

DETERMINING THE VENDING MACHINE PURCHASING EXPERIENCE TOWARDS CUSTOMER SATISFACTION AMONG UNIVERSITY STUDENTS

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Abstract: *Vending machine utilization can give customers easy, autonomous services and is available 24 hours a day. The primary goal of this study is to determine the relationship between vending machine purchasing experiences and customer satisfaction and the most influential determinants. Mode of payment, vending machine condition, vending machine maintenance, product assortment, and product freshness were evaluated. Data is collected from 364 consumers in the UiTM Terengganu campus via an online survey. This study focuses on three Terengganu campuses: UiTM Dungun, UiTM Bukit Besi, and UiTM Kuala Terengganu. Frequency analysis, descriptive analysis, and multiple regression analysis were performed. Machine maintenance is an essential aspect determining consumer satisfaction when purchasing via vending machines. As a result, the findings of this study can assist vending machine retailers in preserving customer loyalty, acquiring new consumers, and helping the company to thrive in the future.*

Keywords: *vending machine, purchasing experience, food choices, university students, customer satisfaction.*

Introduction

Vending machines typically offer convenient, self-contained services and are available 24 hours a day, seven days a week. Consumers, particularly in urban regions, seek items that are of good quality, convenient to obtain, deliver quickly, and are new (Mulyani et al., 2019). Vending machines are getting increasingly popular since they are simple to use and provide fast food in

today's world (Wood et al., 2019). In captive and semi-captive venues such as universities, airports, and train stations, vending machines are key marketing channels for distributing refreshments to customers.

According to Whatnall, Patterson, & Hutchesson (2020) (Whatnall et al., 2020), universities or campuses are among the most common sites where unhealthy food is available via vending machines. A busy lifestyle, according to Bavani & Peng (2016) (Bavani et al., 2016), encourages people to buy food or beverages from vending machines due to lack of time during break or lunch hours. Busy people choose to buy snack food or other unhealthy foods since they are easier to obtain than going to a restaurant and waiting for at least 30 minutes.

Food freshness, taste, and good service are the three most important variables in consumer happiness. Customers are more satisfied with higher quality food that has ideal flavour, freshness, colour, and other attributes, according to (Rafael et al., 2019) investigation. The food factor, facility factor, menu factor, and service factor are all aspects that influence the selection attributes of eating establishments, according to the study. The menu, on the other hand, has the greatest beneficial impact on consumer satisfaction.

Malaysians, according to Koh & Rayden (2019) (Koh et al., 2019), continue to use traditional payment methods, which are cumbersome for those who do not have coins or banknotes. Payment in cash is inconvenient due to the currency's availability and condition. With a bill acceptor loaded to capacity, vending machine services may not perform another vending sale, putting them out of business. The conventional cash and coin payment system, which is still commonly utilised on the streets today, was the source of most of the problems.

The supplier may suffer if the vending machine is placed outside the community area and concealed from view. Vending machines would typically restore selling equipment that still has products available for purchase but cannot sell inventory due to malfunction. The issue is that the vending machine should be positioned away from the neighbourhood and in a hidden spot. One downside is that the vending machine could be a target for vandalism. Vandalism may influence other users' functionality and enjoyment.

The vending machine has the potential to generate a considerable amount of money. According to the study, the difficulty of doing maintenance is also attributable to the expense and time needed in vending machine repair. The problem is that vending machines in study areas are not properly maintained, resulting in some of them not working when customers need them the most.

The purpose of this study is to determine the purchasing experience among the university students who used the vending machines and to uncover how university students used vending machines to make purchases. Vending machines are not commonly used as they are only found in a few places, such as urban regions. The technology employed is still behind other Asian countries like China and Japan. As a result, the experience and happiness of customers using vending machines remain a mystery because there has not been much research done on the subject (Bavani et al., 2016).

Finally, this research looks into the elements that may affect customer satisfaction with vending machines at UiTM Terengganu. The limitations of doing this research is the Coronavirus outbreak in Malaysia. Thus, to complete this study, the researchers take initiatives and continue

with online survey in receiving more comprehensive result. Three Universiti Teknologi Mara (UiTM) Branches in Terengganu campuses; Dungun, Bukit Besi and Kuala Terengganu was chosen due their location at sub-urban areas (Dungun and Kuala Terengganu) and rural (Bukit Besi) area not have many facilities that can help students at the campus. Most of the complaint came from students who stayed at the residential college. Most of the time, the stalls closed after 10 o'clock at night and they can't reach the foods and drinks at midnight. Therefore, this study employs a survey questionnaire, and the results are analysed to see if the hypothesis is accepted.

Literature Review

Technology has also impacted the food business, delivering greater benefits to communities (Stansberry et al., 2019). Furthermore, improvements in information and communication technology (ICT) have revolutionised the way service organisations connect with their clients, resulting in improved service quality (Lovelock et al., 2004), (Iqbal et al., 2018). Self-service technology (SST) is one of the technologies constantly improving to provide the finest value-added services to their clients, thereby enhancing efficiency and satisfaction (Tsou et al., 2017). Vending machines are self-service machines that sell a variety of goods such as food, beverages, and tickets (Lumsden et al., 2019).

Vending machines are commonly found in high-density areas such as schools, workplaces, residential areas, and public areas. As a result, it is no surprise that vending machines are stocked with high-energy but low-nutrient beverages and foods (Griffiths et al., 2020). Price, according to Hua & Ickovics (2016), is one of the most essential factors because it can impact and encourage customers to buy the product. Most of the time, purchasing decisions are made on the basis of a lower price with a healthier option. Participants chose a cost level based on perceived healthfulness, affordability, and payment simplicity. According to (Mansor et al., 2018), most students in UiTM Puncak Alam's Residential College favoured low-cost meals and beverages. Vending machines are becoming more widespread for purchasing foods, according to (Mansor et al., 2018), yet it is rare to see vending machines that solely offer healthy food options. In Malaysia, most vending machines only offer low-nutrient items and energy-dense snacks, with little to no nutritious options. Students' purchasing patterns are changing because of the convenience of buying and acquiring food whenever and wherever they need it.

Freshness is another crucial factor to consider when guaranteeing safe production and high-quality products (Cavanna et al., 2019). Crispness, juiciness, and scent are all indicators of product freshness. Because buyers believe it is healthy, product freshness is essential in purchase behaviour (Lyu & Choi, 2020). Even though part of the products may arrive pre-made, the vending machine with fresh food can be created or made into a huge lunch content supplier, increasing shelf life (freshness and safety) among professional vendors (Sibanda et al., 2020). Introducing cashless payments facilitates payments, shortens remittance timelines, and improves monetary control and tax policies. According to (Sibanda et al., 2020), vending machines used to accept coins as payment, but now debit and credit cards are accepted. The vending machine implemented cash and card payment options to make payment more flexible for consumers, according to (El-sharawy et al., 2020). It is possible to improve customer experiences by upgrading the vending machine's payment method, which can have a positive impact on customer satisfaction with the vending machine. Even though Asian countries are mostly developed, vending machine technology is still outdated, particularly in payment methods. The typical payment method is inconvenient and has numerous flaws (Hutomo et al., 2020).

The state of the vending machine influences customer happiness. Accessibility, signage, and position were factors in the vending machine's condition. The vending machine's appearance, cleanliness, and position are all critical factors. According to (Santos et al., 2020), the vending machine's location has an impact on consumer satisfaction. Secure inexpensive location, storing vending trucks that are not in use, and bulk product purchases can all help to decrease costs, resulting in a more profitable operation (Lucan et al., 2019).

The term "machine maintenance" refers to a collection of technical, administrative, and managerial activities. The objective of machine maintenance is to keep the machine reliable to function properly, which necessitates a precise and consistent maintenance approach to keep the manufacturing process running. Customer satisfaction is a pleasant sensation experienced by customers when their expectations for a product are met. When a consumer is satisfied, they are more likely to buy again, and they are more likely to tell their friends and relatives about their positive experience with the product (Septiani et al., 2018).

Methodology

The primary goal of this research is to examine how vending machine purchasing experiences influence customer satisfaction among university students from various fields, ages, and educational levels. The descriptive research design, frequency research design, and regression research design were all used in this study. The descriptive research approach was chosen because it explains the pleasure of university students who use vending machines. The study then focuses on the 4H1W approach, which includes "how (how to determine customer satisfaction?)," "what (what factors can influence customer satisfaction?)," "when (when was the last time the vending machine's innovation was renewed?)," "who (who is our target population for this study?)," and "where (where is the target population of the vending machine in Malaysia?)." The regression research design is used to assess the link between vending machine purchasing experiences and customer satisfaction among university students. As a result, the theory's hypothesis will be created and constructed by the main deduction process. The population of this study is students from Universiti Teknologi MARA (UiTM), Terengganu, with a current population of 6,735 students. The venue for this research is Universiti Teknologi MARA (UiTM) Terengganu, which has three campuses: Dungun Campus, Bukit Besi Campus, and Kuala Terengganu Campus. Students enrolled at UiTM Terengganu are the intended respondents. The reason for choosing this sampling element is that most students live on campus, and most cafeterias are open from 8 a.m. to 9 p.m. on weekdays and 10 a.m. to 8 p.m. on weekends. Furthermore, these locations are chosen because it is easier to access of the student's data that are all available online and the questionnaire randomly assigned for UiTM Terengganu's students. It is the most convenient way considering method and the data collection during pandemic situation.

The survey is distributed to UiTM Terengganu students, faculty groups, the Student Representative Council (Majlis Kepimpinan Pelajar), and lecturers via the internet.

Krejcie and Morgan (1970) proposed a sample size formula for finite populations to make determining sampling size easier, which is used in this work. A sample size of 364 responders has been estimated. Figure 1 depicts the equation and calculation.

The sample size (n) is calculated based on Krejcie and Morgan's formula with Finite population correction:

$$n = \frac{N}{1 + \frac{Z^2 p q}{n}}$$

Where:

N is population size; 6735

Z is confidence level of 95%; 1.96

e is margin error that 5%; 0.05

p is standard deviation that 50%; 0.5

$$n = \frac{N}{1 + \frac{Z^2 p q}{n}}$$

$$n = \frac{6735}{1 + \frac{1.96^2 \cdot 0.5 \cdot 0.5}{n}}$$

$$n = 363.4437$$

$$n \approx 364$$

The sample size is equal to 364.

Figure 1: The calculation of sample size (n)

The core data in this study is obtained utilising a structured online survey questionnaire approach via Google Form. It includes general information about the respondent, vending machine features, and respondent satisfaction with vending machine use. The secondary data for location, population size, and other details are gathered from the official university website, other records, and publications in this study.

The researchers created the questionnaire using Google Forms, available in English and Malay. The consent form is on the second page of the form, and it needed the responder to agree to participate in the survey. To avoid bias, the consent form will verify the respondent willingness to participate is provided. If the respondent answered 'Yes' on the consent form, the survey moves on to the next stage; if the respondent picked 'No,' the respondent is taken directly to the end of the study. The questionnaire is the five (5) sub-sections in this part. The variables were measured using a 5-point Likert scale that ranged from one (1) "completely dissatisfied" to five (5) "completely satisfied." which is a practical consideration.

The survey has undergone pilot testing to verify that the questions were straightforward and understandable to responders. As a result, it is critical to conduct a questionnaire validity and reliability test. The questionnaire was distributed to academics and food service managers for face and content validity checks. According to Saunders et al. (2007), ten people are required to test the pilot study to collect data utilising the questionnaire (Mulyani et al., 2019). Any feedback and ideas they supplied were considered to improve the study instrument.

In light of the current pandemic situation, this study was conducted utilising primary data, and data collection via online survey was the most convenient option. Respondents were invited to participate in the survey via online platforms such as Facebook, Twitter, Instagram, and WhatsApp. By establishing close and trustworthy contacts, this enable for more accurate sampling. The questionnaire included a brief introduction that focused on the researchers' relationship with the academic institution and their research goals.

The data were tested for bias using the (J. S. Armstrong, T.S. Overton, 1977) method, which compared early and late respondents to see any differences in construct mean across all constructs and fourth quartiles of the respondents' survey. The researchers used SPSS version 25 to analyse the data and LISREL version 8.8 to test the research hypothesis using structural equation modelling (SEM). The standardised factor loading, construct reliability and Cronbach's Alpha were used to evaluate the test.

Result and Discussion

Frequency analysis

Most of the responders are from the Dungun campus, with 289 participants. The Faculty of Hotel and Tourism Management had 195 responders, or 53.6 per cent. Duyung B is the biggest contributor to this study, with 89 respondents, according to the findings of the frequency analyses for a residential college. Given that the researchers are UiTM Dungun students, this is entirely logical. In actuality, when compared to Bukit Besi and Kuala Terengganu, the Dungun campus is considered the main campus and have largest students' population.

Multiple Linear Regressions

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
		(Constant)	2.867	.193		
	Assortment	.013	.016	.060	.824	.411
	Freshness	.009	.013	.055	.667	.505
	Payment	-.032	.018	-.144	-1.719	.086
	Condition	.019	.026	.079	.717	.474
	Maintenance	.075	.019	.345	3.871	.000

a. Dependent Variable: Would you purchase again from the vending machine?

Assortment = Assortment of the food and beverage

Freshness = Product freshness

Payment = Mode of payment

Condition = The condition of the vending machine

Maintenance = The machine maintenance

Figure 2: Multiple Linear Regressions

The numerical values produced from the SPSS analysis were used to evaluate and describe the results in Figure 2. The relationship between the dependent variable (DV) and the independent factors is investigated using multiple linear regression analysis (IV). The purpose of this study

is to uncover the determinants and most influential aspects that influence consumer satisfaction among university students when purchasing via vending machines, so the researchers utilised this method.

Descriptive Analysis

Table 1: Overall mean score of customer's experiences on vending machine usage

Machine maintenance					
	N	Minimum	Maximum	Mean	Std. Deviation
Well-stocked product	364	1	5	3.32	1.151
Functionality of the vending machine	364	1	5	3.75	1.021
Repair made on time	364	1	5	3.43	1.080
The responsiveness of vending machine operator	364	1	5	3.52	1.030
Valid N (listwise)	364				

Machine maintenance claims to be the most critical aspect influencing customer satisfaction among university students when purchasing via vending machines in this survey, as shown in Table 1. Compared to other independent variables, consumer satisfaction has a high level of acceptability. Most responders have had positive experiences with the campus vending machine. Furthermore, the vending machine's functionality was accepted, with a mean score of 3.75. Vending machine technology in Malaysia still needs considerable improvement. With a mean score of 3.32, some respondents were unsatisfied due to food and beverage stocking inconsistencies. As can be seen, some vending machine products are always out of stock, and repairs are impossible to complete on time.

Table 2: Overall mean score of customer's experiences on vending machine usage

Payment					
	N	Minimum	Maximum	Mean	Std. Deviation
Variation of payment methods	364	1	5	3.45	1.121
Easy to make payment	364	1	5	3.62	1.070
Ease of refund	364	1	5	3.37	1.205
Price per product	364	1	5	3.66	.976
Valid N (listwise)	364				

The form of payment is the second aspect that determines consumer happiness. The results suggest that most respondents are marginally satisfied with the payment variation, with a mean score of 3.45. The vending machine's payment method technology is still archaic. According to (Lucan et al., 2019), the old payment method is inconvenient because it has numerous flaws. Good technology will have a significant impact on the vending machine industry. A cashless payment mechanism must be introduced to make payment easier and more convenient. For example, customers are not compelled to bring money with them wherever they go, nor are they required to use a money changer for large sums of money. As a result, customers can efficiently conduct any online transaction (Hadi and Idrizon 2020). Customers will have many payment alternatives available, including cash, pay wave, and any form of an internet transaction. It is possible to improve consumer experiences by changing the vending machine payment system, which can lead to increased customer satisfaction and longer vending machine usage.

Table 3: Overall mean score of customer's experiences on vending machine usage

	Product assortment				
	N	Minimum	Maximum	Mean	Std. Deviation
Variety of food choices	364	1	5	3.25	1.206
Variety of beverage choices	364	1	5	3.71	1.028
Variety of healthy food choices	364	1	5	2.78	1.128
Variety of healthy beverage choices	364	1	5	3.04	1.062
Level of trust on the product	364	1	5	3.83	.971
Valid N (listwise)	364				

The third aspect that determines customer satisfaction with vending machine usage is the product assortment. Most customers have faith in the vending machine's goods. The respondents, on the other hand, are completely unhappy with the range of healthy food options, with a mean of 2.78. In order to raise customer knowledge regarding high-nutrient foods, the vending machine sector should expand its selection of healthy foods and beverages. The bulk of vending machines in Malaysia only sells low-nutrient items and high-energy snacks, with few to no healthy options (Cavanna et al., 2019). Students need a nutritious diet to memorise, have energy, and promote high mental performance in their studies. As a result, they can stay fit and active. In addition, it can assist students in succeeding in school and achieving their academic objectives (Babu et al., 2020). Therefore, vending machine suppliers should consider providing healthy food and beverage alternatives for students to have healthy snacking options while studying. Furthermore, if they consume healthy food and beverage, it can help them improve their academic performance.

Table 4: Overall mean score of customer's experiences on vending machine usage

	Condition of vending machine				
	N	Minimum	Maximum	Mean	Std. Deviation
Vending machine accessibility	364	1	5	3.68	1.062
Vending machine features are user friendly	364	1	5	3.78	.992
Cleanliness of the vending machine	364	1	5	3.66	.988
Adequate instruction on the vending machine	364	1	5	3.93	.932
Valid N (listwise)	364				

Next, with a 3.93 mean score, factor four (4) shows that most respondents accepted the vending machine's condition. Customers should be able to use vending machines with ease if they have proper instructions. Some vending machines, on the other hand, are tucked away from public view. The vending machine should be easy to find, have clear signs, be in a public place, and be clean. Vending machines should be extensively installed in places like residential colleges, classroom spaces, and mosques to make it easy for clients to buy food or drinks. As a result, it has the potential to improve consumer satisfaction. This idea is backed by (Septiani et al., 2018), who stated that one of the major elements is vending machine location, which can significantly impact customer satisfaction. The higher the customer satisfaction, the more likely the client will buy from the vending machine again, increasing the supplier's profits.

Table 5: Overall mean score of customer's experiences on vending machine usage

	Product freshness				
	N	Minimum	Maximum	Mean	Std. Deviation
Appearance of the product	364	1	5	3.87	.948
Texture of the product	364	2	5	3.85	.955
Taste of the product	364	2	5	4.00	.924
Size of the product	364	1	5	3.85	.963
Odour of the product	364	1	5	3.91	.907
Valid N (listwise)	364				

Finally, the freshness of the product has the least impact on consumer satisfaction among university students. With a mean score of 4.00, most respondents were pleased with the product's taste. In fact, with a 3.5 above-average score, people are pleased with the product's appearance, texture, size, and odour. Because most vending machines provide ready-to-eat foods like snacks and isotonic drinks, product flavour should not be an issue. Vending machines that sell fresh food and beverages, such as fruits, are still uncommon. In addition, crispness, juiciness, and scent are all signs of food freshness. The freshness of food and beverage is a critical aspect in customer perceptions of their health and well-being (Lyu & Choi, 2020). Environmental elements, such as product display, can influence students' healthy living choices (Healthline et al., 2020).

Conclusion

In conclusion, although this study was conducted during a coronavirus outbreak where the researchers were required to distribute the questionnaire via the Google platform, both suggested research objectives were met. Even if the responders are on the same campus, it is difficult to reach and connect with them during this outbreak. One of the study's shortcomings is the small sample size of responders with limited data. The researchers found it challenging to engage with UiTM supervisors via the online platform to gather more accurate data.

The first research objective (RO1) investigated factors influencing customer satisfaction in vending machine purchases among university students. As a result, the postulated independent variables (IV) were discovered to have a link with the dependent variable in this study (DV). When RO1 is completed, the second aim (RO2) is completed, which is to determine the most relevant drivers of vending machine purchase experience that may influence customer satisfaction among university students. As a result, machine maintenance is one of the most powerful purchase factors that may influence customer satisfaction among university students. The researchers are optimistic that the vending machine industry will continue to meet the needs of university students. The client buying experience can be enhanced further by following trends and technology to improve the vending machine. It may also affect customer satisfaction when using vending machines. A future study on vending machines should be conducted to get more valuable insight and improve the data by conducting a more extensive analysis of the vending machine.

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