let researchers accurately analyze larger populations with limited resources.
For this research, one of the non-probability sampling methods has been used, which is purposeful sampling. This sampling method involves selecting individuals based on specific criteria. According to Stratton, S. J. (2023), the technique is often used in phenomenon-based qualitative research, and researchers use their own expertise or judgement to select a sample that may represent a target population. Respondents are chosen because they have prior experience with these 3 burger restaurants, which are Woodfire Burger, McDonald's, and Burger King, to ensure that the data collected is relevant and meaningful. This approach provides valuable insights into customers' preferences for burger product attributes, price, and promotion, which are closely related to the study's objectives.

Measurement Of Validity and Reliability

Pre-test
A pretest is necessary for a quantitative study to identify survey improvements needed to create effective survey questions. To guarantee that data collection is done properly. Randomly selecting 30 respondents to uncover ambiguities and enhance questionnaires ensures their applicability. Hashim, Mohamad, HalimLim, & Ahmat, N. H. C. (2022). The pretest for this study includes sending survey questionnaires via WhatsApp, TikTok, Instagram, and Facebook.

Reliability Test
According to Ahmad, N., Alias, F. A., Hamat, M., and Mohamed, S. A. (2024), Cronbach's Alpha was introduced by Lee Cronbach in 1951. It is an internal consistency coefficient that analyzes the extent to which test items measure the same underlying construct. The statistic is calculated by using the average of inter-item correlation, where a higher alpha value indicates greater correlations between items. High Cronbach's Alpha indicates that the instrument's items are closely linked and effectively assess the same construct, which is critical to the validity of the research findings. Table 4 summarizes the recommended levels of reliability based on Nunnally's rules of thumb.

RESULT AND ANALYSIS

This chapter will cover the research findings on how product attributes, pricing, and advertising affect customer preferences for burgers. SPSS will be used to analyze all respondents' answers to meet this research's objectives. 119 respondents completed a questionnaire to obtain all data. Multiple analyses were used to meet this research's objectives.

Data Screening

All 119 responders went to Woodfire, McDonald's, and Burger King after the distribution and collection process, resulting in 100% success. The respondent who had never eaten at any of these burger establishments was disqualified from the survey. SPSS and Excel were used to screen responses for validity and reliability.

Respondent Profile Analysis

The respondent profile summarizes the demographic and socioeconomic characteristics of the 119 research respondents. The data was evaluated using frequency and percentages to show respondents' age, ethnicity, gender, citizenship, education, occupation, income, and how they discovered burger restaurants. These insights are crucial to understanding the sample structure and how demographic factors may affect Woodfire, McDonald's, and Burger King burger preferences.

Demographics

Among the 119 respondents, Generation Z (born 1995–2012) scored 55.5% (66 respondents), followed by Millennials, born 1980–1994, at 35.3% (42 respondents). Generation X, born 1965–1979, scored 7.6% (9 respondents) and Baby Boomers, born 1946–1964, scored 1.75% (2 respondents). Based on ethnicity, Malay is the most common ethnicity, scored 79% (94 respondents), followed by Indian, scored 11.8% (14 respondents), and Chinese, scored 9.2% (11 respondents). Additionally, 57.1% (68 respondents) are female, while 42.9% (51 respondents) are male. All of the research respondents are Malaysian. The majority of respondents are degree holders (63.9%, 76 respondents), followed by Diploma holders (20.2%, 24 respondents), Ph.D. holders (9, 7.6%), Master's Degree holders (5, 4.2%), and School Leavers (3, 2.5%). The Foundation and College holders have 1 respondent (0.8%) apiece. Private sector workers make up 58% of the 119 respondents. Student responders were 14.3% (7 respondents), and government servants were 21% (25 respondents). Only 2.5% (3 responders) are retirees, while 4.2% (5 respondents) are self-employed. And lastly, 61.3% (73 respondents) are from the B40 (less than RM 5,249) income range, followed by 33.6% (40 respondents) from the M40 (RM 5,250 to RM 11,819) range. The T20 income level (RM 11,820 and above) had the fewest respondents, 5% (6 respondents).

How Respondents First Discovered Wood Fire?

The first discovery regarding Woodfire shows that 56 respondents (47.1%) learned about Woodfire from a friend, followed by 50 (42%), who learned about it from social media. About 6 responders (5%) learned about Woodfire from family. 4 respondents (3.4%) heard about Woodfire from coworkers, neighbors, or others (Sutriani, M., & Ramli, A. H., 2024). Only 2 respondents (1.7%) discovered Woodfire's through intergenerational influence, either from their young or old family members (Makowska M, Boguszewski R, Hrehorowicz A., 2024).

One respondent (0.8%) discovered Woodfire's from their first walk-in store.

How Respondents First Discovered McDonald's?
The first discovery of McDonald's was through early food exposure for 29 respondents (24.4%), who have eaten the brand since childhood (Małachowska A, Jeżewska-Zychowicz M, 2021). The second discovery was through social media for 24 respondents (20.2%). The TV commercial introduced McDonald's to 19 respondents (16%). In addition, 12 respondents (10.1%) first tried McDonald's as students. Additionally, 9 respondents (7.6%) learned about McDonald's from a friend. Due to proximity (nearby), 8 respondents (6.7%) discovered McDonald's. Intergenerational influence occurred with 6 respondents (5%), where respondents were influenced by younger family members (sons, daughters, or anyone younger than them) or older generations (mother, father, or anyone older than them) (Makowska M, Boguszewski R, Hrehorowicz A., 2024), and 5 respondents (4.2%) discovered McDonald's for the first time through their impression of the walk-in. Other than that, 3 respondents (2.5%) said their family introduced them to McDonald's. Finally, 2 respondents (1.7%) discovered McDonald's through word-of-mouth and billboard highway or roadside signs.

How Respondents First Discovered Burger King?
Burger King was first noticed by 19 respondents (16%) through friends and social media. Family Recommendation and intergenerational influence, where respondents were influenced by younger family members (sons, daughters, or anyone younger than them) or older generations (mother, father, or anyone older than them) (Makowska M, Boguszewski R, Hrehorowicz A., 2024), scoring the same amount of 14 respondents (11.8%) who learned about Burger King for the first time. Burger King was first encountered by 11 respondents (9.2%) as students. Followed by a TV commercial with 10 respondents (8.4%), and 9 respondents (7.6%) discovered Burger King through their walk-in store experience. Early food exposure (Małachowska A, Jeżewska-Zychowicz M, 2021) and proximity influence (7% each) were the main factors in 7 respondents each, discovering Burger King for the first time. Additionally, 6 responders (5%) found Burger King through billboard, highway, or roadside signs. The final three respondents (2.5%) learned about Burger King through word-of-mouth.

Reliability Test
The results analysis below demonstrates that all of the research variables for Woodfire, McDonald's, and Burger King are above the 0.60 range, indicating all items are above the "Poor" range. This indicates the variable items are correlated and the overall scale, providing evidence of their reliability as follows. And a group of 30 respondents from the pretest has been collected for the reliability analysis.

Woodfire
The reliability analysis for Woodfire items, product attributes, consists of 5 items, resulting in a Cronbach's Alpha of 0.808, which indicates strong internal consistency, according to Nunnally, J. C. (1978). Furthermore, the reliability test for Woodfire pricing consists of 3 items, resulting in the Cronbach's Alpha analysis of 0.741, indicating that it is an acceptable internal consistency, according to Nunnally, J. C. (1978). Lastly, for Woodfire promotion, the reliability analysis for this aspect consists of 12 items, which are divided into 3 sections (promotion strategy, customer action, and how the respondents discovered the restaurant for the first time),

resulting in 0.795 from Cronbach's Alpha, indicating the acceptable internal consistency, according to Nunnally, J. C. (1978).

McDonald's

The reliability analysis for McDonald's product attributes consists of 5 items, resulting in a Cronbach's Alpha of 0.833, which indicates strong internal consistency, according to Nunnally, J. C. (1978). Furthermore, the reliability test for McDonald's pricing consists of 3 items, resulting in the Cronbach's Alpha analysis of 0.705, indicating that it is acceptable internal consistency, according to Nunnally, J. C. (1978). Lastly, for McDonald's promotion, the reliability analysis for this aspect is consist of 12 items, which divide into 3 sections (promotion strategy, customer action, and how did the respondents discover the restaurant for the first time), resulting on 0.856 from the Cronbach's Alpha, indicates the strong internal consistency, according to Nunnally, J. C. (1978).

Burger King

The reliability analysis for Burger King product attributes consists of 5 items, resulting in a Cronbach's Alpha of 0.777, which indicates acceptable internal consistency, according to Nunnally, J. C. (1978). Furthermore, the reliability test for Burger King pricing consists of 3 items, resulting in the Cronbach's Alpha analysis of 0.793, indicating that it reflects strong internal consistency, according to Nunnally, J. C. (1978). Lastly for Burger King promotion, the reliability analysis for this aspect is consist of 12 items, which divide into three subdivisions; promotion strategy, customer action, and how did the respondents discover the restaurant for the first time, resulting on 0.633 from the Cronbach's Alpha, indicates the reflects question internal consistency, according to according to Nunnally, J. C. (1978). This can be caused by the combination of those three subdivisions: promotion strategy, customer action, and how the respondents discovered the restaurant for the first time, into a single construct, and also by the presence of the customer's first discovery, one weak item, which is not strongly related to the promotion strategy and customer action.

Descriptive Analysis

Woodfire's Product Attributes

According to the results for 5 product attributes, respondents evaluated the Wood Fire Product attributes as 'least preferred' to 'moderately preferred', with mean values ranging from 1.24 to 1.62 on a 3-point scale. The highest mean score is 1.62 for Wood Fire's menu. At 1.24, Wood Fire filling has the lowest mean of any product attribute. Other aspects, such as burger taste (1.35), sauce taste (1.34), and ingredient quality (1.33), are ranked 'moderately preferred'. Overall, Wood Fire menu variants are the most preferred attribute. On a 3-point scale, the SD is moderate at 0.563–0.823. This shows the responses are somewhat, but not significantly, spread out. The menu variety has the greatest SD score, 0.823, showing that respondents are more divided on it than on other aspects. Positive skewness values for all five product attributes showed that more respondents chose lower categories (near to least preferred) and fewer picked 'most preferred', corresponding to low means. Highly positive kurtosis analysis, especially for the Wood Fire burger filling, scoring 4.195, demonstrated that the responses were focused in one category, likely '1st' as the least favored, indicating that many respondents regularly rated this item low. Nevertheless, the menu variety's negative kurtosis analysis, -1.043, demonstrates

more equally distributed response scores across 3 categories and less concentration.

Woodfire's Pricing

The analysis for the three pricing categories that respondents ranked Wood Fire Pricing as 'least preferred' to 'mostly preferred' showed mean values ranging from 1.29 to 2.43 on a 3-point scale. Wood Fire's combo set price scored 2.43, followed by ala-carte burger price at 2.39, indicating that respondents agree that both prices are on the higher end of the 3-point scale, which is closer to most preferred. The Wood Fire perceived value has the lowest mean, 1.29. This suggests they are not greatly influencing respondents' purchase intentions. Overall, Wood Fire menu prices are the most preferred attribute. An SD of 0.616 to 0.846 is moderate on a 3-point scale. This indicates a moderate spread of responses. A la carte burgers have the greatest SD score, 0.846, showing that respondents have more varied opinions rather than the price set and the perceived value. The price of the burger set (-0.948) and à la carte (-0.860) had negative skewness values, indicating that more respondents chose the highest of the 3-point-scale (near to most preferred) and fewer chose 'least preferred', which corresponded to the high means. However, the perceived value (1.941) has positive skewness values, indicating that more respondents chose the lowest of the 3-point scale (close to least preferred) and fewer chose 'most preferred', which corresponds to low means. Kurtosis analysis showed that responses were more spread out and less peaked around 1 category from the 3-point scale, especially for the price of a set burger, scoring -0.871, and the price of an à la carte burger, scoring -1.050. The perceived value had a positive kurtosis of 2.458 and was more concentrated near one category, generally near the 1st as least favored, indicating that respondents rated it poorly.

Woodfire's Promotion Strategies

After analysing these 8 promotion items, respondents ranked Wood Fire promotion from 'least preferred' to 'mostly preferred', with mean values ranging from 1.35 to 2.35 on a 3-point scale. The highest mean score of 2.35 goes to Woodfire's ad frequency, indicating that respondents think they've seen enough advertising to like the business. Following that, Woodfire's media suitability (social media posts, video ads, posters, etc.) to promote their burger menu and the advertisement channel's suitability to introduce their new menu scored 2.18, the attractiveness of their advertisement scored 2.14, and how well they used TikTok, Instagram, Facebook, etc. to promote all of their menus scored 2.02. This shows that respondents approve of the medium and delivery. Advertisement persuasiveness may be improved. In contrast, the encouragement of social media content to persuade to purchase scored 1.86, how much respondents were influenced by social media reviews of the burger menu scored 1.61, and how positively people around respondents described the menu (word-of-mouth) scored 1.35. They do not greatly influence respondents' purchase intentions. On a 3-point scale, the SD is moderate at 0.696–0.830. This shows the responses are somewhat, but not significantly, spread out. Media suitability (social media postings, video ads, posters, etc.) has the highest SD score, 0.830, indicating that respondents have more varied opinions about it than other items.

The frequency of ads (-0.710), media suitability (social media posts, video ads, posters, etc.) (-0.342), the advertisement channel's suitability to introduce new menu (-0.306), Woodfire's advertisement's attractiveness (-0.235), and the promotion medium's effectiveness in introducing all menu items (-0.030) all had negative skewness values, indicating that more respondents chose the highest of the 3 point-scale. In contrast, the encouragement of social

media content to persuade to purchase (0.273), influenced by social media reviews of the burger menu (0.824), and positive word of mouth about the burger menu (1.692) have positive skewness values, indicating that more respondents chose the lowest of the 3-point-scale (near to least preferred) and fewer picked 'most preferred', which corresponded to the low means. In terms of kurtosis analysis, the frequency of ads (-0.984), media suitability to advertise the menu (-1.468), suitability of the advertising channel to introduce new menu (-1.183), attractiveness of the advertisement (-1.132), effectiveness of the promotion medium to introduce all of the menu (-1.399), and encouragement of social media content to persuade to purchase the menu, positive word of mouth had a positive kurtosis, rating 1.249, and was concentrated near one category, often near the 1st as least favoured, indicating that respondents rated this item poorly.

\\Woodfire's Customer Action

According to the analysis of the three customer action items, more frequent visits have the greatest mean score of 1.61, followed by promoting Woodfire to others (1.41) and bringing loved ones (1.31). From here, respondents are less likely to return, suggest, and introduce loved ones to Woodfire. On a 3-point scale, the SD is moderate at 0.661–0.845. This shows the responses are somewhat, but not significantly, spread out. The revisit to Woodfire has the greatest SD score, 0.845, indicating that respondents have more mixed opinions about it compared to recommendations and bring love ones. According to skewness analysis, revisiting Woodfire (0.837), recommending it to others (1.444), and bringing loved ones (1.895) all have positive skewness values, indicating that more respondents chose the lowest of the 3-point scale (near to least preferred) and fewer chose 'most preferred', corresponding to the low means. Kurtosis analysis shows that only Woodfire revisits scored -1.076. Responses were more spread out and less concentrated around one 3-point scale category. Positive kurtosis values indicate that respondents rated Woodfire poorly, as it was consistently near the 1st as least preferred. Recommending Woodfire to others scored 0.460, and bringing loved ones scored 2.034.

McDonald's Product Attributes

McDonald's 5 product qualities were scored from 'moderately preferred' to 'mostly preferred' on a 3-point scale. At 2.58, fast food fillings scored highest. McDonald's menu variants have the lowest other product attribute mean, 1.92. Ingredient quality (2.48), burger taste (2.26), and sauce taste (2.19) are 'moderately preferred' by respondents. The most preferred feature is McDonald's burger filling. Standard deviation (SD) is modest on a 3-point scale at 0.617–0.783. The responses appear to be quite dispersed. McDonald's menu variants have the highest SD score, 0.783, indicating responses are more divided on them than on other features. The skewness values of McDonald's burger filling (-1.188), quality of the ingredients (-1.035), taste of the burger (-0.381), and taste of the sauces (-0.169) were negative, indicating that more respondents chose highest of the 3-point-scale (near to most preferred) and fewer chose 'least preferred' corresponding with the high means. The McDonald's menu variety, score 0.134, shows positive skewness values, meaning that more respondents chose the lowest 3-point scale (near to least favored) and fewer chose 'most desired', which matched the low mean. Ingredient quality scored -0.377, burger tasted -0.826, sauce tasted -0.549, and McDonald's menu variety scored -1.350, according to Kurtosis. This indicates a wider range of responses than one 3-point scale category. The only preferred item was McDonald's burger filling, which received 0.362, suggesting that most respondents placed it as their most preferred.

McDonald's Pricing

The three McDonald's pricing items scored from "Moderately Preferred" to "Mostly Preferred" on a 3-point scale. A mean value of 1.53 to 2.54 was identified. McDonald's perceived value has the greatest mean of 2.54, indicating that respondents are more likely to agree that it is "Most Preferred". McDonald's ala carte and set burger prices have means of 1.57 and 1.53, this suggests they are not driving customer purchase intention. Thus, McDonald's perceived value is the most chosen attribute among set and ala carte burger prices. On a 3-point scale, the SD is moderate at 0.674–0.765. The responses appear to be quite spread. A la carte burgers get the highest SD score, 0.765, showing that respondents have more varied opinions about the price than the price set and the perceived value. Only one McDonald pricing item, its perceived value (-1.154), exhibited negative skewness values, indicating that more respondents chose the high end of the 3-point scale (close to most preferred) and fewer chose 'least preferred', which corresponded to the high means. McDonald's ala carte burger (0.908) and set burger (1.006) show positive skewness values, indicating that more respondents chose the low end of the 3-point-scale (close to least preferred) and fewer chose 'most preferred', which matched the low means. Kurtosis analysis showed that the results were more spread out and less peaked around 1 category on the 3-point scale, especially for the price of à la carte and set combo burgers, which scored -0.693 and -0.422, respectively. A positive kurtosis of 0.087 and concentration near one category, usually the most preferred, indicated that respondents valued the McDonald's burger highly.

McDonald's Promotion Strategies

These 8 promotion items showed that respondents ranked McDonald's promotion from 'least preferred' to 'moderately preferred', with mean values ranging from 1.37 to 2.06 on a 3-point scale. McDonald's burger menu's positive word-of-mouth scores the highest at 2.06, indicating that respondents receive a lot of positive recommendations, which influences their brand preference. On the other hand, the influence of social media reviews scored a mean of 1.96. Followed by social media content's ability to persuade to purchase (1.69) and McDonald's promotion medium (TikTok, Instagram, Facebook, etc.) to offer their menu (1.48). The media suitability (social media posts, video ads, posters, etc.) to advertise their burger menu scored a mean of 1.44, followed by the advertising channel's suitability to introduce McDonald's new menu (1.43), the frequency of McDonald's ads (1.38), and the ads' attractiveness (1.37). This suggests they are not greatly influencing respondents' purchase intentions. On a 3-point scale, the SD is moderate at 0.649–0.775. This shows the responses are somewhat, but not significantly, spread out. The greatest SD, 0.775, goes to the influence of social media reviews, showing that respondents have a more conflicted opinion about this feature than other attributes.

The only promotional item with negative skewness was positive word-of-mouth (-0.067). This means that more people chose the high end of the 3-point scale (mostly preferred), which is in line with its higher mean. In contrast, social media reviews (0.073), persuasive social media content (0.599), effectiveness of using TikTok/Instagram/Facebook to introduce the menu (1.153), media suitability (1.316), new-menu advertising channels (1.334), ad attractiveness (1.538), and ad frequency (1.558) all had positive skewness. This means that more people chose the lowest category, and these items were the least preferred overall. For kurtosis, positive word-of-mouth (-0.723), the influence of social media reviews (-1.321), encouragement from social media content (-1.056), and the effectiveness of promotion media (-0.070) all showed

negative kurtosis. This means that the responses were more spread out and less peaked around one category. At the same time, media suitability (0.269), the suitability of new-menu advertising channels (0.367), ad frequency (0.931), and ad attractiveness (1.078) all exhibited positive kurtosis. This means that responses were concentrated around the "least preferred" choice, which means that these parts of McDonald's advertising were not well received.

McDonald's Customer Action

For the three customer action items, respondents ranked their actions on a 3-point scale from "least preferred" to "mostly preferred," with mean values between 2.13 and 2.35. The highest mean score (2.35) was for bringing loved ones to McDonald's, followed by recommending McDonald's to others (2.31) and revisiting McDonald's (2.13). This means that respondents are most motivated to bring loved ones, slightly less motivated to recommend, and to revisit, but all actions are still positively motivated overall. The standard deviation (SD) is between 0.659 and 0.736, which is seen as moderate on a 3-point scale. This means the responses are somewhat spread out, but not extremely so. Bringing loved ones has the highest standard deviation at 0.736, showing that people have more varied opinions compared to revisiting or recommending to others. In terms of skewness analysis, the customer actions of bringing loved ones to McDonald (-0.526), recommending to others (-0.548), and revisiting (-0.217) all have negative skewness values, indicating that more respondents chose the high end of the 3-point scale (near to most preferred), with fewer picking "least preferred," which corresponded to the high means. In terms of kurtosis analysis, the customer actions of bringing loved ones to McDonald's (-0.684), recommending to others (-0.911), and revisiting McDonald's (-1.115) all have negative kurtosis values, indicating that responses were more spread out and less peaked around 1 category from the 3-point scale.

Burger King Product Attributes

Five Burger King product attributes were scored from 'moderately preferred' to 'mostly preferred' on a 3-point scale, with mean values ranging from 2.15 to 2.44. Burger King sauce has the highest mean score of 2.44. Burger King's menu variety scored a mean score of 2.40, the taste of the burger 2.35, and the quality of the ingredients and filling 2.15. The taste of Burger King's sauce is the most preferred attribute. All these features enhance customer preference for Burger King's burgers. Burger King's product attributes have a moderate SD of 0.547 to 0.721 on a 3-point scale. This shows spread-out responses, indicating different opinions but not extremely so. Burger King's sauce has the highest SD score of 0.721, indicating that respondents have more mixed opinions about it than other attributes. Only Burger King's ingredient quality earned 0.129 in skewness analysis, showing that respondents leaned toward the lowest of the 3-point scale, near "least preferred", correlating to the low mean results. The filling of Burger King's burger scored -0.107, followed by the taste, variety, and sauce, which scored -0.607, -0.608, and - 0.881, respectively, indicating that respondents leaned toward the highest of the three-point scale, which is close to "most preferred", which corresponded to the high means. Burger King's filling (-0.443), sauces (-0.554), menu variation (-0.586), and burger taste (-0.762) all had negative kurtosis values, indicating that responses were more spread out and less concentrated around a single category from the 3-point scale. Only Burger King's burger quality (0.129) has a positive kurtosis value, indicating more responses to "moderately preferred".

Burger King Pricing

Three items for Burger King's price; Burger King's perceived value has the highest mean with a score of 2.13, indicating that respondents are more likely to agree that this brand's perceived value is moderately high, close to "Moderately Preferred". Next are Burger King's à la carte (2.02) and set burger (2.01). Thus, Burger King's perceived value is the most preferred attribute, but still in the "moderately preferred" area on the 3-point scale. Pricing items' SD ranged from 0.575 to 0.596, which is moderate on a 3-point scale. This shows that responses are spread out but not extreme. The items with the greatest SD score are Burger King's ala carte burgers (0.596), showing that respondents have different opinions about the ala carte than the price set and perceived value. Two Burger King pricing items, Burger King's perceived value (-0.033) and the price of its à la carte burgers (-0.005), have negative skewness, indicating that more respondents chose the high end of the 3-point scale, which is close to "most preferred," which corresponded with the high means. However, Burger King's burger set pricing has a positive skewness (0.001), indicating that more respondents lean slightly toward the low end of the 3-point scale, near "least preferred," which corresponds to the low means. Two of Burger King's pricing items have negative kurtosis: its perceived value (-0.180) and its à la carte burger price (-0.121), indicating that responses were more spread out and less concentrated around a single 3-point scale category. The pricing set of Burger King's burger exhibits positive kurtosis, score 0.106, indicating that responses are more concentrated around a single category, generally "least preferred."

Burger King Promotion Strategies

Among eight items for Burger King's promotion strategy, the positivity of word-of-mouth has the highest mean value of 2.55, demonstrating that respondents receive many favorable comments about Burger King's burger menu, which influences their brand choice. The effectiveness of Burger King's advertising medium (TikTok, Instagram, Facebook, etc.) to introduce the entire menu received a mean score of 2.47, followed by online reviews and ad attractiveness, both of which received 2.45. Burger King's advertising channel's suitability to introduce new menus (2.43), social media content's encouragement to persuade purchase (2.39), and the frequency and media suitability (social media posts, video ads, or posters) to advertise their menu (2.29 each). From here, respondents are more inclined to buy the Burger King menu owing to positive word-of-mouth than other marketing items, but they still support the moderate to high range of the 3-point scale. On a 3-point scale, the SD is moderate at 0.579–0.692. It appears that the responses are somewhat distributed. Burger King's social media content to persuade purchase had the highest SD, 0.692, indicating more mixed opinions than other items. In terms of skewness analysis, all of Burger King's promotion strategies have negative values, indicating that most respondents chose the higher category of the 3-point scale (near to "most preferred"), which is consistent with the high mean. In particular, the positive word-of-mouth score of -1.042 indicates that respondents preferred Burger King more because of the positive word-of-mouth. Burger King's promotion strategy's 7 items had negative kurtosis values: the effectiveness of Burger King's promotion medium (TikTok, Instagram, Facebook, etc.) to introduce all menu items, -0.465; the influence of social media reviews, -0.697; and the attractiveness of Burger King's ads, -0.461. Next, the Burger King advertising channel's suitability to debut a new menu rated -0.532, and Burger King's social media content's motivation to purchase scored -0.651. Burger King's ad frequency comes next with -0.582. Burger King's ability to make known their menu through social media posts, videos, and posters

is rated -0.558. This means 3-point scale responses are more evenly distributed and less concentrated on one category. Burger King's only promotion plan item with a positive kurtosis value is positive word-of-mouth, scoring 0.054. This shows that responders are concentrated "mostly preferred", indicating high ratings.

Burger King Customer Action

The highest mean score for customer actions was 2.34 for bringing loved ones to Burger King, followed by 2.27 for recommending Burger King to others and 2.21 for revisits. These findings suggest that respondents are more likely to bring their loved ones to Burger King based on their Burger King experience, to influence their restaurant burger preferences.

Burger King's customer action standard deviation was moderate (0.641–0.735) on a 3-point scale. This indicates more spread-out, but not excessive, responses. Customer action to revisit scored the highest (0.735), indicating that respondents have more mixed opinions about it than other items. Skewness analysis shows that all of Burger King's customer action items have negative values, indicating that most respondents chose the higher category of the 3-point scale, close to "most preferred," which is consistent with the highest mean statistics of the items. Bringing loved ones have highest negative skewness (-0.440), indicating that many respondents ranked this item at the upper end of the 3-point scale, implying they would bring their loved ones based on their Burger King experience to influence their restaurant burger preferences. All of Burger King's customer items have negative kurtosis values, including bringing loved ones (-0.672), recommending (-0.787), and revisiting (-1.075). The responses were spread out rather than concentrated around a single 3-point scale category.

Chi-Square Analysis

Age Range and Woodfire

The P-value of the age range and Woodfire's product attributes is 0.282, which is not significant due to its P-value above 0.05. This shows there is no relationship between the age range and the product attributes of Woodfire that influence customer preferences towards burgers. Moreover, the p-value of age range and Woodfire's pricing is 0.044, which is significant due to its P-value's below 0.05. This shows there are relationship between the age range and the pricing of Woodfire that influences customer preferences towards burgers. And lastly, the p-value of age range and Woodfire's promotion is 0.848, which is not significant due to its P-value's above 0.05. This indicates that there is no relationship between age range and the promotion of Woodfire that influences customer preferences towards burgers.

Age Range and McDonald's

The P-value of the age range and McDonald's product attributes is 0.500, which is not significant due to its p-value being above 0.05. This shows there is no relationship between age range and the product attributes of McDonald's that influence customer preferences towards burgers. Moreover, The P-value of the age range and McDonald's pricing is 0.259, which is not significant due to its p-value being above 0.05. This shows there is no relationship between age range and the pricing of McDonald's that influences customer preferences towards burgers. Lastly, the P-value of the age range and McDonald's promotion is 0.003, which is significant due to its p-value being below 0.05. This shows there is a relationship between age range and the promotion of McDonald's that influences customer preferences towards burgers.

Age Range and Burger King

The P-value of the age range and Burger King's product attributes is 0.118, which is not significant due to its p-value being above 0.05. This shows there is no relationship between the age range and product attributes of Burger King that influence customer preferences towards burgers. Moreover, the p-value of the age range and Burger King's pricing is 0.862, which is not significant due to its p-value being above 0.05. This indicates that there is no relationship between the age range and Burger King pricing that influences customer preferences towards burgers. Lastly, the p-value of the age range and Burger King's promotion is 0.555, which is not significant due to its p-value being above 0.05. This shows there is no relationship between age range and Burger King's promotion that influences customer preferences towards burgers.

Income Range and Woodfire

The P-value of the income range and Woodfire's product attributes is 0.060, which is not significant due to its P-value being above 0.05. This shows there is no relationship between the income range and product attributes of Woodfire that influence customer preferences towards burgers. Moreover, the P-value of the income range and Woodfire's pricing is 0.046, which is significant due to its p-value being below 0.05. This shows there are relationship between the income range and pricing of Woodfire that influences customer preferences towards the burger. Lastly, The P-value of the income range and Woodfire's promotion is 0.688, which is not significant due to its p-value being above 0.05. This shows there is no relationship between the income range and the promotion of Woodfire that influences customer preferences towards burgers.

Income Range and McDonald's

The P-value of the income range and McDonald's product attributes is 0.381, which is not significant due to its P-value being above 0.05. This shows there is no relationship between the income range and the product attributes of McDonald's that influence customer preferences towards burgers. Moreover, the P-value of the income range and McDonald's pricing is 0.720, which is not significant due to the P-value being above 0.05. This shows there is no relationship between the income range and the pricing of McDonald's that influences customer preferences towards burgers. Lastly, the P-value of the income range and McDonald's promotion is 0.606, which is not significant due to the P-value being above 0.05. This shows there is no relationship between income range and the promotion of McDonald's that influences customer preferences towards burgers.

Income Range and Burger King

The P-value of the income range and Burger King's product attributes is 0.474, which is not significant due to the P-value being above 0.05. This shows there is no relationship between the income range and the product attributes of Burger King that influence customer preferences towards burgers. Moreover, the P-value of the income range and Burger King's pricing is 0.077, which is not significant due to the P-value being above 0.05. This shows there is no relationship between income range and the pricing of Burger King that influences customer preferences towards burgers. Lastly, the P-value of the income range and Burger King's promotion is 0.097, which is not significant due to the P-value being above 0.05. This shows there is no relationship between the income range and the promotion of Burger King that influences customer

preferences towards burgers.

Ethnicity and Woodfire

The P-value of the ethnicity and Woodfire's product attributes is 0.703, which is not significant due to the P-value being above 0.05. This shows there is no significant relationship between the ethnicity (race) and Woodfire's product attributes that influence customer preferences towards the burger. Moreover, the P-value of the ethnicity and Woodfire's pricing is 0.099, which is above the p-value (0.05), and this indicates that it is not significant. This shows no relationship between ethnicity and Woodfire pricing influences customer preferences towards the burger. Lastly, the P-value of the ethnicity and Woodfire's promotion is 0.810, which is above the p-value (0.05), and this indicates that it is not significant. This shows there is no significant relationship between ethnicity and Woodfire promotion that influences customer preferences towards burgers.

Ethnicity and McDonald's

The P-value of the Ethnicity and McDonald's product attributes is 0.032, which is below the p-value (0.05), and this indicates that it is significant. This indicates that there is a significant relationship between ethnicity and McDonald's product attributes that influences customer preferences towards burgers. Moreover, the P-value of the ethnicity and McDonald's pricing is 0.704, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between ethnicity and McDonald's pricing that influences the customer preferences towards burgers. Lastly, the P-value of the ethnicity and McDonald's promotion is 0.858, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between ethnicity and McDonald's promotion that influences the customer preferences towards burgers.

Ethnicity and Burger King's

The P-value of the ethnicity and Burger King's product attributes is 0.021, which is below the p-value (0.05), and this indicates that it is significant. This indicates that there is a significant relationship between ethnicity and Burger King's product attributes that influence customer preferences towards burgers. Moreover, the P-value of the ethnicity and Burger King's pricing is 0.779, which is above the p-value (0.05), indicating that it is not significant.
This shows there is no relationship between ethnicity and Burger King's pricing that influences the customer preferences towards burgers. Lastly, the P-value of the ethnicity and Burger King's promotion is 0.854, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between ethnicity and Burger King's promotion that influences the customer preferences towards burgers.

Education Level and Woodfire

The P-value of the education level and Woodfire's product attributes is 0.022, which is below the p-value (0.05), and this indicates that it is significant. This indicates that there is a significant relationship between the Education Level and Woodfire's Product Attributes that influence customer preferences towards burgers. Moreover, the P-value of the education level and Woodfire's pricing is 0.196, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between Education Level and Woodfire's Pricing that influences the customer preferences towards the burger. Lastly, the P-value of the

education level and Woodfire's promotion is 0.105, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between Education Level and Woodfire's Promotion that influences the customer preferences towards burgers.

Education Level and McDonald's
The P-value of the education level and McDonald's product attributes is 0.171, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between education level and McDonald's product attributes that influences the customer preferences towards burgers. Moreover, the P-value of the education level and McDonald's pricing is 0.456, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between education level and McDonald's pricing that influences the customer preferences towards burgers. Lastly, the P-value of the education level and McDonald's promotion is 0.705, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between education level and McDonald's promotion that influences the customer preferences towards burgers.

Education Level and Burger King
The P-value of the education level and Burger King's product attributes is 0.074, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between education level and Burger King's product attributes that influence the customer preferences towards burgers. Moreover, the P-value of the education level and Burger King's pricing is 0.547, which is above the p-value (0.05), indicating that it is not significant. This shows there is no relationship between education level and Burger King's pricing that influences the customer preferences towards burgers. Lastly, the P-value of the education level and Burger King's promotion is 0.005, which is below the p-value (0.05), and this indicates that it is significant. This indicates that there are significant relationship between education level and Burger King's promotion that influences customer preferences towards burgers.

Hypothesis Summary
In summary, only 7 of the 36 hypotheses are significant and supported: respondents preferred Woodfire's because of their pricing based on respondent age range (H2 (a)) and respondent income range (H2 (d)), and respondents preferred McDonald's because of their promotion strategy based on respondents' age range (H3 (b)). Aside from that, the respondent preferred McDonald's (H1 (h)) and Burger King's (H1 (i)) product attributes based on respondents' ethnicity (race), while respondents preferred Woodfire's product attributes based on respondents' education level (H1 (j)). And lastly, respondents preferred Burger King because of their promotion strategies based on the respondents' education level (H3 (l)).

DISCUSSION
This chapter concludes the research by comparing the hypothesis to the findings. This study examines whether product qualities, pricing, and promotion lead to revisits, recommendations, and bringing loved ones, which affect customer preferences for Woodfire, McDonald's, and Burger King burgers. This discussion analyzes hypothesis relationships and their effects on burger buyer choices.

Research Objective 1

Woodfire's product attributes are moderately preferred overall, with menu varieties having the highest mean (1.64) and burger filling the lowest (1.24), while skewness and kurtosis show that burger filling ratings are strongly concentrated in the least preferred category. Even though its gourmet variety and uniqueness distinguish it, Woodfire is not consistently chosen as the first preference compared to McDonald's and Burger King in customer actions (revisit, recommend, bring loved ones). The analysis demonstrates that McDonald's and Burger King product features are associated with consumer preferences by ethnicity, whereas Woodfire's are significant by education level. Research Objective 1 is partially met: Woodfire's menu variety is a strength, although it doesn't exceed McDonald's and Burger King on all product items.

Research Objective 2

Chapter 4 shows that Woodfire's pricing items are mostly preferred, with the combo set price having the highest mean (2.43) and à la carte price (2.39) on a 3-point scale, outperforming McDonald's and Burger King. Though perceived value has a lower mean (1.29) with high skewness and kurtosis, many respondents rank it near "least preferred," indicating they rarely pay Woodfire's prices and do not consider them a good value. Chi-square results reveal Woodfire's pricing is significantly correlated with customer preferences by age and income, while McDonald's and Burger King have no significant correlations. This suggests Woodfire's pricing is more sensitive among B40 and certain age groups, while McDonald's and Burger King are perceived as more affordable. Thus, Research Objective 2 is supported: pricing influences value and affordability, and Woodfire's pricing positions the brand as an occasional treat rather than a frequent alternative to McDonald's and Burger King.

Research Objective 3

Chapter 4 shows that Woodfire's core promotional items—ad appearance frequency, media and channel suitability, ad attractiveness, and online platform effectiveness—are rated between "moderately preferred" and "mostly preferred," with means from 2.02 to 2.35, indicating respondents generally view its social media use as appropriate but still improvable in persuasiveness Encouragement of social media posts (1.86), online reviews (1.61), and favorable word-of-mouth (1.35) have the lowest means, demonstrating they barely influence purchase intention. Negative skewness and kurtosis for the main promotion items show that many respondents regard Woodfire's ad frequency, media/channel compatibility, attractiveness, and platform efficacy as "most preferred," with responses dispersed across categories. Positive skewness and kurtosis demonstrate that content, online reviews, and word-of-mouth are generally rated "least preferred" and more peaked, making them weak drivers. Promotion, especially social media exposure, shapes preferences and intentions, but online reviews and word-of-mouth are not strong drivers, and Woodfire's reach still lags behind McDonald's and Burger King.

Research Implication

This research affects academic research, Woodfire's practice, and the local burger and food sector, notably customer preferences. The results show that product attributes, pricing, and promotional elements influence customer preferences in the Quick Service Restaurants (QSR) and gourmet burger sectors differently from demographic factors like age, income, education, ethnicity, and occupation. The study found that a 3-point scale and brand comparisons can

discern customer quality preferences among Woodfire, McDonald's, and Burger King, giving a useful measurement approach for future QSR investigations. Woodfire's practical consequences include enhancing the burger stuffing and balancing the sauces while retaining a wide menu. Customers only modestly like these value-creating traits. Refocus the pricing strategy on value rather than menu prices. In the analysis, respondents accept combo and à la carte pricing, but value for money is inadequate, especially among B40 respondents and certain age groupings. Value communication must improve. They should continue to promote via social media and other avenues, which have worked successfully. If Woodfire wants to raise revisit rates, referrals, and plans to invite family, it must improve social media content, online reviews, and word of mouth. Finally, the product qualities, price, and promotion plan framework and questionnaire can be used by local burger and food enterprises to compare themselves to McDonald's and Burger King. This technique helps them determine which product qualities, pricing, and promotion strategies position them as a regular option for customers rather than a treat.

Research Limitation

This study had two main limitations. The study used non-probability purposive sampling, focusing only on respondents who had dined at the selected restaurants, particularly Woodfire Burger. Therefore, the findings may not be generalizable to all burger restaurants or the wider population of burger consumers, as few have tried Woodfire. The use of a 3-point Likert scale limited precision and reliability by grouping responses into broad categories (1st = most preferred, 2nd = moderately preferred, 3rd = least preferred). This reduced detail may not fully capture genuine opinions, and makes it difficult to distinguish between strong and mild preferences, potentially weakening the statistical power of the analysis.

Future Research Recommendations

Here are two main suggestions to tackle these issues. Future studies should use probability sampling so that everyone in the population has a fair chance of being selected. This will help make the results more representative and allow for better generalization beyond just current Woodfire customers. This would allow us to compare people who have tried Woodfire with those who haven't. By using stratified sampling based on factors like age, income, occupation, and education, we can make sure every group is represented, which will help us draw more accurate conclusions. Next, it's recommended that future research use a 5-point (or higher) Likert scale. This format strikes a nice balance between detail and comfort for respondents, has a clear neutral option, and is commonly used in quantitative studies. A 5-point scale offers a good balance for measuring data, allowing for more advanced statistics without overwhelming users as larger scales can. Research shows it produces reliable and valid results when the data is normal, and there are enough response options.

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TEKNOLOGI DIGITAL DAN PENGURUSAN PRESTASI DALAM SEKTOR AWAM

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ABSTRACT

Kemajuan pesat teknologi digital telah membawa perubahan ketara terhadap amalan pengurusan dalam sektor awam dan swasta. Seiring dengan agenda transformasi digital kerajaan, organisasi sektor awam di Malaysia semakin mengadaptasi teknologi digital bagi meningkatkan kecekapan, ketelusan dan akauntabiliti, khususnya dalam aspek pengurusan prestasi. Kajian ini bertujuan mengkaji pengaruh teknologi digital terhadap pengurusan prestasi dalam sektor awam di Malaysia. Objektif kajian adalah untuk menilai keberkesanan teknologi digital dalam memperkukuh pengurusan prestasi, mengenal pasti cabaran pelaksanaannya serta menganalisis sumbangannya terhadap keberkesanan organisasi.Kajian ini menggunakan pendekatan kaedah campuran (mixed-method) yang melibatkan pengumpulan data kuantitatif melalui soal selidik dan data kualitatif melalui temu bual separa berstruktur. Dapatan kajian menunjukkan bahawa teknologi digital memberi kesan positif terhadap pengurusan prestasi melalui peningkatan ketepatan data, pemantauan prestasi secara masa nyata dan sokongan kepada pembuatan keputusan berasaskan data. Walau bagaimanapun, pelaksanaan teknologi digital masih berdepan cabaran seperti kekurangan kemahiran digital, rintangan perubahan dan isu keselamatan data. Kajian ini diharapkan dapat menyumbang kepada penambahbaikan amalan pengurusan prestasi sektor awam serta menjadi rujukan kepada pembuat dasar dan pengurusan organisasi

Keywords: peningkatan ketepatan data, pemantauan prestasi secara masa nyata, pembuatan keputusan berasaskan data

PENGENALAN

Dalam sektor awam, teknologi digital kini semakin banyak digunakan untuk meningkatkan kecekapan, produktiviti, dan prestasi. Sistem pengurusan prestasi berasaskan digital, seperti aplikasi mudah alih, platform analitik, dan sistem automasi, telah menjadi alat yang penting dalam usaha untuk menilai dan memperbaiki prestasi pekerja serta mencapai matlamat organisasi dengan lebih cekap. Penggunaan teknologi ini mencerminkan keperluan untuk menyesuaikan proses pengurusan dengan perubahan teknologi yang berlaku di peringkat global (Hao et al., 2019; Nguyen, 2021). Pengurusan prestasi merupakan satu proses penting dalam sektor awam yang bertujuan untuk menilai pencapaian pekerja, memberikan maklum balas, dan membangun potensi pekerja ke tahap yang lebih tinggi. Dengan wujudnya teknologi digital, proses ini kini dapat dijalankan dengan lebih sistematik melalui pengumpulan data secara automatik, pemantauan masa nyata, dan analisis data yang lebih mendalam. Ini bukan sahaja mempercepatkan proses penilaian prestasi, tetapi juga meningkatkan keadilan dan ketelusan dalam penilaian tersebut. Sebagai contoh, platform digital boleh menyediakan maklumat prestasi yang objektif, membolehkan pekerja memahami dengan lebih jelas kekuatan dan kelemahan mereka serta langkah yang perlu diambil untuk memperbaiki prestasi

mereka (Rajendran et al., 2019; Wahab et al., 2021). Walaupun teknologi digital memberikan banyak manfaat, pelaksanaannya dalam sektor awam sering menghadapi pelbagai cabaran. Antaranya ialah tahap literasi digital yang rendah dalam kalangan pekerja, kekangan kewangan untuk menyediakan infrastruktur yang diperlukan, dan kurangnya pengetahuan mengenai teknologi yang sesuai untuk pengurusan prestasi. Tambahan pula, organisasi sering menghadapi kesukaran dalam mengubah budaya kerja yang sedia ada untuk menerima pendekatan baharu yang menggunakan teknologi (Moorthy et al., 2021). Hal ini menyebabkan ramai pekerja dan pengurus kurang yakin terhadap keberkesanan teknologi digital dalam memperbaiki pengurusan prestasi. Berikut merupakan objektif kajian bagi kajian ini:

Objektif Kajian
1.   Menilai tahap pengaruh teknologi digital terhadap pengurusan prestasi dalam organisasi awam.
2.   Mengenal pasti cabaran utama yang dihadapi oleh organisasi awam dalam pelaksanaan teknologi digital untuk pengurusan prestasi.
3.   Mengukur manfaat teknologi digital terhadap produktiviti pekerja dan keberkesanan organisasi.
4.   Mengemukakan cadangan strategik untuk meningkatkan keberkesanan penggunaan teknologi digital dalam pengurusan prestasi

KAJIAN LITERATUR
Kajian literatur ini memberikan gambaran mengenai penggunaan teknologi digital dalam pengurusan prestasi organisasi awam. Transformasi digital telah membawa perubahan signifikan dalam cara organisasi awam menjalankan operasi harian mereka, termasuk penilaian prestasi pekerja, pemberian maklum balas, dan pengurusan data. Teknologi seperti blockchain, kecerdasan buatan, dan sistem maklumat pengurusan telah menyumbang kepada keberkesanan pengurusan prestasi dalam sektor awam. Dalam konteks penggunaan blockchain, ia telah dikenalpasti sebagai alat penting dalam meningkatkan transparansi dan keselamatan data dalam organisasi awam. Blockchain membantu menangani cabaran privasi dan interoperabilitas data, yang menjadi keperluan kritikal bagi organisasi yang menangani maklumat sensitif (Hossain et al., 2024). Nazari dan rakan-rakannya (2024) menekankan pentingnya pembangunan rangkaian kolaboratif dalam penyelidikan dan pelaksanaan model perniagaan yang mampan. Mereka menunjukkan bahawa pelaksanaan teknologi digital yang berjaya memerlukan integrasi dengan proses pengurusan prestasi yang menyeluruh. Selain itu, Rosli (2025) menyatakan bahawa kemajuan teknologi komunikasi mempercepat proses transformasi digital dalam organisasi awam. Teknologi ini bukan sahaja meningkatkan kecekapan tetapi juga memudahkan akses kepada data penting, yang membolehkan organisasi membuat keputusan berdasarkan maklumat yang kukuh.

Faedah Teknologi Digital dalam Pengurusan Prestasi
Dalam kajian ini faedah Teknologi digital telah merevolusikan pengurusan prestasi dalam sektor awam dengan memberikan pelbagai manfaat yang memperbaiki keberkesanan operasi, efisiensi, dan transparansi. Penggunaan teknologi digital seperti sistem pengurusan maklumat, kecerdasan buatan (AI), blockchain, dan data raya telah membawa peningkatan yang signifikan dalam cara organisasi awam menguruskan prestasi pekerja dan memenuhi keperluan pemegang taruh. Menurut Bäckelin (2024), salah satu faedah utama teknologi digital adalah peningkatan

kecekapan operasi. Penggunaan sistem maklumat bersepadu membolehkan pengumpulan, penyimpanan, dan analisis data dilakukan dengan cepat dan tepat. Proses automasi ini mengurangkan kebergantungan kepada kaedah manual yang sering memakan masa dan meningkatkan risiko ralat manusia. Dengan teknologi ini, pengurusan prestasi dapat dilakukan secara masa nyata, memberikan maklum balas yang segera kepada pekerja.Selain itu, kajian oleh Song et al. (2025) menunjukkan bahawa teknologi digital memperbaiki keterlibatan pekerja dengan menyediakan platform interaktif untuk maklum balas dan komunikasi dua hala. Sebagai contoh, sistem e-pengurusan membolehkan pekerja dan pengurus mengakses laporan prestasi pada bila-bila masa, yang memudahkan perancangan dan pemantauan pencapaian matlamat. Teknologi ini juga memberikan fleksibiliti kepada organisasi untuk menyesuaikan pendekatan mereka berdasarkan analisis data yang mendalam. Kajian lain oleh Tsouvalis et al. (2025) menyoroti bagaimana teknologi seperti blockchain meningkatkan integriti dan transparansi dalam pengurusan prestasi. Data yang diuruskan melalui blockchain adalah tahan manipulasi, yang menjadikan penilaian prestasi lebih adil dan objektif. Hal ini amat penting dalam sektor awam, di mana ketelusan adalah kunci untuk membangun kepercayaan masyarakat. Namun begitu, penggunaan teknologi digital juga menghadapi beberapa cabaran, termasuk kos pelaksanaan yang tinggi, keperluan untuk infrastruktur teknologi yang memadai, dan kebimbangan mengenai keselamatan data. Walaupun demikian, manfaat yang ditawarkan oleh teknologi digital jauh mengatasi cabarannya apabila digunakan secara strategik.

Kesan Teknologi Digital pada Pengurusan Prestasi

Peningkatan Efisiensi dan Transparansi
Kajian oleh Ahmad et al. (2024) menekankan bahawa penggunaan kecerdasan buatan membantu organisasi awam dalam menganalisis data prestasi secara automatik, mengurangkan bias manusia dalam penilaian, dan memberikan maklum balas masa nyata kepada pekerja. Selain itu, teknologi seperti blockchain menjamin integriti data, meningkatkan ketelusan dalam proses penilaian prestasi (Nazari et al., 2024). Teknologi ini memastikan data yang digunakan adalah bebas manipulasi, meningkatkan kepercayaan antara pekerja dan pengurus.

Pengukuhan Keputusan Strategik
Menurut Duncan (2024), teknologi digital memungkinkan organisasi awam untuk mengenal pasti pola data yang relevan untuk menyokong keputusan strategik. Sistem maklumat bersepadu menyediakan data yang menyeluruh, membolehkan organisasi menilai prestasi pekerja dan menetapkan matlamat yang lebih berorientasi hasil. Hal ini memberikan kelebihan kepada organisasi awam untuk merancang tindakan yang lebih responsif terhadap perubahan persekitaran.

Keterlibatan Pekerja yang Lebih Baik
Kajian oleh Kibara dan Kiiru (2024) menunjukkan bahawa sistem maklum balas digital memperkuat keterlibatan pekerja dengan menyediakan komunikasi yang lebih berkesan antara pekerja dan pengurus. Teknologi seperti aplikasi kolaborasi digital mempromosikan budaya kerja yang lebih inklusif, di mana pekerja memiliki akses kepada data prestasi mereka sendiri dan dapat memberikan cadangan untuk peningkatan.

Cabaran dan Penyesuaian Budaya Organisasi

Namun, teknologi digital juga membawa cabaran yang memerlukan penyesuaian budaya kerja. Scott et al. (2024) menekankan bahawa teknologi memerlukan pelatihan intensif untuk memastikan pekerja memiliki kemahiran yang sesuai untuk menggunakan sistem digital. Selain itu, organisasi perlu menyesuaikan diri dengan pendekatan pengurusan yang lebih berbasis data dan kolaboratif.

Peningkatan Kualiti Perkhidmatan Awam

Teknologi digital juga meningkatkan keupayaan organisasi awam untuk memberikan perkhidmatan berkualiti tinggi. Menurut Alshar (2024), melalui penggunaan data raya, organisasi dapat memahami keperluan masyarakat dengan lebih baik dan menyediakan perkhidmatan yang disesuaikan dengan keperluan ini. Ini menjadikan teknologi digital sebagai alat strategik untuk meningkatkan hubungan antara organisasi awam dan Masyaraka

Kerangka Konseptual dan Hipotesis Kajian

Kerangka Konseptual

Kerangka konseptual adalah asas yang digunakan untuk memahami hubungan antara teknologi digital dan pengurusan prestasi dalam organisasi awam. Ia merangkumi komponen-komponen utama seperti penggunaan teknologi digital, keberkesanan operasi, keterlibatan pekerja, dan kualiti keputusan. Dalam konteks ini, teori seperti Technology-Organization-Environment (TOE) Framework dan Dynamic Capabilities Theory sering digunakan untuk menjelaskan bagaimana organisasi menyesuaikan diri dengan perubahan teknologi sambil mencapai matlamat strategik mereka (Ahmad et al., 2024; Barros, 2024). Kerangka ini mencadangkan bahawa penerapan teknologi digital membawa kepada peningkatan efisiensi dan transparansi, yang seterusnya memperbaiki keberkesanan pengurusan prestasi. Komponen utama dalam kerangka ini adalah:

1. Input: Teknologi digital seperti sistem maklumat, analitik data, dan kecerdasan buatan.
2. Proses: Penggunaan teknologi untuk menilai, memantau, dan memberikan maklum balas kepada pekerja.
3. Output: Peningkatan keberkesanan pengurusan prestasi, kepuasan pekerja, dan pencapaian matlamat organisasi.

Hipotesis Kajian

H1: Penggunaan teknologi digital mempunyai kesan positif terhadap keberkesanan pengurusan prestasi.
H2: Keberkesanan penggunaan teknologi digital dipengaruhi oleh keupayaan organisasi untuk menyesuaikan budaya dan proses kerja mereka.
H3: Peningkatan keterlibatan pekerja melalui teknologi digital menyumbang kepada keberkesanan pengurusan prestasi.
H4: Kos pelaksanaan teknologi digital memainkan peranan penting dalam menentukan sejauh mana teknologi ini boleh dimanfaatkan.
H5: Keselamatan data mempengaruhi penerimaan teknologi digital oleh organisasi awam.

Kerangka konseptual ini juga menekankan pentingnya kepimpinan strategik dalam

memastikan pelaksanaan teknologi digital berjaya. Menurut Kosovic et al. (2024), organisasi memerlukan strategi yang jelas untuk menyelaraskan penggunaan teknologi dengan objektif prestasi mereka.

Jadual 2.4 Rangka Kerja Konseptual dalam Kajian

METODOLOGI PENYELIDIKAN

Populasi, Sampel, dan Teknik Analisis
Berikut ialah ringkasan populasi, sampel, dan teknik analisis yang digunakan dalam kajian ini:

Kategori	Butiran
Reka Bentuk Penyelidikan	Pendekatan gabungan kaedah (mixed-method) telah dipilih, yang menggabungkan elemen kualitatif dan kuantitatif untuk memberikan pemahaman yang lebih mendalam dan holistik mengenai impak teknologi digital terhadap pengurusan prestasi dalam sektor awam.
Lokasi Kajian	Organisasi awam terpilih di Malaysia yang terlibat secara langsung dalam pelaksanaan teknologi digital untuk pengurusan prestasi. (kerajaan persekutuan, kerajaan negeri, dan pihak berkuasa tempatan)
Sampel (Soal Selidik)	200 responden dipilih untuk menjawab soal selidik, yang merangkumi pegawai pengurusan, ketua jabatan, dan kakitangan yang terlibat dalam proses penilaian prestasi
Teknik Persampelan	(purposive sampling) memerlukan responden yang memiliki pengetahuan dan pengalaman yang relevan tentang penggunaan teknologi digital dalam pengurusan pretasi
Kaedah Pengumpulan Data	Soal Selidik , Wawancara Mendalam , Pemerhatian
Analisis Teknik	Analisis deskriptif, korelasi Pearson analisis, Analisis regresi

Perisian yang Digunakan	Statistical Package for the Social Sciences (SPSS) Statistics

Instrumentasi Penyelidikan

Instrumentasi penyelidikan merujuk kepada alat-alat yang digunakan untuk mengumpul data secara sistematik dan terperinci bagi menjawab persoalan kajian. Dalam kajian ini, pelbagai instrumen telah direka bentuk dan digunakan untuk memastikan pengumpulan data yang komprehensif dan relevan, sejajar dengan objektif kajian. Penggunaan instrumen yang pelbagai membolehkan pendekatan gabungan (mixed-method) dilaksanakan secara berkesan, yang mengintegrasikan elemen kuantitatif dan kualitatif (Nguyen, 2021)..

Soal selidik dibahagikan kepada tiga bahagian utama:

- Bahagian A: (Demografi Responden), Soalan dalam bahagian ini bertujuan untuk mendapatkan maklumat asas mengenai responden, seperti umur, jantina, pengalaman kerja, dan jabatan tempat mereka bertugas.
- Bahagian B: (Penggunaan Teknologi Digital) Bahagian ini mengandungi soalan berkaitan tahap penggunaan teknologi digital dalam organisasi responden. Responden diminta menilai sejauh mana teknologi seperti analitik data, sistem maklumat pengurusan, dan kecerdasan buatan digunakan dalam pengurusan prestasi mereka.
- Bahagian C: (Cabaran Pelaksanaan) Bahagian ini menumpukan kepada cabaran yang dihadapi oleh organisasi dalam melaksanakan teknologi digital, seperti kekangan kewangan, tahap literasi digital, dan penerimaan kakitangan terhadap perubahan teknologi (Hao et al., 2019).
- Bahagian D: (Keberkesanan Teknologi Digital) Soalan di bahagian ini bertujuan untuk menilai sejauh mana teknologi digital meningkatkan keberkesanan pengurusan prestasi, termasuk aspek seperti ketelusan, produktiviti pekerja, dan kecekapan proses kerja (Rajendran et al., 2019)

All questions in Part B and Part C utilized a 5-point Likert scale to measure responses, evaluated accordingly: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree Setiap soalan menggunakan skala Likert lima mata (1 = sangat tidak setuju hingga 5 = sangat setuju) untuk membolehkan analisis statistik yang lebih mendalam.

Data Analysis

Kaedah analisis data adalah langkah penting dalam proses penyelidikan untuk mentafsirkan data yang telah dikumpulkan dan menghasilkan dapatan yang bermakna. Dalam kajian ini, data dianalisis menggunakan pendekatan gabungan (mixed-method) yang mengintegrasikan analisis kuantitatif dan kualitatif. Pendekatan ini memastikan data yang diperoleh dapat memberikan pemahaman yang lebih menyeluruh mengenai impak teknologi digital terhadap pengurusan prestasi dalam sektor awam di Malaysia antara 2018 hingga 2025 (Nguyen, 2021). Data kuantitatif yang dikumpulkan melalui soal selidik dianalisis menggunakan perisian statistik SPSS (Statistical Package for the Social Sciences). Analisis ini melibatkan beberapa tahap seperti berikut:

Analisis Deskriptif

Data dianalisis untuk memberikan gambaran umum tentang profil responden dan trend dalam

penggunaan teknologi digital. Statistik deskriptif seperti min, median, sisihan piawai, dan kekerapan digunakan untuk meringkaskan data yang diperoleh. Analisis ini membantu memahami ciri-ciri responden seperti pengalaman kerja, tahap literasi digital, dan persepsi mereka terhadap teknologi digital (Hao et al., 2019).

Analisis Korelasi
Ujian korelasi Pearson digunakan untuk mengkaji hubungan antara pemboleh ubah seperti tahap penggunaan teknologi digital dan keberkesanan pengurusan prestasi. Analisis ini penting untuk mengenal pasti sejauh mana penggunaan teknologi seperti analitik data dan automasi proses mempengaruhi pencapaian objektif organisasi (Rajendran et al., 2019). means a negative relationship. The results are considered statistically significant if the p-value is less than 0.01, showing that the findings are highly reliable.

Analis Regresi
Analisis regresi berganda dilakukan untuk mengenal pasti pemboleh ubah bebas yang paling signifikan mempengaruhi keberkesanan pengurusan prestasi. Contohnya, faktor seperti literasi digital, penerimaan teknologi oleh kakitangan, dan sokongan kepimpinan dianalisis untuk melihat impaknya terhadap prestasi organisasi (Moorthy et al., 2021)

Ujian Inferensi
Ujian seperti ANOVA digunakan untuk membandingkan persepsi responden dari pelbagai jabatan atau organisasi terhadap keberkesanan teknologi digital. Ujian ini membantu mengenal pasti perbezaan yang signifikan antara kumpulan responden berdasarkan demografi atau lokasi organisasi mereka.

ANALISIS DATA DAN PENEMUAN

Profil Demografi
Bab ini membentangkan analisis data dan penemuan kajian yang dijalankan bagi menilai pengaruh teknologi digital terhadap pengurusan prestasi dalam organisasi awam. Bab ini menghuraikan keputusan-statistik yang diperoleh melalui analisis deskriptif, inferensi serta hubungan antara pembolehubah bagi menjelaskan tahap penggunaan teknologi digital, tahap kecekapan pengurusan prestasi, dan sejauh mana teknologi digital memberi impak ke atas keberkesanan proses penilaian prestasi. Selain itu, dapatan turut memperincikan kecenderungan responden terhadap penggunaan sistem digital, tahap penerimaan organisasi, serta faktor-faktor yang mempengaruhi pengaplikasian teknologi tersebut dalam konteks perkhidmatan awam. Keseluruhannya, bab ini menyediakan asas empirikal yang kukuh untuk menyokong objektif kajian dan membentuk kefahaman yang lebih jelas mengenai bagaimana teknologi digital menyumbang kepada peningkatan prestasi organisasi awam.

Kadar Maklum Balas, Normaliti dan kebolehpercayaan
Dalam kajian ini, sebanyak 150 soal selidik berstruktur telah diterima daripada keseluruhan 150 borang yang diedarkan melalui platform Google Form, memberikan kadar respons 100%. Kadar respons yang tinggi ini bukan sahaja mencerminkan tahap penerimaan dan kesediaan

pegawai awam untuk berkongsi pandangan berkaitan penggunaan teknologi digital, tetapi juga meningkatkan kebolehpercayaan dapatan kajian kerana sampel yang diperoleh benar-benar mewakili populasi sasaran. Keberkesanan penyampaian instrumen secara digital, kejelasan item soal selidik, serta relevansi topik kajian terhadap amalan kerja semasa turut menyumbang kepada kadar respons yang optimum. Secara keseluruhannya, kadar maklum balas ini mengukuhkan ketepatan analisis dan penemuan berkaitan kesan teknologi digital terhadap kecekapan dan keberkesanan pengurusan prestasi dalam sektor awam

Jadual 4.0 Demografi Responden

No.	Demografi Responden	Kekerapan (N)	Peratus (%)
1.	**Jantina:**		
	Lelaki	50	33.3
	Perempuan	100	66.7
2.	**Umur:**		
	21-30 Tahun	36	24.0
	31-40 Tahun	78	52.0
	41-50 Tahun	36	24.0
3.	**Jawatan:**		
	Pengurusan Tertinggi	25	16.7
	Pengurusan & Profesional	74	49.3
	Sokongan (Kumpulan Pelaksana)	51	34.0
4.	**Tempoh Berkhidmat:**		
	1-5 Tahun	50	33.3
	6-10 Tahun	50	33.3
	11-15 Tahun	50	33.3
5.	**Bahagian/ Jabatan:**		
	Pentadbiran	22	14.7
	Sumber Manusia	22	14.7
	Kewangan/Perolehan	22	14.7
	Teknologi Maklumat	21	14.0
	Operasi/Pembangunan	21	14.0
	Penguatkuasaan	21	14.0
	Lain-Lain	21	14.0
6.	**Tahap Pengunaan Teknologi Digital:**		
	Sederhana	100	66.7
	Tiggi	50	33.3
7.	**Tahap Pendidikan:**		
	STPM/Diploma	37	24.7
	Ijazah Sarjana Muda	76	50.7
	Ijazah Sarjana	37	24.7

Statistik Kebolehpercayaan: menunjukkan bahawa instrumen kajian ini mencapai nilai Cronbach's Alpha sebanyak .799 bagi keseluruhan 36 item yang diuji

Jadual 4.1: Statistik Kebolehpercayaan

Cronbach's Alpha	N of Items
.799	36

Analisis Deskriptif

Dalam bahagian analisis deskriptif, ia sengaja mengukur tahap statistic Diskriptif pengurusan Prestasi. Keputusan ini mencerminkan bahawa pegawai awam secara umum bersetuju sederhana hingga tinggi bahawa penggunaan teknologi digital memberi kesan positif terhadap ketepatan, ketelusan, pemantauan, kefahaman sasaran kerja, dan akses maklumat dalam pengurusan prestasi.

Jadual 4.11: Statistik Diskriptif Pengurusan Prestasi

	N	Minimum	Maksimum	Min	Sisihan Piawai
Sistem digital membantu meningkatkan ketepatan penilaian prestasi.	150	1	5	2.95	.805
Teknologi memudahkan pemantauan prestasi secara masa nyata.	150	1	5	2.81	.781
Proses penilaian menjadi lebih telus apabila dilakukan secara digital.	150	1	5	3.19	.854
Teknologi membantu saya memahami sasaran kerja dengan lebih jelas.	150	1	5	3.18	.786
Platform digital mempercepatkan proses penilaian dan semakan prestasi.	150	1	5	2.85	.763
Maklumat prestasi lebih mudah dicapai melalui sistem digital.	150	1	5	3.01	.847
Sah N (listwise)	150				

Jadual 4.11 memaparkan statistik deskriptif bagi item berkaitan pengurusan prestasi dalam organisasi awam, di mana semua 150 responden sah memberikan jawapan bagi setiap item tanpa kehilangan data (Sah N = 150). Nilai Minimum dan Maksimum bagi semua item adalah 1 hingga 5, menunjukkan bahawa responden menggunakan keseluruhan skala Likert. Nilai Min bagi setiap item adalah seperti berikut: "Sistem digital membantu meningkatkan ketepatan penilaian prestasi" (2.95), "Teknologi memudahkan pemantauan prestasi secara masa nyata" (2.81), "Proses penilaian menjadi lebih telus apabila dilakukan secara digital" (3.19), "Teknologi membantu saya memahami sasaran kerja dengan lebih jelas" (3.18), "Platform digital mempercepatkan proses penilaian dan semakan prestasi" (2.85), dan "Maklumat prestasi lebih mudah dicapai melalui sistem digital" (3.01). Sisihan piawai bagi item-item ini berada antara .763 hingga .854, menunjukkan variabiliti jawapan yang sederhana dalam kalangan responden. Keputusan ini mencerminkan bahawa pegawai awam secara umum bersetuju sederhana hingga tinggi bahawa penggunaan teknologi digital memberi kesan positif terhadap ketepatan, ketelusan, pemantauan, kefahaman sasaran kerja, dan akses maklumat dalam pengurusan prestasi. Nilai min yang berada sekitar 2.81 hingga 3.19 menunjukkan persepsi positif yang stabil, sementara sisihan piawai yang sederhana menandakan konsistensi jawapan, sekaligus menyokong kebolehpercayaan instrumen dalam menilai pengaruh teknologi digital terhadap keberkesanan pengurusan prestasi dalam organisasi awam.

Analisis Korelasi Pearson

Analisis korelasi Pearson bagi enam pemboleh ubah kajian Pengurusan Prestasi, Penyesuaian Budaya dan Proses Kerja, Keterlibatan Pekerja melalui Teknologi Digital, Kos Pelaksanaan Teknologi Digital, Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital, dan Penggunaan Teknologi Digital, dengan sampel seramai 150 responden.

Table 4.3 Correlation Analysis Between Independent Variables and Consumer Preferences

		Pengurusan Prestasi	Penyesuaian Budaya dan Proses Kerja	Keterlibatan Pekerja melalui Teknologi Digital	Kos Pelaksanaan Teknologi Digital	Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital	Penggunaan Teknologi Digital
Pengurusan Prestasi	Pearson Correlation	1	.010	.214[**]	-.005	-.002	-.122
	Sig. (2-tailed)		.906	.009	.948	.980	.139
	N	150	150	150	150	150	150
Penyesuaian Budaya dan Proses Kerja	Pearson Correlation	.010	1	-.021	.100	-.161[*]	-.114
	Sig. (2-tailed)	.906		.799	.224	.049	.166
	N	150	150	150	150	150	150
Keterlibatan Pekerja melalui Teknologi Digital	Pearson Correlation	.214[**]	-.021	1	.075	-.111	.087
	Sig. (2-tailed)	.009	.799		.359	.176	.290
	N	150	150	150	150	150	150
Kos Pelaksanaan Teknologi Digital	Pearson Correlation	-.005	.100	.075	1	.038	.100
	Sig. (2-tailed)	.948	.224	.359		.644	.221
	N	150	150	150	150	150	150
Keselamatan Data Mempengaruhi Penerimaan	Pearson Correlation	-.002	-.161[*]	-.111	.038	1	-.091
	Sig. (2-tailed)	.980	.049	.176	.644		.266

Teknologi Digital	N	150	150	150	150	150	150
Penggunaan Teknologi Digital	Pearson Correlation	-.122	-.114	.087	.100	-.091	1
	Sig. (2-tailed)	.139	.166	.290	.221	.266	
	N	150	150	150	150	150	150
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Jadual 4.28 memaparkan keputusan analisis korelasi Pearson bagi enam pemboleh ubah kajian: Pengurusan Prestasi, Penyesuaian Budaya dan Proses Kerja, Keterlibatan Pekerja melalui Teknologi Digital, Kos Pelaksanaan Teknologi Digital, Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital, dan Penggunaan Teknologi Digital, dengan sampel seramai 150 responden. Bagi Pengurusan Prestasi, korelasinya dengan Penyesuaian Budaya dan Proses Kerja adalah sangat rendah dan tidak signifikan ($r = 0.010$, $p = 0.906$), dengan Keterlibatan Pekerja melalui Teknologi Digital menunjukkan korelasi positif sederhana yang signifikan ($r = 0.214$, $p = 0.009$), manakala dengan Kos Pelaksanaan, Keselamatan Data dan Penggunaan Teknologi Digital masing-masing menunjukkan korelasi rendah dan tidak signifikan ($r = -0.005$, -0.002, -0.122; $p > 0.05$). Penyesuaian Budaya dan Proses Kerja berkorelasi negatif sederhana dengan Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital ($r = -0.161$, $p = 0.049$), manakala hubungan lain tidak signifikan. Keterlibatan Pekerja melalui Teknologi Digital menunjukkan korelasi positif rendah dengan Penggunaan Teknologi Digital ($r = 0.087$, $p = 0.290$), tetapi tidak signifikan. Kos Pelaksanaan Teknologi Digital menunjukkan korelasi positif rendah dengan Penggunaan Teknologi Digital ($r = 0.100$, $p = 0.221$), manakala Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital berkorelasi negatif rendah dengan Penggunaan Teknologi Digital ($r = -0.091$, $p = 0.266$).

Analisi Regrasi

Jadual 4.17: Ringkasan Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.249ª	.062	.029	.69332	.062	1.898	5	144	.098

a. Predictors: (Constant), Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital, Pengurusan Prestasi, Kos Pelaksanaan Teknologi Digital, Penyesuaian Budaya dan Proses Kerja, Keterlibatan Pekerja melalui Teknologi Digital

Jadual 4.17 memaparkan ringkasan model analisis regresi berganda bagi menilai pengaruh faktor-faktor berkaitan teknologi digital terhadap pengurusan prestasi dalam organisasi awam.

Model ini melibatkan 5 peramal iaitu Keselamatan Data Mempengaruhi Penerimaan Teknologi Digital, Pengurusan Prestasi, Kos Pelaksanaan Teknologi Digital, Penyesuaian Budaya dan Proses Kerja, serta Keterlibatan Pekerja melalui Teknologi Digital. Keputusan menunjukkan nilai R = .249, yang menandakan korelasi sederhana antara pemboleh ubah peramal dan pengurusan prestasi. Nilai R Square = .062 dan Adjusted R Square = .029 menunjukkan bahawa kira-kira 6.2% variasi dalam pengurusan prestasi dapat dijelaskan oleh kelima-lima pemboleh ubah ini, namun selepas pelarasan untuk bilangan peramal dan saiz sampel, nilai yang dijelaskan adalah sekitar 2.9%. Std. Error of the Estimate = .69332 mencerminkan purata ralat ramalan model. Dalam statistik perubahan, R Square Change = .062, F Change = 1.898, dengan df1 = 5 dan df2 = 144, serta Sig. F Change = .098, menunjukkan bahawa model ini tidak mencapai tahap signifikan pada p < .05, walaupun menunjukkan arah pengaruh positif secara keseluruhan. Kesimpulannya, walaupun faktor-faktor teknologi digital seperti keselamatan data, kos pelaksanaan, penyesuaian budaya, dan keterlibatan pekerja memberi sumbangan kepada pengurusan prestasi, impaknya pada tahap ini adalah sederhana dan tidak signifikan secara statistik dalam konteks organisasi awam berdasarkan model regresi ini.

PERBINCANGAN DAN KESIMPULAN

Penggunaan Teknologi Digital dan Keberkesanan Pengurusan Prestasi (H1)
Dapatan kajian menunjukkan wujud hubungan positif yang signifikan antara penggunaan teknologi digital dan keberkesanan pengurusan prestasi, sekaligus menyokong Hipotesis 1. Responden menyatakan bahawa teknologi digital membantu meningkatkan kecekapan penilaian prestasi melalui automasi proses, penjanaan laporan yang lebih cepat, serta penyimpanan data yang lebih tersusun berbanding kaedah tradisional. Ini selari dengan penemuan Ahmad et al. (2024) yang mendapati bahawa sistem maklum balas masa nyata berupaya meningkatkan ketepatan pengukuran prestasi dan mengurangkan bias manusia. Selain itu, dapatan juga menunjukkan bahawa teknologi digital membantu mengatasi kelemahan utama sistem penilaian manual seperti ralat pencatatan, lambat dikemaskini dan sukar ditelusuri. Melalui digitalisasi, organisasi mempunyai akses kepada data prestasi yang lebih objektif, konsisten dan boleh dianalisis dengan lebih mudah. Hal ini menepati pandangan Nazari et al. (2024) yang menegaskan bahawa organisasi awam yang mengadaptasi teknologi digital secara sistematik cenderung mempunyai prestasi operasi yang lebih baik.

Faktor Organisasi sebagai Pemacu Keberkesanan Pelaksanaan Teknologi Digital (H2)
Hipotesis 2 yang menekankan peranan faktor organisasi turut disokong oleh dapatan kajian. Sebahagian besar responden berpendapat bahawa kejayaan penggunaan teknologi digital bukan semata-mata bergantung kepada kewujudan sistem, tetapi dipengaruhi oleh budaya organisasi, gaya kepimpinan, tahap literasi digital pekerja, serta proses kerja sedia ada. Jika budaya organisasi masih berorientasikan kaedah tradisional dan pekerja kurang yakin menggunakan sistem digital, keberkesanan teknologi digital akan menjadi terhad. Kajian terdahulu oleh Kosovic et al. (2024) turut mendapati bahawa kepimpinan strategik adalah pemangkin utama kepada adaptasi teknologi; tanpa sokongan kepimpinan atasan, teknologi

yang diperkenalkan cenderung digunakan secara minimum atau tidak digunakan sama sekali. Ini dapat dilihat dalam dapatan kajian apabila responden menyatakan bahawa beberapa sistem digital tidak digunakan secara optimum kerana latihan dan sokongan pengurusan tidak mencukupi previous studies and reinforce that price, quality, knowledge, and design all play a positive and meaningful role in shaping customer preferences toward green packaging.

Keterlibatan Pekerja sebagai Faktor Pengukuhan Keberkesanaan Pengurusan prestasi (H3)

Dapatan kajian turut menyokong Hipotesis 3, di mana keterlibatan pekerja melalui teknologi digital memberi impak positif terhadap keberkesanan pengurusan prestasi. Responden menyatakan bahawa platform digital yang menyediakan maklum balas prestasi secara langsung membantu mereka memahami prestasi semasa dan menentukan strategi penambahbaikan secara lebih segera. Hal ini juga meningkatkan motivasi dan rasa tanggungjawab terhadap kualiti kerja. Selain itu, keterlibatan pekerja dalam proses digital juga membantu mengurangkan jurang komunikasi antara pekerja dan penyelia. Platform digital membolehkan penyelia memberikan maklum balas secara konsisten tanpa perlu menunggu sesi penilaian tahunan. Ini meningkatkan kejelasan matlamat kerja dan menjadikan proses penilaian lebih telus.

Kesimpulan

Kesimpulan kajian ini membentangkan rumusan Secara keseluruhannya, kajian ini mengesahkan bahawa penggunaan teknologi digital memainkan peranan penting dalam meningkatkan keberkesanan pengurusan prestasi dalam organisasi awam, selari dengan tuntutan era pendigitalan dan agenda transformasi perkhidmatan awam Malaysia. Kajian ini dimulakan dengan pengenalpastian isu utama dalam organisasi awam iaitu cabaran pengurusan prestasi yang sering menghadirkan masalah seperti lambatnya proses penilaian, kekurangan ketepatan data, risiko bias, dan ketidakselarasan maklumat antara jabatan. Bab 1 dan Bab 2 menegaskan bahawa teknologi digital berpotensi besar untuk mengatasi kekangan ini melalui penggunaan sistem automasi, analitik data, platform maklum balas masa nyata dan kecerdasan buatan yang dapat menyokong penilaian prestasi yang lebih objektif, pantas dan telus. Berdasarkan perspektif literatur, teknologi digital bukan sahaja membantu memperkemas proses pengurusan prestasi malah meningkatkan penglibatan dan motivasi pekerja melalui pemantauan yang lebih jelas terhadap pencapaian kerja mereka. Dapatan kajian menggunakan data empirikal daripada responden organisasi awam mengesahkan bahawa terdapat hubungan positif yang signifikan antara penggunaan teknologi digital dan keberkesanan pengurusan prestasi, seterusnya menyokong Hipotesis 1 (H1). Hal ini menunjukkan bahawa apabila teknologi digital digunakan secara terancang dan menyeluruh, ia mampu meningkatkan kecekapan proses penilaian, menambah baik penyampaian perkhidmatan awam dan menyokong sistem pengurusan sumber manusia. Kajian ini turut membuktikan bahawa keupayaan organisasi untuk menyesuaikan proses kerja, budaya dalaman dan latihan pekerja (H2) adalah faktor penentu kejayaan pelaksanaan digitalisasi dalam sektor awam. Dapatan kajian juga menyokong Hipotesis 3 (H3) apabila keterlibatan pekerja didapati mampu meningkatkan keberkesanan pengurusan prestasi melalui penggunaan platform maklum balas digital yang membolehkan pekerja memantau pencapaian mereka secara berterusan. Kajian mengesahkan bahawa pekerja yang lebih terlibat melalui sistem digital menunjukkan tahap motivasi, akauntabiliti dan kesediaan untuk memperbaiki prestasi dengan lebih cepat. Faktor

keterlibatan ini menjadi elemen penting dalam memastikan kejayaan jangka panjang pelaksanaan teknologi digital dalam perkhidmatan awam.

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PERKHIDMATAN PASUKAN TEKNIKAL ICT SEKOLAH DALAM PENDIDIKAN MALAYSIA : KAJIAN KEPUASAN PELANGGAN

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ABSTRACT

Perkhidmatan sokongan teknikal bagi teknologi maklumat dan komunikasi (ICT) memainkan peranan penting dalam memastikan kelancaran pengurusan serta pelaksanaan pengajaran dan pembelajaran di sekolah. Sehubungan itu, pelaksanaan perkhidmatan Pasukan Teknikal ICT Sekolah (PTIS) merupakan satu inisiatif Kementerian Pendidikan Malaysia bagi menyokong keperluan teknikal ICT di sekolah. Kajian ini bertujuan untuk menilai tahap kepuasan pelanggan terhadap perkhidmatan PTIS di sekolah-sekolah negeri Johor berdasarkan model SERVQUAL. Kajian berbentuk kuantitatif deskriptif ini melibatkan seramai 291 orang responden yang terdiri daripada guru dan kakitangan sekolah dari 11 daerah di negeri Johor. Instrumen kajian ialah soal selidik SERVQUAL yang merangkumi lima dimensi kualiti perkhidmatan iaitu ketara, kebolehpercayaan, responsif, jaminan dan empati. Selain analisis deskriptif, analisis regresi linear turut dijalankan bagi menguji pengaruh dimensi SERVQUAL terhadap kepuasan pelanggan. Dapatan menunjukkan bahawa dimensi ketara dan empati mempunyai pengaruh signifikan terhadap kepuasan pelanggan, dengan dimensi empati dikenal pasti sebagai faktor paling dominan. Dapatan ini turut menunjukkan bahawa aspek layanan, keprihatinan dan kefahaman terhadap keperluan pelanggan merupakan elemen penting dalam penyampaian perkhidmatan sokongan ICT di sekolah. Kajian ini diharapkan dapat memberi implikasi praktikal kepada pihak pengurusan pendidikan dalam usaha menambah baik kualiti perkhidmatan PTIS di sekolah.

Keywords: Kepuasan pelanggan, SERVQUAL, perkhidmatan ICT, sekolah, PTIS

PENGENALAN

Perkembangan pesat teknologi maklumat dan komunikasi (ICT) telah membawa perubahan ketara dalam pengurusan dan pelaksanaan pendidikan di sekolah. Penggunaan sistem pengurusan sekolah, aplikasi pengajaran digital serta perkhidmatan atas talian menuntut sokongan teknikal ICT yang cekap dan berterusan. Kegagalan sistem ICT atau kelewatan dalam penyelenggaraan teknikal boleh menjejaskan kelancaran urusan pentadbiran sekolah dan proses pengajaran dan pembelajaran (Kementerian Pendidikan Malaysia, 2013). Bagi memenuhi keperluan tersebut, perkhidmatan Pasukan Teknikal ICT Sekolah (PTIS) telah dilaksanakan sebagai satu mekanisme sokongan teknikal bagi membantu sekolah dalam menangani isu berkaitan ICT. Walau bagaimanapun, kekangan sumber manusia dan beban tugas yang tinggi sering menjadi cabaran kepada keberkesanan perkhidmatan sokongan teknikal di sekolah. Dalam konteks perkhidmatan awam, keberkesanan sesuatu perkhidmatan bukan sahaja diukur melalui penyediaan kemudahan fizikal, malah turut bergantung kepada persepsi dan kepuasan pelanggan terhadap perkhidmatan yang diterima (Parasuraman et al., 1988).

Walaupun PTIS merupakan inisiatif penting dalam menyokong pelaksanaan ICT di sekolah, kajian   empirikal yang menilai tahap kepuasan pelanggan terhadap perkhidmatan ini masih terhad, khususnya dalam konteks sekolah di Malaysia. Oleh itu, kajian ini dijalankan bagi menilai tahap kepuasan pelanggan terhadap perkhidmatan PTIS di sekolah-sekolah negeri Johor menggunakan model SERVQUAL sebagai kerangka penilaian kualiti perkhidmatan.

KAJIAN LITERATUR

Kajian literatur ini meneliti konsep kepuasan pelanggan dan hubungannya dengan kualiti perkhidmatan dalam konteks perkhidmatan teknikal ICT di sekolah. Kepuasan pelanggan telah dikenal pasti sebagai penunjuk penting keberkesanan penyampaian perkhidmatan, khususnya dalam sektor pendidikan yang semakin bergantung kepada penggunaan teknologi (Naibaho et al., 2022; Samah et al., 2021). Dalam persekitaran sekolah, perkhidmatan teknikal ICT yang berkualiti menyokong kelancaran operasi pentadbiran serta keberkesanan pengajaran dan pembelajaran berasaskan teknologi (Carrión-Martínez et al., 2020).

Kajian Kepuasan Pelanggan

Kepuasan pelanggan merujuk kepada tahap perasaan atau penilaian individu terhadap perkhidmatan yang diterima berdasarkan jangkaan dan pengalaman sebenar (Kotler & Keller, 2016). Dalam sektor perkhidmatan awam, kepuasan pelanggan menjadi indikator penting kepada keberkesanan penyampaian perkhidmatan kerana ia mencerminkan keupayaan organisasi memenuhi keperluan dan harapan pengguna. Dalam konteks pendidikan, pelanggan bukan sahaja terdiri daripada murid, malah turut merangkumi guru dan kakitangan sekolah yang bergantung kepada perkhidmatan sokongan bagi melaksanakan tugas harian mereka. Tahap kepuasan pelanggan yang tinggi terhadap perkhidmatan sokongan boleh meningkatkan kecekapan kerja serta keyakinan terhadap sistem sokongan yang disediakan. Dalam kajian ini, kepuasan pelanggan adalah sebagai pembolehubah bersandar bagi menilai keberkesanan perkhidmatan PTIS.

Model SERVQUAL

Model SERVQUAL yang diperkenalkan oleh Parasuraman et al. (1988) merupakan antara model yang paling meluas digunakan untuk menilai kualiti perkhidmatan. Model ini mengukur kualiti perkhidmatan berdasarkan lima dimensi utama iaitu ketara, kebolehpercayaan, responsif, jaminan, dan empati. Model SERVQUAL telah digunakan secara meluas dalam pelbagai sektor termasuk pendidikan dan perkhidmatan awam bagi menilai persepsi pelanggan terhadap perkhidmatan yang diterima (Zeithaml et al., 2009). Dalam konteks perkhidmatan sokongan ICT, penggunaan SERVQUAL adalah bersesuaian kerana model ini bukan sahaja menilai aspek teknikal perkhidmatan, malah turut memberi penekanan kepada aspek interaksi dan layanan antara penyedia perkhidmatan dan pelanggan. Oleh itu, model SERVQUAL dipilih sebagai asas teori dalam kajian ini untuk menilai kualiti perkhidmatan Pasukan Teknikal ICT Sekolah.

Rangka Kerja Konseptual

Berdasarkan sorotan literatur, kajian ini membangunkan satu rangka kerja konseptual yang menghubungkan lima dimensi kualiti perkhidmatan SERVQUAL, iaitu ketara,

kebolehpercayaan, responsif, jaminan dan empati sebagai pembolehubah tidak bersandar dengan kepuasan pelanggan sebagai pembolehubah bersandar. Rangka kerja ini digunakan untuk menilai pengaruh setiap dimensi kualiti perkhidmatan terhadap tahap kepuasan pelanggan terhadap perkhidmatan PTIS di negeri Johor.

Hipotesis Kajian

H1 - Terdapat pengaruh yang signifikan antara dimensi ketara *(tangibles)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah.

H2 - Terdapat pengaruh yang signifikan antara dimensi kebolehpercayaan *(reliability)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah.

H3 - Terdapat pengaruh yang signifikan antara dimensi responsif *(responsive)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah.

H4 - Terdapat pengaruh yang signifikan antara dimensi jaminan *(assurance)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah.

H5 - Terdapat pengaruh yang signifikan antara dimensi empati *(empathy)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah.

H6 - Terdapat satu dimensi kualiti perkhidmatan yang paling dominan yang mempengaruhi tahap kepuasan pelanggan terhadap perkhidmatan pasukan teknikal ICT sekolah.

METODOLOGI

Bahagian ini menghuraikan reka bentuk kajian, lokasi kajian, populasi dan sampel, instrumen kajian, prosedur pengumpulan data serta teknik analisis data yang digunakan bagi mencapai objektif kajian. Pemilihan metodologi yang sistematik adalah penting bagi memastikan kesahan dan kebolehpercayaan dapatan kajian.

Reka Bentuk Kajian

Kajian ini menggunakan reka bentuk kuantitatif deskriptif bagi menilai tahap kepuasan pelanggan terhadap perkhidmatan PTIS. Reka bentuk ini dipilih kerana ia sesuai untuk memberikan gambaran menyeluruh tentang persepsi responden terhadap kualiti perkhidmatan yang diterima.

Populasi dan Sampel

Populasi kajian terdiri daripada guru dan kakitangan sekolah di sekolah-sekolah negeri Johor yang menerima perkhidmatan PTIS. Seramai 291 orang responden telah dipilih sebagai sampel kajian yang melibatkan sekolah dari 11 daerah di negeri Johor.

Instrumen Kajian

Instrumen kajian ialah soal selidik berasaskan model SERVQUAL yang merangkumi lima dimensi kualiti perkhidmatan. Walaupun model SERVQUAL menyediakan satu set instrumen soal selidik standard sebagai panduan pengukuran kualiti perkhidmatan, kajian ini tidak menggunakan sepenuhnya item soalan yang dicadangkan dalam modul asal tersebut. Sebaliknya, instrumen kajian telah dibangunkan sendiri oleh pengkaji dengan berpandukan lima dimensi utama SERVQUAL, iaitu kebolehpercayaan *(reliability)*, jaminan *(assurance)*, bukti fizikal *(tangibles)*, empati *(empathy)* dan responsif *(responsive)*. Pembinaan item soalan ini disesuaikan dengan konteks kajian serta latar belakang responden bagi memastikan kesesuaian, kefahaman dan ketepatan pengukuran terhadap tahap kepuasan pelanggan dalam

perkhidmatan yang dikaji. Skala Likert lima mata digunakan bagi mengukur tahap persetujuan responden terhadap setiap item.

Kesahan dan Kebolehpercayaan Instrumen
Ujian kebolehpercayaan menunjukkan nilai Cronbach Alpha yang tinggi bagi keseluruhan instrumen dan setiap dimensi, sekali gus membuktikan instrumen kajian mempunyai tahap kebolehpercayaan yang sangat baik (Hair et al., 2014).

Kaedah Analisis Data
Data dianalisis menggunakan statistik deskriptif yang melibatkan min dan sisihan piawai bagi menentukan tahap kepuasan pelanggan terhadap perkhidmatan PTIS.

ANALISIS DAN HASIL KAJIAN
Analisis data kajian secara terperinci dilakukan untuk membincangkan maklum balas responden terhadap soal selidik yang diedarkan. Kajian kuantitatif dianalisis menggunakan perisian SPSS secara deskriptif. Analisis kajian berbentuk deskriptif dilakukan bagi menghuraikan persoalan pertama, kedua dan ketiga berkenaan tahap kepuasan pelanggan bagi perkhidmatan (PTIS).

Maklumat Demografi Responden
Sebanyak 291 orang responden yang terdiri daripada guru dan kakitangan pelaksana daripada sekolah di bawah Kementerian Pendidikan Malaysia di dalam negeri Johor. Data demografi yang dikumpul merangkumi maklumat jantina, jawatan di sekolah, tempoh perkhidmatan dan status pernah membuat aduan atau permohonan berkaitan perkhidmatan ICT kepada Pasukan Teknikal ICT Sekolah (PTIS).

Jadual 4.1 : Demografi Responden

Bil	Kategori	Kekerapan	Peratus
1.	**Jantina**		
	Lelaki	101 orang	34.71%
	Perempuan	190 orang	65.29%
2.	**Jawatan di Sekolah**		
	Pentadbir	32 orang	11.00%
	Guru Akademik Biasa	133 orang	45.70%
	Guru ICT / Penyelaras ICT	95 orang	32.65%
	Pembantu Tadbir	31 orang	10.65%
3.	**Tempoh Perkhidmatan**		
	Kurang daripada 3 tahun	43 orang	14.77%
	3 hingga 5 tahun	24 orang	8.25%
	6 hingga 10 tahun	32 orang	11.00%
	Lebih daripada 10 tahun	192 orang	65.98%
4.	**Adakah anda pernah membuat aduan atau permohonan berkaitan perkhidmatan ICT kepada Pasukan Teknikal ICT Sekolah (PTIS)?**		
	Ya	176 orang	60.48%
	Tidak	115 orang	39.52%

Analisis Kebolehpercayaan Instrumen

Ujian kebolehpercayaan Cronbach Alpha dijalankan bagi menilai konsistensi dalaman item soal selidik. Jadual 4.2 menunjukkan nilai Cronbach Alpha keseluruhan melebihi 0.90. Dapatan ini menunjukkan instrumen kajian mempunyai tahap kebolehpercayaan yang tinggi dan sesuai digunakan.

Jadual 4.2 : Nilai Cronbach Alpha Kepuasan Keseluruhan

Domain	Jumlah Item (N)	Cronbach Alpha
Kepuasan Keseluruhan	5	0.912

Ujian kepercayaan juga dijalankan mengikut lima dimensi SERVQUAL dan hasil ujian mendapati nilai Cronbach Alpha mengikut dimensi juga melebiihi 0.90. Jadual 4.3 menunjukkan nilai Cronbach Alpha mengikut dimensi.

Jadual 4.3 : Nilai Cronbach Alpha Mengikut Dimensi

Dimensi	Jumlah Item (N)	Cronbach Alpha
Ketara	**4**	**0.912**
Kepercayaan	**5**	**0.958**
Responsif	**4**	**0.951**
Jaminan	**5**	**0.974**
Empati	**5**	**0.969**

Tahap Kepuasan Pelanggan Secara Keseluruhan

Dapatan kajian menunjukkan tahap kepuasan pelanggan terhadap perkhidmatan PTIS berada pada tahap tinggi secara keseluruhan. Hal ini menunjukkan perkhidmatan yang disediakan oleh PTIS secara umumnya memenuhi keperluan dan jangkaan pelanggan di sekolah. Jadual 4.1 menunjukkan Tahap Kepuasan Pelanggan Secara Keseluruhan.

Jadual 4.4 : Tahap Kepuasan Pelanggan Secara Keseluruhan

Pembolehubah	Min	Sisihan Piawai	Tahap
Kepuasan Keseluruhan	4.18	0.67	Tinggi

Tahap Kepuasan Mengikut Dimensi SERVQUAL

Analisis lanjut mendapati semua dimensi SERVQUAL mencatatkan nilai min yang tinggi.

Jadual 4.5 : Tahap Kepuasan Pelanggan Mengikut Dimensi

Dimensi	Min	Sisihan Piawai	Tahap
Ketara	4.07	0.60	Tinggi
Kebolehpercayaan	4.10	0.65	Tinggi
Responsif	4.12	0.66	Tinggi
Jaminan	4.20	0.65	Tinggi
Empati	4.17	0.65	Tinggi

Dimensi SERVQUAL Paling Dominan - Analisis Regresi Linear

Bagi menguji hipotesis kajian H1 hingga H6, analisis regresi linear berganda telah dijalankan bagi menilai pengaruh dimensi SERVQUAL terhadap kepuasan pelanggan. Jadual 4.6 menunjukkan nilai pekali korelasi (R) adalah sebanyak 0.918, manakala pekali penentu adalah (R2) ialah 0.843. Hal ini bermaksud sebanyak 84.3% varians kepuasan pelanggan dipengaruhi oleh kualiti perkhidmatan. Ujian signifikan terhadap model regresi menunjukkan bahawa model tersebut adalah signifikan secara statistik dengan nilai F (5,285) = 306.380, p<0.01 seperti yang ditunjukkan dalam jadual ANOVA di Jadual 4.7. Jadual 4.8 pula menunjukkan nilai Beta bagi dimensi ketara (tangible) ialah β = 0.206 dengan nilai t = 4.892, dan p<.001. Dimensi kepercayaan *(reliability)* pula mencatatkan nilai β = 0.67 dengan nilai t = 1.272, dan p>.001. Dimensi responsif *(responsive)* mencatatkan β = 0.111 dengan nilai t = 1.930, dan p<.001. Nilai beta bagi dimensi jaminan *(assurance)* pula ialah β = 0.155 dengan nilai t = 2.712, dan p>.001 manakala dimensi empati *(empathy)* pula mencatatkan nilai β = 0.441 dengan nilai t = 7.851, dan p<.001. Dapatan ini menunjukkan dimensi ketara *(tangible)* dan empati *(empathy)* signifikan terhadap kepuasan pelanggan dengan dimensi dimensi empati *(empathy)* menjadi faktor yang dominan dalam mempengaruhi tahap kepuasan pelanggan bagi perkhidmatan PTIS.

Jadual 4.6 : Jadual Regresi Linear

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.918ᵃ	.843	.840	.26817	.843	306.380	5	285	<.001

a. Predictors: (Constant), MIN_EMPATHY, MIN_TANGIBLE, MIN_RELIABLE, MIN_ASSURANCE, MIN_RESPONSIF

Jadual 4.7 : Jadual Anova

ANOVAᵃ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	110.169	5	22.034	306.380	<.001ᵇ
	Residual	20.496	285	.072		
	Total	130.665	290			

a. Dependent Variable: MIN_KEPUASAN

b. Predictors: (Constant), MIN_EMPATHY, MIN_TANGIBLE, MIN_RELIABLE, MIN_ASSURANCE, MIN_RESPONSIF

Hasil analisis menunjukkan bahawa dimensi ketara (β = 0.206, p < .001) dan empati (β = 0.441, p < .001) mempunyai pengaruh yang signifikan terhadap kepuasan pelanggan. Oleh itu, hipotesis H1 dan H5 adalah diterima. Dimensi empati dikenal pasti sebagai faktor paling dominan, justeru hipotesis H6 turut diterima. Sebaliknya, dimensi kebolehpercayaan, responsif dan jaminan tidak menunjukkan pengaruh signifikan (p > .001), maka hipotesis H2, H3 dan H4 adalah ditolak.

Jadual 4.8 : Jadual Pekali

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.059	.112		-.522	.602
	MIN_TANGIBLE	.231	.047	.206	4.892	<.001
	MIN_RELIABLE	.069	.054	.067	1.272	.205
	MIN_RESPONSIF	.113	.058	.111	1.930	.055
	MIN_ASSURANCE	.159	.059	.155	2.712	.007
	MIN_EMPATHY	.453	.058	.441	7.851	<.001

a. Dependent Variable: MIN_KEPUASAN

PERBINCANGAN

Nilai min bagi tahap kepuasan keseluruhan pelanggan menunjukkan skor yang tinggi (Min = 4.18), menunjukkan secara keseluruhannya pelanggan berpuas hati dengan perkhidmatan yang diberikan oleh PTIS. Ini menunjukkan bahawa penyampaian perkhidmatan ICT memenuhi jangkaan pelanggan dalam aspek kelancaran operasi harian sekolah dan sokongan. Ini secara langsung dapat meningkatkan produktiviti warga sekolah khususnya dan warga pendidikan amnya. Dapatan ini selari dengan kajian lepas di mana tahap kepuasan peserta dalam program pendidikan dan latihan dapat meningkatkan keberkesanan program dan kelestarian serta reputasi sesebuah institusi (M. A. Dzakwan & F. Ubit, 2025). Analisis kajian mengikut dimensi SERVQUAL mencatatkan nilai min yang tinggi bagi kelima dimensi, >4.00. Namun, dimensi ketara *(tangibles)* dan dimensi empati *(empathy)* mempunyai hubungan yang signifikan terhadap tahap kepuasan pelanggan dengan nilai p<.001 bagi kedua dimensi. Justeru dapatan ini, menyokong hipotesis pada kajian literatur di mana, H1-Terdapat pengaruh yang signifikan antara dimensi ketara *(tangibles)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah. Dapatan ini disokong dengan literatur terkini yang menunjukkan bahawa aspek fizikal prasarana dan kemudahan perkhidmatan mempunyai hubungan positif dengan kepuasan pelanggan dalam konteks perkhidmatan pendidikan dan latihan, di mana dimensi ketara dianggap sebagai salah satu elemen penting dalam model SERVQUAL. Kajian literatur oleh M. Suryaman & M. Tukiran (2025) menyatakan bahawa kemudahan fizikal dan infrastruktur perkhidmatan berkait rapat dengan persepsi kepuasan pelanggan serta membantu mengukuhkan kepercayaan pelanggan terhadap perkhidmatan yang disediakan. Dimensi ini mencerminkan kehadiran peralatan fizikal, kemudahan dan dokumen yang terurus serta profesionalisme PTIS merupakan elemen yang secara langsung dapat dilihat dan dinilai terus dan cepat oleh pelanggan.

Penilaian bagi dimensi empati juga signifikan dan dominan dengan mencatatkan nilai p<.001, β = 0.441. Ini secara langsung menyokong hipotesis H5-Terdapat pengaruh yang signifikan antara dimensi empati *(empathy)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah dan H6-Terdapat satu dimensi kualiti perkhidmatan yang paling dominan yang mempengaruhi tahap kepuasan pelanggan terhadap perkhidmatan pasukan teknikal ICT sekolah. Dalam kajian sistematik yang menyelaras perkhidmatan pendidikan dan latihan, M. Suryaman & M. Tukiran (2025) turut menunjukkan bahawa dimensi empati sebagai cerminan perhatian peribadi dan kefahaman terhadap keperluan pelanggan dan memberi impak

yang signifikan kepada persepsi kepuasan pelanggan. Keputusan ini menunjukkan bahawa aspek perhatian, kefahaman terhadap keperluan pengguna serta keprihatinan PTIS memainkan peranan yang lebih penting berbanding dimensi kualiti perkhidmatan yang lain dalam membentuk persepsi kepuasan pelanggan. Dapatan kajian bagi dimensi kebolehpercayaan mencatatkan nilai min yang tinggi (M = 4.10), ini menunjukkan bahawa pelanggan menilai pelaksanaan perkhidmatan Pasukan Teknikal ICT Sekolah sebagai konsisten, tepat dan boleh dipercayai, termasuk pematuhan kepada garis panduan Kementerian Pendidikan Malaysia (KPM), penyelesaian aduan dalam tempoh munasabah, serta pelaksanaan penyelenggaraan peralatan ICT secara berkala. Walau bagaimanapun, dimensi kebolehpercayaan tidak menunjukkan hubungan yang signifikan terhadap tahap kepuasan pelanggan (p > .001).

Keadaan ini boleh ditafsirkan bahawa kebolehpercayaan telah dianggap sebagai keperluan asas (expected service) oleh pelanggan, dan bukannya faktor pembeza yang meningkatkan kepuasan. Apabila perkhidmatan asas ini dilaksanakan secara konsisten, pelanggan cenderung menganggap ia sebagai suatu keperluan minimum yang sememangnya perlu wujud, sekali gus menyebabkan dimensi ini tidak muncul sebagai dimensi yang signifikan terhadap kepuasan pelanggan. Oleh itu H2 - Terdapat pengaruh yang signifikan antara dimensi kebolehpercayaan *(reliability)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah adalah ditolak. Dimensi responsif turut mencatatkan nilai min yang tinggi (M = 4.12), ini mencerminkan persepsi positif pelanggan terhadap kecekapan PTIS dalam memberikan maklum balas segera, memproses permohonan perkhidmatan dengan pantas serta kesediaan membantu apabila berlaku masalah ICT di sekolah. Namun begitu, hasil analisis mendapati bahawa dimensi ini tidak signifikan dalam mempengaruhi tahap kepuasan pelanggan (p > .001).

Dapatan ini menunjukkan bahawa kecekapan dan kepantasan dalam memberi respons telah menjadi norma perkhidmatan yang dijangkakan oleh pelanggan, khususnya dalam konteks perkhidmatan sokongan ICT. Oleh itu, walaupun tahap responsif dinilai tinggi, ia tidak lagi memberi kesan tambahan terhadap kepuasan pelanggan kerana pelanggan menganggap respons segera sebagai satu kewajipan asas pasukan teknikal. Oleh itu H3- Terdapat pengaruh yang signifikan antara dimensi responsif *(responsive)* terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah adalah ditolak. Terakhir, dimensi jaminan mencatatkan nilai min tertinggi (M = 4.20) di antara semua dimensi, ini menunjukkan bahawa pelanggan mempunyai tahap keyakinan yang tinggi terhadap pengetahuan teknikal, profesionalisme dan keupayaan PTIS dalam melaksanakan inisiatif ICT di sekolah. Pelanggan juga berasa selamat dan yakin terhadap perkhidmatan yang disediakan. Walau bagaimanapun, dapatan kajian menunjukkan bahawa dimensi ini tidak signifikan dalam mempengaruhi kepuasan pelanggan (p > .001). Situasi ini menunjukkan bahawa tahap jaminan yang tinggi telah berjaya memenuhi jangkaan pelanggan, namun tidak lagi bertindak sebagai faktor pembeza yang meningkatkan kepuasan. Dalam konteks perkhidmatan teknikal ICT sekolah, kecekapan dan profesionalisme dianggap sebagai keperluan asas yang mesti dipenuhi, dan kepuasan pelanggan lebih dipengaruhi oleh elemen hubungan interpersonal seperti empati dan perhatian peribadi. Oleh itu H4 - Terdapat pengaruh yang signifikan antara dimensi jaminan

(assurance) terhadap tahap kepuasan pelanggan kepada perkhidmatan pasukan teknikal ICT sekolah adalah ditolak.

KESIMPULAN

Kajian ini dijalankan bagi menilai tahap kepuasan pelanggan terhadap Perkhidmatan Pasukan Teknikal ICT Sekolah (PTIS) di sekolah-sekolah negeri Johor berdasarkan model SERVQUAL. Secara keseluruhannya, dapatan kajian menunjukkan bahawa tahap kepuasan pelanggan terhadap perkhidmatan PTIS berada pada tahap tinggi, sekali gus mencerminkan keberkesanan perkhidmatan sokongan ICT dalam menyokong kelancaran operasi pentadbiran sekolah serta pelaksanaan pengajaran dan pembelajaran berasaskan teknologi. Analisis mengikut dimensi SERVQUAL mendapati bahawa semua lima dimensi kualiti perkhidmatan iaitu ketara, kebolehpercayaan, responsif, jaminan dan empati mencatatkan nilai min yang tinggi. Walau bagaimanapun, hasil analisis regresi menunjukkan bahawa dimensi ketara dan empati mempunyai pengaruh yang signifikan terhadap tahap kepuasan pelanggan, manakala dimensi empati dikenal pasti sebagai dimensi paling dominan dalam mempengaruhi kepuasan pelanggan terhadap perkhidmatan PTIS. Dapatan ini menunjukkan bahawa selain penyediaan kemudahan fizikal dan peralatan ICT yang mencukupi, aspek layanan, perhatian peribadi serta kefahaman terhadap keperluan pengguna memainkan peranan yang lebih besar dalam membentuk persepsi kepuasan pelanggan. Sebaliknya, dimensi kebolehpercayaan, responsif dan jaminan walaupun dinilai tinggi oleh pelanggan, tidak menunjukkan pengaruh signifikan terhadap tahap kepuasan pelanggan. Keadaan ini mencerminkan bahawa ketiga-tiga dimensi tersebut telah dianggap sebagai keperluan asas yang sememangnya perlu dipenuhi oleh perkhidmatan sokongan ICT sekolah, dan bukan lagi faktor pembeza yang meningkatkan kepuasan pelanggan. Secara keseluruhannya, kajian ini mengukuhkan kesesuaian penggunaan model SERVQUAL dalam menilai kualiti perkhidmatan sokongan ICT dalam konteks pendidikan. Dapatan kajian ini diharapkan dapat menjadi rujukan kepada pihak pengurusan pendidikan dan pihak berkepentingan dalam merancang serta menambah baik kualiti perkhidmatan PTIS, khususnya dengan memberi penekanan kepada aspek empati dan hubungan interpersonal bagi meningkatkan tahap kepuasan pelanggan secara berterusan.

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ASSESSING THE PRECEIVED COMMERCIAL VALUE OF UNIVERSITI TEKNOLOGI MALAYSIA (UTM) SPIN-OFF COMPANIES AMONG STUDENTS

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ABSTRACT

University spin-offs companies play an important role in commercial academic research and contributing to innovation, economic development and social impact. Since 2004, Universiti Teknologi Malaysia (UTM) has actively established spin-off companies as parts of its research commercialisation strategy. University spin-offs companies also represent vital mechanism in translating academic research into commercial value. However, limited students awareness and understanding may affect how commercial values perceived. This studies quantitatively to aim the perceived commercial value of Universiti Teknologi Malaysia (UTM) spin-off companies among its student. The study also aim to understand students level of awareness, perception of economic impact, innovation and market relevance, and the main source information influencing these perceptions. A cross sectional survey design was employed using structured questionnaire distributed to undergraduate and postgraduate students for all faculties at UTM through random sampling and share link via google form. Statistical analyses were condected to analyse collected data. The findings of this study are expected to highlight the awareness gap among students and identify key factors of their evaluation of spin-offs initiatives. The results will provide valuable insights for UTM in improving communications strategies, enhance students involvement and streghtening UTM entreprenuerial system.

Keywords: Perceived, Awareness, Students

INTRODUCTION

University spin-off refers to a collection of companies that makes the utility of technological inventions and ideas that would otherwise remain unexploited or in some cases underutilized. University spin-offs are of various types all of which fulfil the purpose of creating utility of the vast knowledge innovative university students have to offer (Fu et al., 2022). Some of the subtypes include but are not limited to, Crucell, Lycos and Plastic logic it should be noted that the ones I have shortlisted are among the prominent subcategories of university spin-offs. University spin-off in University Technology Malaysia (UTM) is a company founded in exploits the result of university research (Hrivnák et al., 2022). University will invest in protecting the Intellectual property (IP) of each company research in return university will get a share of the company. A company founded with USOs will get licenses for the technologies from the university. However, in most cases patent rights are held by the company itself. USOs are form in two (2) approaches from university research. This will be called INSIDE OUT approach and the OUTSIDE IN approach. The inside out approach required the intrapreneur that is someone within university such as professor of the quoted university to commercialize close market technologies and identify industrial client. On the other hand, the outside in approach involves someone outside the quoted university (an extern) such as entrepreneur or

early-stage start-up coming to the university within industry need and seeking solution to take to market. The technologies were mid stage TRL, but entrepreneur has good vision of market and its potential client. Some countries have come up with mechanisms to boost the innovativeness of university students this is because of the realization of the pivotal role played by university students in the field of research and innovations (Benassi et al., 2022). The fact that some countries allow students to be accredited the intellectual property rights abbreviated as IP on innovations and ideas they come up with have developed has enacted motivation to many students to devote their extra time and energy to thinking about making advancements it the research field. Another motivational factor is the fact that some countries a good example being the USA funds their young researchers this was not the case in the previous years where every technological or any other innovation made in an institutional laboratory or facilities had the patent rigts being given to the instituition. From state funding that comes in form of grants one a researcher can make an invention and at last get the patent rights of his/her innovations.

Academic spin-offs commercialize technological discoveries created through university research that might otherwise go untapped. The vital element of these discoveries makes it a critical area of adventure as it is through such discoveries that technological and business advancements come in happening. As a result, university or in other words academic spin-offs fall within the research spin-off umbrella. Autonomous Integrated Sdn. Bhd., Bio-pro Resources, and others. Are all instances of university spin-offs? Universities can claim intellectual property (IP) rights to innovations developed in their laboratories in most nations. Patents or in rare situations, copyrights are used to create this IP (Prencipe et al., 2022). As a result, establishing the spin-off as a new organization entails either transferring the IP to the new corporation or granting it a license to use the IP. In the United States for example this is made into realization by the Bayh-Dole Act which permits universities to call for ownership of their innovations patent rights unlike before where the patent was held by the government. This has increased the usefulness of USOs as it as a corporation is actively involved in the seeing of transfer of intellectual property. Universities play a critical role in other word universities harbours brains with great intellectual capabilities, 21st century has seen the role of the world universities changing at a rapid rate portraying a massive interest in the research fields enhancing commercialization of university-based knowledge amongst scholars and other stakeholders (Facoor et al., 2009). This places university spinoffs on a pivotal point of assuring positive change. USOs represent one mechanism that commercialize knowledge luring substantial attention as a result of its great ability in ensuring continuous and positive growth of local economic development as well as assisting the teaching practice in the universities inclusive of research and creation of high performing and efficient firms.

The essential and contribution of USOs has widely been spoken of with many studies highlighting its contribution. For instance, in a study conducted by Bray and Lee back in 2000 with reference to small sample based in the US found that averagely, technology transfers offices made higher returns sourcing from equity stakes of their USOs. The ever growing interest is being credited to the increase in academic interest, and the increase yearns for innovativeness. However, on the same knot of USOs it has been observed that apart from boosting professionalism and commercialization of academic work it has also won the approval and acceptance as it holds fairness in distribution and ownership of royalties through the adoption of procedures that are transparent in spin-off formation process.

UTM started with first USOs in 2004 by company name Phyto Biznet Sdn. Bhd. As Prof. Dr. Mohamad Roji Sarmidi as company representative. This company has been monitoring by UTM ICC department. Since then, UTM ICC has 45 companies under ICC umbrella to commercialize UTM technologies product to the market.

LITERATURE REVIEW

Definition University Spin-off

University spin-offs are businesses that transform technological discoveries created via university research that would otherwise go untapped. They are a type of research offshoot. Universities can claim intellectual property (IP) rights to technology developed in their laboratories in almost all nations (Facoor 2009). Patents or, in rare instances, copyrights are used to create this IP. As a result, forming the spin-off is a lengthy process. As a result, establishing the spin-off as a new organization entails either transferring the IP to the new corporation or granting it a license to use the IP.

Over the past years, academic entrepreneurship has found greater visibility universities are being considered as a source of research to generate high performing firms. "Spinoff," according to Pirnay and colleagues (2003), is a hazy and broad concept that encompasses a wide range of phenomena, of which a university spinoff is only one form. This claim may also lead to a muddled understanding of spinoffs, obstructing definitional comprehension of the notion.

Why need of USO and How USO created
WHY?

USOs are important for economic development (Lowe 2002) commercializing university research, technologies and assisting universities with objective and mission as centers of knowledge and research.

Economic development

- Creating business opportunities by translating research results into workable technologies leading to market solutions. Typically conducting basic business activity at locality (e.g. hiring, sourcing and vendor) it has multiplier effects on local activity economics.

Commercialization university technologies

- According to (Etzkowitz 2003) USO will give a framework for businesses to market ideas with a high level of uncertainty, reducing interest from larger businesses.
- According to (Shane, 2004) USO provides a mechanism for ensuring inventor participation in the subsequent development of university technologies, which is critical when technologies are dependent on tacit knowledge.

In addition to providing an efficient mechanism to involve the inventor of the technology in the commercialization process, university spinoffs also assist in the commercialization of university technologies (Hindle & Yencken, 2004; Jensen & Thursby, 1998). Researchers like to work at university spinoffs because they think they'll be more interesting or challenging than established firms (Kenney, 1986). Therefore, university inventors are more likely to work with

new companies looking to commercialize their inventions than they are with established companies. Also start up firms seeking new technologies to expose in the market to boost the company name if the project successfully executes. By collaborating with universities, they help the start up company to seek new products for release in the market and as university researchers are more interested in technology development than business. Equity is also a more effective means of ensuring inventor involvement in spinoffs than other compensation methods. If an institution does not have a university spinoff, attracting and keeping productive science and engineering faculty can be extremely challenging. Universities provide a financial incentive to retain and recruit faculty members by allowing them to supplement their salaries with equity in their own companies, particularly in biomedical fields where this works similarly to practice plans used by clinical faculty in medical schools (Jones & Gold, 2001). Research in the field of biological sciences has shown that faculty members are less likely to leave universities for higher paying jobs in industry after they are permitted to start spinoffs (Powell & Owen-Smith, 1998).

HOW?

There is a multistage process involved in creating the technology use of USOs. Government, industry and funds are used to support scholarly research in science and engineering. Some research results of the creation of new technology brought attention to the university. The university's technical admissions office can then decide whether to not seek intellectual property protection for inventions and then work to license the technology. Policies regarding the retention and protection of intellectual property vary from university to university, but in most cases established companies are licensees of university inventions and in some cases start-up companies are licensees. From the initial research phase, the university technology development process involved a lot of hard work, with only a few efforts producing results that marked the transition to the next phase. There are three widely used models for creation of USOs:

In the first model, Ndonzuau, Pirnay, and Surlemont (2002) four important stages identified in development of USOs:
1)   Generate variable business idea
2)   Translate idea into business process
3)   Creating firm
4)   Contribute value to stakeholders (internal and external).

All four-models depend on each other's decision made in an earlier stage. Second model, by Shane (2004) it consists of five stages and describes the typical process of creating a university affiliate. The first state is purely academic, but the model of potential tangential technologies can also be realized to enable new products and services. If researchers believe their new technology is an invention that can be commercialized, they disclose it to the university's technology licensing agency. Then, in the third stage, the potential to protect the intellectual property is assessed and a patent application is filed. With limited monopoly on patents, technology transfer agencies can license technology to incumbents, or researchers can create a spin-off company. The creation of technology is a critical practice that can be done by university spin-off that comprises of the multi-stage processes. Funding from the university, government, foundations, and industries can be used to support the scholarly research in engineering the

general science. Typically, some research can lead in the creation of new technology that highly attracts the attention of the university (Odei and Novak 2022). The technology-licensing office of the university may then decide to seek for the intellectual protection for the invention. After this process, the university management may put in some efforts ton licensing of the technology. Policies concerning the protection ande the retention of the intellectual property may be vary from one university to another. However, in most cases the companies which are already established are the licensees of the inventions made by the university. Commencing wit the initial stage, the university technology development process involves the considerable amounts of hard work. These efforts can lead to outcomes that will determine the progression to the following stage. Therefore, on this particular study, there will be nee to discuss three main models which are widely accepted as far the creation of the university spin-off is concerned.

Impact of University spin-off on the Economic development and Commercialization of university technologies

University spin-offs have got significant number of impacts on both economic and commercialization of university technologies. The introduction and execution of the idea of university spin-offs has had a great impact on the public socially and has greatly left and still is positively contributing to the general economy. The execution of the spin-off idea has led to creation of new jobs assuring the general public livelihoods employment opportunities in the spin-off companies. The idea was positively embraced by investors and entrepreneurs who ventured and still venture in the field opening corporation in various part of the world this in turn creates new job opportunities for the benefit of the general public. University spin-offs has also made it easy for the harnessing of vital knowledge related to researching entrepreneurship which has lead to the creation of successful firms increasing their production capacities and employability creating job slots that have seen economic status of those that would otherwise be unemployed improve. USOs have also had a critical role in the shaping of the roles that universities play in the regional and development through shaping their entrepreneurial skills. This is as a result of university affiliates being exposed to the problems in the real world and given an interactive platform to interact with the purpose of coming up with solutions. Regional developments are likely to increase a great deal as a result of the motivational factors USOs has to offer inclusive of the fair issue of patent rights. USOs have also had a great impact in the educational sector. With most of the USOs corporates dedicating heir energy on mostly the field of research, consultancy as well as other business support services it has it has enacted the yearning for research among many university students as well as boost their interest in the same (de Lucena et al., 2022). This has lead to maximum use and exploitation of student's research capabilities. USOs has also has added values to the research efforts of students as through tapping of what otherwise would be rendered to waste has had played a motivational role cheering up the innovative trait through research.

The entrepreneurial university model has gained prominent scholarly attention as knowledge and innovation concept vital for improved competitiveness, economic growth and wealth creation (Pugh et al., 2018). Universities undertaking entrepreneurial activities are classified as more efficient in research commercialization through mediums such as licenses and patents or mainly through spin-off creations (O`Shea et al., 2007). Knowledge transfer and academic research commercialization activities have helped in the classification of universities as innovators. Universities and other higher educational institutions have become knowledge hubs

and birthplaces of academic spin-offs that boost the commercialization of research and the creation of new firms (Fuerlinger et al., 2015). Scientific discoveries are commercialized through spin-offs established close to university campuses and academic researchers (Odei & Stejskal, 2018). MIT, Stanford, and the University of Wisconsin were pioneers in having good patent policies and in developing technology transfer that established new businesses and created new industries. The second wave has occurred in Western Europe since the early 1990s when universities in the United Kingdom, France, Belgium, the Netherlands and other countries turned into entrepreneurial organizations with commercial responsibility to promote socio-economic development (Dalmarco et. al., 2018). British entrepreneurial universities identify business opportunities and increase their competitiveness by developing productive policies for academic institutions and central governments, thereby making a significant contribution to the development of the region. These universities also incorporate theoretical and methodological approaches into their academic research processes. They also launched a more hands-on approach than previous college education using descriptive industrial linkage analysis to measure economic impact. University spin-offs are related to creating new companies because they use powerful technology to create these companies. In the UK, for example, the Russell Group was economically beneficial in creating jobs, helping to provide excellent quantitative and qualitative research in education and learning, as well as transforming local businesses and the public sector (Audretsch and Belitski 2022). The UK Government has invested approximately £ 87 billion in hiring talented and skilled resource staff to support its operations. According to a Russell Group report, every £ 1 awarded to a research-intensive university by the Higher Education Innovation Fund had an impact of about £ 13 on society and the economy as a whole. In particular, according to research reports, the company produces 68% of the world's leading studies in the UK and 50% of both undergraduate and graduate studies (Russell Group, 2021). In this series of literature, the economic impact of university spin-offs and the results of university research activities were investigated.

The increasing focus on knowledge-based economies has established universities as essential catalysts for innovation, entrepreneurship, and economic advancement. In addition to their conventional functions in education and research, higher education institutions are progressively anticipated to convert academic knowledge into economically viable results via methods such as patents, licensing, and the establishment of university spin-off enterprises. Consequently, university spin-offs have emerged as a significant metric of institutional efficacy in research commercialisation and entrepreneurial capacity. Significant academic focus has been directed towards the establishment, performance, and determinants of success of university spin-off enterprises, especially in developed economies. Current research predominantly emphasises objective performance metrics, including financial returns, company survival rates, patent production, and job creation. Although these measurements yield significant insights into commercial outcomes, they provide a constrained picture of how internal stakeholders, particularly students, view the value generated by these businesses. The perspective of stakeholders is essential, as it affects awareness, involvement, and the enduring viability of university entrepreneurial ecosystems. In Malaysia, research on university spin-offs is rather scarce, with even fewer studies investigating perception-based assessments among students. At Universiti Teknologi Malaysia (UTM), significant institutional efforts have been undertaken to create and support spin-off enterprises; yet, anecdotal data indicates a disconnect between these programs and student understanding. This literature review synthesises both

global and local studies regarding university spin-offs, commercial value, and stakeholder perceptions, with a specific focus on student views. This chapter establishes the conceptual framework for evaluating the perceived commercial value of UTM spin-off firms among students by defining theoretical foundations, empirical findings, and existing research gaps.

Conceptual Framework

Figure 1 outlines the conceptual framework of this study. The independent variables of this study are student awareness level, perceived economic impact and Perceived innovation & market relevance while the dependent variable of this study is perceived commercial value of UTM spin-off companies.
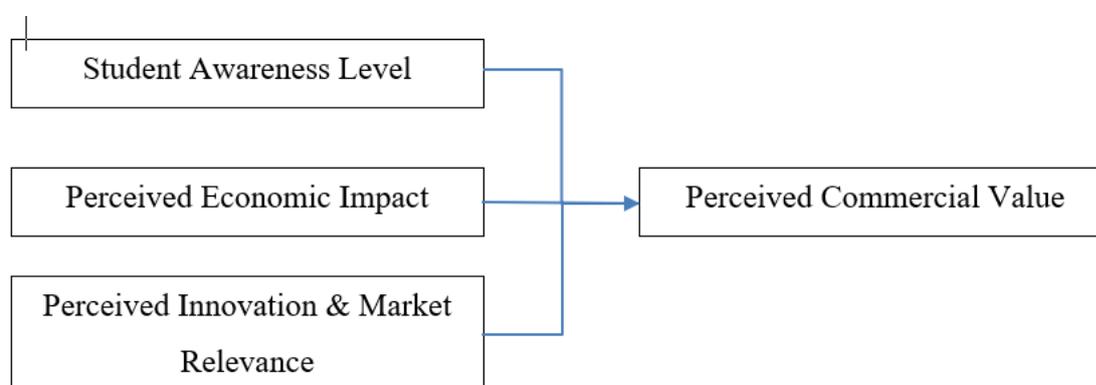

Figure 1. Research Framework

METHODOLOGY

This study will involve the use statistical package for social science (SPSS) techniques to invest the various factors contributing to the perceived commercial value of UTM spin-off companies among students. There are three main factors which need to investigation in relation to perceived commercial value of UTM spin-off companies. These factors include the aspects of Student awareness level, perceived economic impact, perceived innovation, and market relevance. Therefore, this section of the study will put much attention on the techniques that will be used to collect the required information concerning perceived commercial value of UTM spin-off companies among students. There will be also discussion on the targeted population of individuals which is necessary in providing relevant information concerning the university spin-offs. Appropriate discussion of the research design will also be discussed on this particular section of the study. There are variety of research designs that can be used in research which include descriptive research design, correlational research design, and many others (Braun and Clarke 2022). The types of tools and instruments that are used to conduct the collection and the analysis of data. There exist different types unique that can be used to collect the required information from the participants. These techniques include the use of observation, survey, questionnaire, interview, and many others. On the same note, the different techniques of data analysis include the use of regression model, charts and graphs, Pearson's correlation, descriptive statistics, and many others. This section of the study will also provide room to discuss the size of sample and population as well the sampling technique.

Research Design

Deductive approach will be used on this study to investigate the factors contributing to the perceived commercial value of UTM spin-off companies among students. The deductive approach of this study will involve the formulation of variety of hypotheses that will act as guidance to meet the research objectives. The formulation of the research hypotheses are made regarding the relationships between the aspect of Student awareness level, perceived economic impact, perceived innovation, and market relevance. Hence, upon the formulation of research hypotheses, different statistical techniques will be applied to test them using a suitable statistical software. Therefore, the use of deductive approach on this study will very useful in providing the link between the different categories of factors and the failure of university spin-offs in UTM. The use of deductive approach on this research was also necessary as it is widely used to provide conclusion on the relationships of quantitative measures within a given dataset. Figure 2 shows the questionnaire structure.

Figure 2

Content	Section	No of Item
A	Demographic Information	4
B	Awareness and information sources	4
C	Perception of economic impact	5
D	Perception of Innovation and market relevance	5
E	Overall perceived commercial value	5
F	Engagement and suggestions	2

Data collection

The collection of relevant data regarding the factors that influence the perceived commercial value of UTM spin-off companies among students will be done using the Questionnaire method. Therefore, this study utilizes primary data to explore the factors contributing to perceived commercial value of UTM spin-off companies among students. Hence, the collection of required information will be conducted in UTM among students in different courses and academic year. The questionnaire sheet used to collect data from the participants will include closed questions that will be appropriate to captures responses concerning the commercial value for university spin-offs in UTM. There participants will be given a maximum of 20 minutes to provide the required responses concerning the factors resulting to the perceived commercial value of UTM spin-off companies among students. The information collected from among students in UTM with different faculty, years, undergraduate and postgraduate will be recorded on excel sheet ready for cleaning and analysis.

Population and sample

For one to come up with more reliable and convictive research, there is need to make use of a considerable magnitude of population. The research will be conducted on a population of individuals from the tertiary learning institution named UTM. Therefore fore, a population size of 30 to 50 respondents will be used to study the factors that contribute to perceived commercial value of UTM spin-off companies among students. This population size includes the students from different departments in UTM. This research on university spin-offs will also involve extraction of a sample size of 43 respondents from the population of 50 participants. The sample size of 50 participants in UTM will be extracted using simple random sampling technique. The

technique of simple random sampling was preferred because all the participants including the students will have equal chances of being involved in the research. Therefore, the selected sample size of 50 respondents will comprise individuals with distinguished demographic factors and other related parameters. The different demographic factors will in terms of the year of study, course pursued, gender, and other categories of studies. Individuals with different demographic factors were included on the sample of 50 participants to cut down on the cases of data bias.

Analysis techniques

The process of data collection and analysis requires some essential tools or instruments to facilitate the success of the research. One of the key instrument which was used to gather necessary information concerning the factors contributing to university spin-offs is Questionnaire sheet using google form. Questionnaire sheet consisted a variety of questions concerning the aspect of university spin-offs in UTM. The questions involved are closed-ended which provide some assistance to respondents as they only make selection on the available choices. After the collection of required information from the participants in UTM, appropriate statistical tool was also applied in conducting data analysis. IBM SPSS software is a statistical tool for social sciences that was applied to carry out analysis of the collected data using different types of techniques (Paun et al., 2022). This instrument of IBM SPSS was preferred on this study as it consists powerful statistical features that are relevant in investigating the relationship that exists between different sets of variables. Some of the statistical methods that can be conducted by SPSS software include t-test, regression analysis, Pearson's correlation, and many others.

RESULT AND ANALYSIS

Demographic Analysis

Figure 3 *Respondents Demographic Analysis Result*

No.	Demographic	Frequency (N)	Percentage (%)
1.	**Faculty:**		
	Management	15	34.1
	Engineering	11	25
	Educational Science and Technology	5	11.4
	Computing	7	15.9
	Social Science	6	13.6
2.	**Level of Study**		
	Undergraduate (Bachelor)	38	86.4
	Postgraduate (Master)	5	11.4
	Postgraduate (PHD)	1	2.3
3.	**Year of Study**		
	Year 1	9	20.5
	Year 2	8	18.2
	Year 3	13	29.5
	Year 4 and above	14	31.8

No.	Demographic	Frequency (N)	Percentage (%)
4.	**Gender**		
	Male	26	59.1
	Female	18	40.9

The demographic data from 44 respondent provides important context for understanding student perception of UTM spin-offs company. Most student participate in this survey were from management student were large group of (34.1%) followed by engineering (25%) this due to faculties naturally focus more on business and technology and closely related to spin-off companies. However, this means students from other faculties are underrepresented and their perspectives on spin-offs might be different. 86.4% respondents were undergraduates and only 13.6% were postgraduate students. Due to time constraints, unable to collect more data from them as their might work closer with lecturers on research that could become spin-offs and their view might be more informed. For the years seem even across all year of study as well as gender representation were balance by male (59.1% and female (40.9%) respondents. This finding is strongly shape by management and engineering students and most of the view are from undergraduates dominate.

Reliability Test Analysis

Figure 4

Scale Component	Number of Items	Cronbach's Alpha	Interpretation
Economic Impact Perception	5 items	0.88	Excellent
Market Success Perception	5 items	0.86	Excellent
Overall Perception Scale	10 items	0.91	Excellent
Sample Size	**N = 40**		

Descriptive Analysis

Figure 5: Awareness and Knowledge Levels

Awareness Category	Frequency	Percentage	Mean Knowledge Score
No awareness at all	3	7.5%	1.00
Know exists (can't name)	23	57.5%	2.57
Know and can name some	14	35.0%	3.43
Total	**40**	**100%**	**2.85**
ICC Awareness	**Frequency**	**Percentage**	
Yes	29	72.5%	
No	5	12.5%	
Maybe	6	15.0%	

Figure 6: Perception Means Score (1-5 Scale, N=40)

Perception Statement	Mean	Std. Deviation	Interpretation	Rank
Create job opportunities	4.08	0.78	High	1
Contribute to economic growth	4.13	0.81	High	2
Generate substantial revenue	4.15	0.91	High	3
Attract investment	3.95	0.82	Moderate-High	8
Benefits outweigh costs	3.95	0.85	Moderate-High	9
Commercialize cutting-edge tech	3.90	0.79	Moderate-High	10
Address real market needs	3.98	0.83	Moderate-High	7
Successfully compete in market	3.98	0.86	Moderate-High	6
High commercial potential	4.05	0.80	High	5
Enhance university reputation	4.08	0.83	High	4
Overall Average	**4.03**	**0.69**	**High Positive**	

PEARSON correlation Results

Figure 7: Significant correlation summary

Relationship	Correlation (r)	Significance	Strength	Interpretation
Knowledge ↔Awareness	0.78	$p < 0.001$	Strong	Higher awareness = Higher knowledge
Knowledge ↔ Overall Perception	0.65	$p < 0.001$	Moderate-Strong	Knowledgeable = More positive views
Awareness ↔ Partnership Likelihood	0.58	$p < 0.01$	Moderate	Awareness increases recommendation likelihood

Relationship	Correlation (r)	Significance	Strength	Interpretation
Economic Impact ↔ Market Success	0.82	$p < 0.001$	Strong	Perceptions are consistent across dimensions
Knowledge ↔ Entrepreneurship Motivation	0.52	$p < 0.01$	Moderate	Knowledge inspires entrepreneurial interest

CONCLUSION

The research indicates a robust awareness and favourable view of UTM spin-offs among students. The primary opportunity resides in transforming general awareness into targeted knowledge and experiential involvement. Ninety percent of students express a desire for further learning, indicating a strong demand for practical experience. UTM possesses substantial potential to capitalise on its spin-off ecosystem to improve student development, fortify university-industry connections, and amplify entrepreneurial endeavours. The strategic recommendations delineate a defined course towards:

1. Augment specialised knowledge via comprehensive education
2. Enhance experience involvement via organised initiatives
3. Enhance communication via certain channels
4. Encourage interdisciplinary collaboration for comprehensive development

Final Recommendation: Establish a unified "Spin-off Education and Engagement Initiative" aimed at integrating UTM spin-offs as a hallmark of the student experience and a significant distinction for the university.

LIMITATION

This research highly relies on primary data collected from respondents that are survey as sample are skewed toward faculty management (AHIBS) (42.5% and Year of 3 to 5 years student (67.5%), cross-sectional design limited to causal inferences and data collected bias to management and engineering student which is undergraduate that not much involvement with industries and research primarily. This study highly relies on the quantitative methods of data analysis to meet the research objectives without involving qualitative statistical analysis.

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