

Factor Analysis on Fast-food Consumption at UTHM Pagoh

Ee Che Chuan¹, Khuneswari P Gopal Pillay^{2*}

¹Econsave Cash & Carry Sdn Bhd
Lot 218 & 219, Jalan Banting KS/05, Pandamaran, Taman Perindustrian Sobena
Jaya Pelabuhan Klang, 42000 Klang, Selangor, MALAYSIA

²Department of Mathematics and Statistics,
Faculty of Applied Sciences and Technology,
Universiti Tun Hussein Onn Malaysia (Pagoh Campus),
84600 Pagoh, Muar, Johor, MALAYSIA.

*Corresponding Author Designation

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Abstract: Fast food takes short time to be served and fast food tastes unique and has provided convenience to people when they just order and immediately get served. Despite fast-food having a high density which contains high calories and fats, a lot of people still prefer fast food and their preference for certain fast-food brands are different. The objectives of this study are to determine the nutrient content of fast food, identify the factors that influence fast-food consumption, and identify the popular fast-food brands among UTHM Pagoh. In this study, 373 students and staff from UTHM Pagoh have been selected to become the respondents of this study and an online questionnaire has been distributed to the respondents. Descriptive Analysis, Factor Analysis, and Word Cloud are the methods used to analyse the data. From the analysis, the factors of fast-food consumption among UTHM Pagoh are “Quickness of Fast Food”, “Price of Fast food”, “Reputation of Fast food”, “Fast Food Types and Quality”, “Fast Food Advertisement”, “Convenience of Fast food”, “Unique Taste and Items of Fast Food”, and “Environment of Fast Food Restaurant”. From Word Cloud, McDonald’s is the fast-food brand that is the most preferred. This study can contribute to UTHM Pagoh students and staff to understand which factors contribute the most to fast-food consumption and the most popular fast-food brand.

Keywords: Fast Food, Price, Convenience

1. Introduction

Fast food is food that only takes a short amount of time to be prepared and served. Fast food is considered high-density food as it contains a high number of calories and fats inside. Burgers, fries, pizza, fried chicken, and chips are the most common fast food and they are usually served with soft drinks, juices, and desserts that are high in sugar.

Fast food is being served in substantial portion sizes and it tends to have higher calories which are more than the usual intake, resulting in parallel growth to the average body weight of a person [1]. To match with the lifestyle transformation due to the rapid economic development, urbanization, and Western cultural impact [2], a lot of food manufacturers produce fast-food products that could be considered junk food [3].

People are too busy with work, and lack time for leisure, therefore they prefer fast food so they have more leisure time [4]. Convenience is the most significant factor that contributes to the purchase intention of fast food [5]. The price of fast food is also a significant factor that influences the purchase of fast-food [6]. In past research, there is a positive relationship between customer satisfaction and food quality, service quality, and price sensitivity in fast food restaurants [7].

There are many fast-food franchises around the world such as McDonald's, Kentucky Fried Chicken (KFC), and Pizza Hut. KFC are the largest foreign franchise operator that holds the largest market share (46%) in Quick Service Restaurant (QSR) and Pizza Hut is the largest restaurant chain operator in Malaysia [8]. Different fast-food brands have different popularity and availability. Many researchers obtained different results for the most favourite fast food brand among their respondents such as McDonald's [9], KFC [5], and Subway [10].

The objectives of this study are to determine the nutrient content of several types of fast food. Next, this study aims to identify the factors that influence fast-food consumption among UTHM Pagoh students and staff. Furthermore, this study is to determine the popular fast-food brands among UTHM students and staff in UTHM Pagoh.

2. Materials and Methods

2.1 Materials

2.1.1 Survey

In this study, an online survey is conducted using Google Forms. The questionnaire is distributed among UTHM Pagoh students and staff through social media such as WhatsApp and Telegram. The questionnaire consists of three sections:

- Section A: Demographic Information of Respondents
- Section B: Popular Fast-food Brand Among UTHM Pagoh Students and Staff
- Section C: Factors Influencing Fast-food Consumption

Section A consists of three questions that ask the respondents about their gender, race, and age. Section B contains 6 questions that ask the respondents about the frequency of fast-food consumption per week and their favourite fast-food brand. The level of measurement is nominal for Section A and Section B. Section C consists of 21 questions that understand the respondents' agreement on the factors of fast-food consumption. The level of measurement is ordinal which applies a 5-level Likert Scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

2.1.2 Dataset

The nutrition content of datasets of foods and drinks served in McDonald's and KFC are obtained from the McDonald's and KFC websites, respectively. The calories and sugar content are being taken for this study. The calories content in the foods are listed in calories (kcal) per gram while the sugar content in the beverages is listed in sugar (gram) per millilitres. The sources of the datasets are obtained from:

- McDonald's: https://www.mcdelivery.com.my/m/my/assets/60/nutritional_chart_60.pdf
- KFC: <https://dinein.kfc.com.my/nutrition-facts>

2.2 Sampling Techniques

The sampling technique that is applied in this study is convenience sampling. This sampling technique is easy to apply as the samples are being chosen from nearby. Slovin's formula is used to estimate the sample size needed through the UTHM Pagoh population, which is a total number of 5667 students and staff up to year 2022. Based on the calculation, 373 respondents are needed to become the sample size (see Eq. 1).

$$\text{Sample size, } n = \frac{N}{1 + Ne^2} \quad \text{Eq. 1}$$

where:

N = Population size

e = Accepted error

$$n = \frac{5667}{1 + [5667 \times 0.05^2]} \approx 373$$

The pilot study is essential to test if the questionnaire fits to proceed with collecting a larger sample size. The consistency of the questionnaire is tested by using Cronbach's Alpha. The value above 0.7 indicates that the reliability of the questionnaire is good enough to fit with the study. Otherwise, the questionnaire should be reconstructed until the value reaches above 0.7.

2.3 Analysis Techniques

2.3.1 Descriptive Analysis

Descriptive analysis is the quantitative analysis of the data to provide a summary of the samples and measures done in the study [11]. Descriptive analysis is being used to display the respondents' demographic information and to show the nutrient content of several types of fast food by graphical analysis. This method is used for achieving Objective 1.

2.3.2 Factor Analysis

Factor analysis is a data-reducing technique in which a large set of variables is reduced into smaller factor components [10]. Explanatory factor analysis is conducted to identify the consumers' preference factors for consuming fast food and to explain the amount of variance explained by the factors. This analysis can accomplish Objective 2. The formula of the factor analysis model is stated in Eq. 2:

$$X_i = l_{i1}F_1 + l_{i2}F_2 + \dots + l_{ip}F_p + \varepsilon_i \quad \text{Eq. 2}$$

where:

X_1, X_2, \dots, X_i = Number of variables from 1, 2, ..., i

l_{ip} = Factor loading of the i^{th} variable and p^{th} factor

F_1, F_2, \dots, F_p = Factors

ε_i = Error/Specific factors

2.3.3 Chi-Square Test

Chi-Square Test is applied to test if there is a dependency between the two variables [12]. A decision is made to determine whether to accept or reject the null hypothesis based on the significance test. Gender and race are the variables used to test if there is an association with the 21 questions in Section C questionnaire.

H₀: There is no association between the two variables.

H₁: There is an association between two variables.

$$\chi = \sum_{j=1}^m \sum_{i=1}^n \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \tag{Eq. 3}$$

$$E_{ij} = \frac{\text{Row Total} \times \text{Column Total}}{\text{Grand Total}} \tag{Eq. 4}$$

where:

χ = Test statistic

O_{ij} = Observe the number in i^{th} row and j^{th} column

E_{ij} = Expected number in i^{th} row and j^{th} column

$i = 1, 2 \dots n$

$j = 1, 2 \dots m$

2.3.4 Word Cloud

Word cloud is a presentation technique for text processing, in which the bigger and bold letters show how frequently the word appears in a selected document [13]. To achieve Objective 3 in this study, Word cloud is used to view the famous fast-food brand among UTHM Pagoh students and staff. The process of creating a word cloud is expressed in Figure 1.

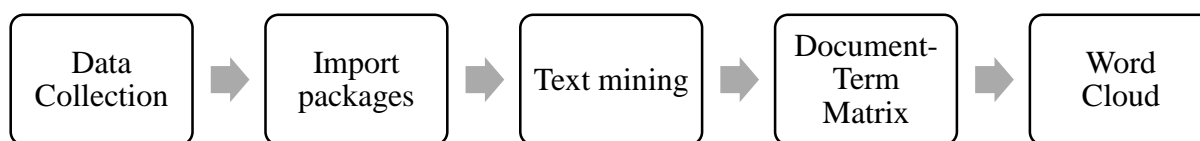


Figure 1: Process of Creating Word Cloud

3. Results and Discussion

3.1 Reliability Test

A pilot study consists of 30 samples are taken for the reliability test. Through the reliability test for the questionnaire, the value of Cronbach’s alpha is 0.756. The result shows that the questionnaire is acceptable to proceed with collecting more respondents for a bigger result analysis.

3.2 Descriptive Analysis

Table 1: Demographic Information of Respondents

Demographic Information		Frequency and Percentage
Gender	Male	175(47%)
	Female	198(53%)
Race	Malay	215(58%)
	Chinese	103(27%)
	Indian	55(15%)
Age	18-20	82(22%)
	21-30	204(54.7%)
	31-40	40(10.7%)

	41-50	36(9.6%)
	51-60	11(3%)
Frequency of Fast Food Consumption	0	46(12.3%)
	1	87(23.3%)
	2	100(26.8%)
	3	74(19.8%)
	4	42(11.3%)
	5	12(3.2%)
	6	8(2.1%)
	7	4(1.1%)

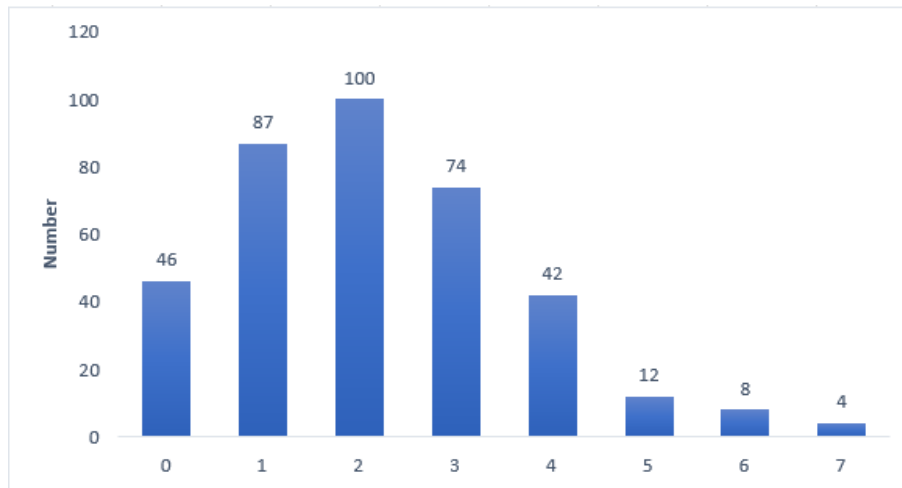


Figure 2: Bar Chart of Weekly Fast-food Consumption by the Respondents

Figure 3 and Figure 4 show the bar charts of calorie (kcal) content in food per gram from McDonald’s and KFC, respectively. From both bar charts, KFC has more menu items that have higher calorie content than McDonald’s menu items. The food with the highest calories per gram in McDonald’s and KFC are Spicy Chicken McDeluxe with 3.324 kcal per gram and Fries with 3.306 kcal per gram, respectively. Figure 5 and Figure 6 show the bar charts of sugar (gram) content per millilitres in beverages served in McDonald’s and KFC, respectively. Most beverages served in McDonald’s have higher sugar content than KFC.

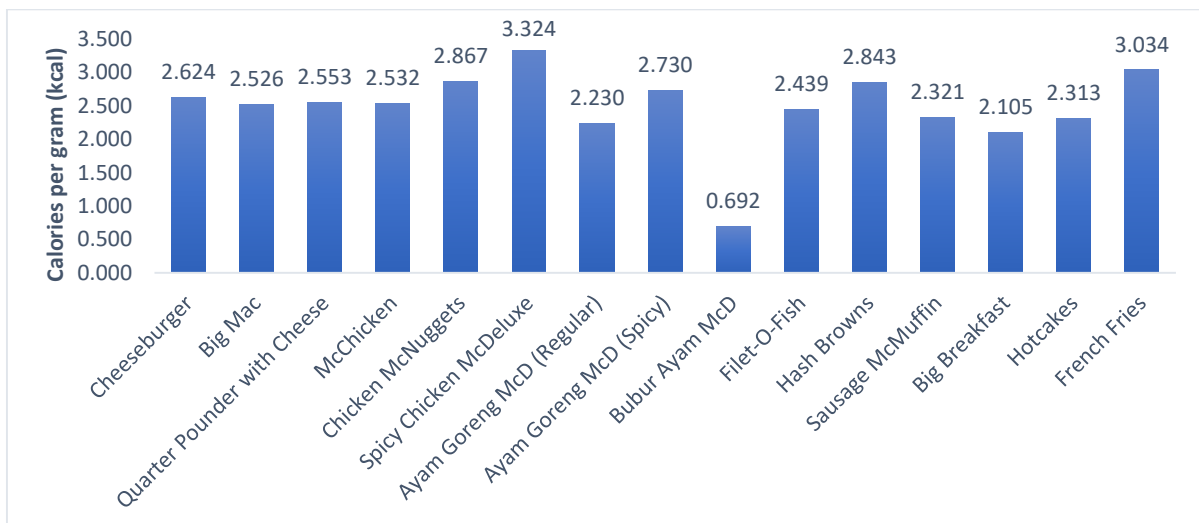


Figure 3: Bar Chart of Calories content in McDonald’s Food

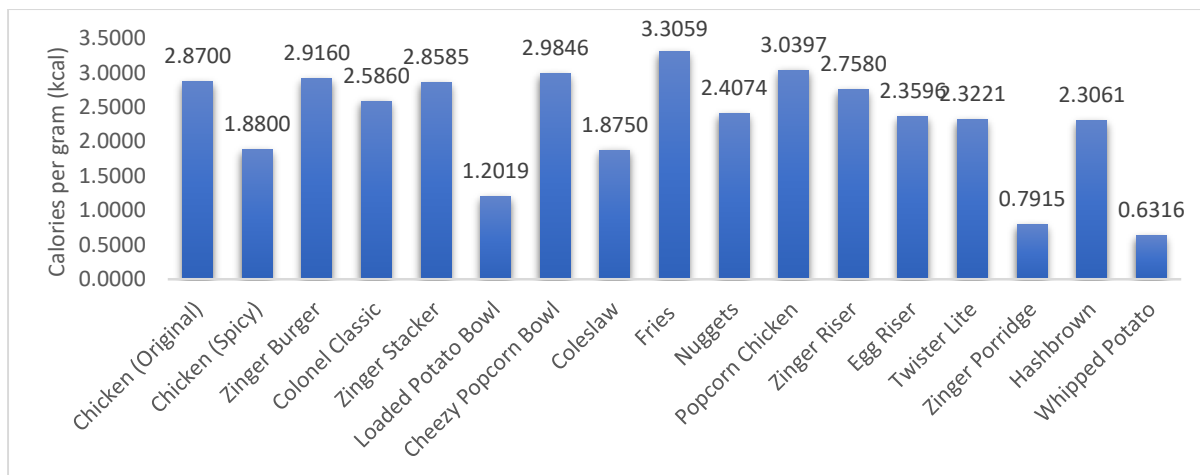


Figure 4: Bar Chart of Calories Content in KFC Food

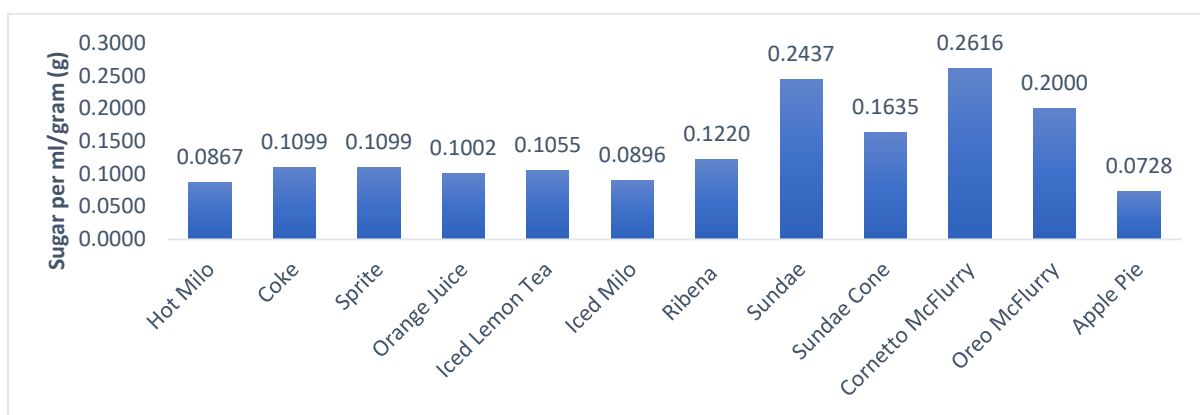


Figure 5: Bar Chart of Sugar Content in McDonald's Beverages and Desserts

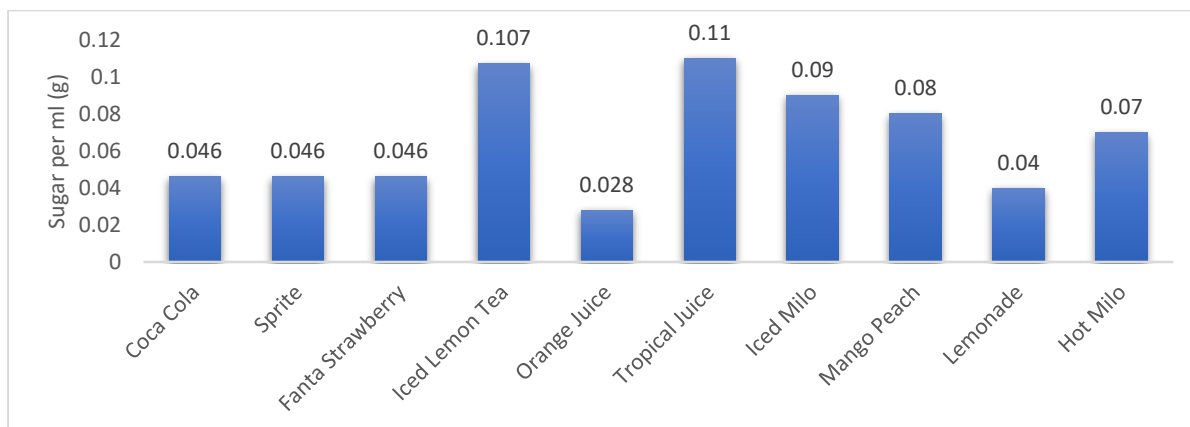


Figure 6: Bar Chart of Sugar Content in KFC Beverages

3.3 Factor Analysis

Table 2 shows the table of rotated component matrix of extracted factors from the 21 variables. 8 factors have been extracted from the factor analysis. Table 3 shows the table of the factors that are categorized in each component extracted from the factor analysis.

Table 2: Table of Rotated Component Matrix of Extracted Factors

No.	Questions	Rotated Component Matrix							
		1	2	3	4	5	6	7	8
1	I tend to eat fast-food more often when I am busy.	0.601							
2	Short waiting time for the meal to be done prepared in the fast-food restaurant.	0.668							
3	Good service or self-service by the fast-food restaurant.	0.662							
4	Quick delivery is provided by the fast-food restaurants.	0.408							
5	The price of the fast-food items is acceptable for me.		0.550						
6	Fast-food items are cheaper than homemade meals.		0.667						
7	The higher the cost of a fast-food item, the higher the quality of the fast-food item.		0.709						
8	I like how fast food is prepared by using fresh ingredients every day.			0.348					
9	The brand reputation of fast food attracts me.			0.623					
10	I only go to the fast-food restaurant that has a high reputation.			0.634					
11	Fast food outlets offer a variety of discounts, cashback, and promotions that attracts me.			0.557					
12	Fast food restaurant is clean, and the hygiene is very satisfying.			0.287					
13	There are many types of fast-food meals to choose from.				0.776				
14	The fast-food brand represents good quality in terms of everything.				0.517				
15	I am attracted to the advertisement for fast food on social media, banners, etc.				0.489				
16	Fast food advertisement is easily accessible as it is advertised everywhere.					0.679			
17	Fast food outlets are accessible as they are available almost everywhere.						0.793		
18	Fast food is very convenient as it takes little time to finish preparing the food.							0.766	

19	I like the taste/texture of the fast food.	0.740
20	Fast food restaurants offer interesting fast-food items that taste unique to me.	0.564
21	The environment/decoration inside the fast-food restaurant makes me feel comfortable.	0.697

Table 3: Table of Components to the Categorized Factors

Component	Factors
1	Quickness of Fast Food
2	Price of Fast-food
3	Reputation of Fast-food
4	Fast Food Types and Quality
5	Fast Food Advertisement
6	Convenience of Fast-food
7	Unique Taste and Items of Fast Food
8	Environment of Fast Food Restaurant

Table 4 shows how much the extracted factors have explained the total variance with Figure 7 showing the scree plot. Component 1, which is the factor “Quickness of Fast Food” explained the highest among the total variances which is 12.409%. The 8 factors extracted have explained 52.894% of total variances. Through the scree plot in Figure 7, Component 1 captures the most explained variances as the plots from Component 1 and Component 2 have huge gap.

Table 4: Table of Total Variance Explained by the Factors Extracted

Component	Initial Eigenvalues			Extraction Sum of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.606	12.409	12.409	1.865	8.882	8.882
2	1.511	7.198	19.606	1.626	7.744	16.626
3	1.321	6.292	25.898	1.423	6.775	23.401
4	1.207	5.746	31.644	1.333	6.347	29.748
5	1.162	5.535	37.179	1.248	5.945	35.693
6	1.146	5.455	42.634	1.206	5.742	41.435
7	1.102	5.246	47.879	1.205	5.736	47.171
8	1.053	5.015	52.894	1.202	5.723	52.894

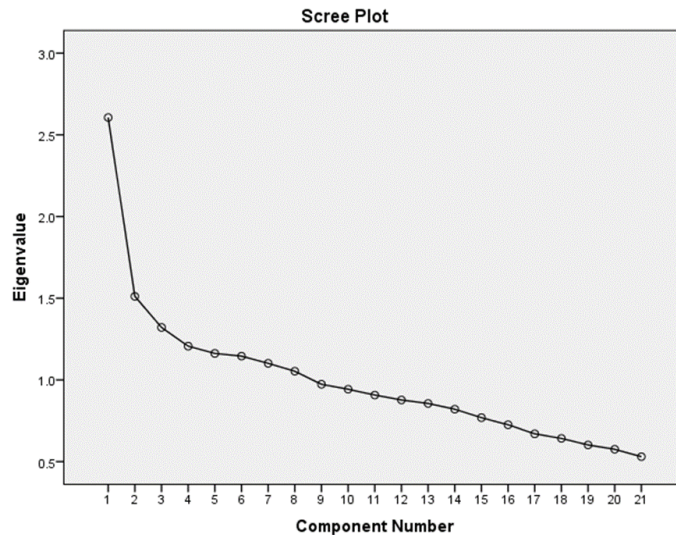


Figure 7: Scree Plot of Eigenvalues of the Components

3.3.1 Chi-Square Test

The Chi-square test is made to find the association between gender and race with the variables. Through the test, gender has an association with 3 variables and race has an association with 2 variables. The other 16 variables are independent with gender and race. Table 5 shows the summarized variables that have association with gender and races with the significant value.

Table 5: Test Result of the Variables with the Factors

No.	Variable	Factor	Significant Value
1	The fast-food brand represents good quality in terms of everything.	Gender	0.026
2	Fast food advertisement is easily accessible as it is advertised everywhere.	Gender	0.030
3	The higher the cost of a fast-food item, the higher the quality of the fast-food item.	Gender	0.010
4	There are many types of fast-food meals to choose from.	Race	0.048
5	Fast food outlets are accessible as they are available almost everywhere.	Race	0.002

3.4 Word Cloud

Through the result of the questionnaire, 357 respondents (95.7%) heard of McDonald's, KFC, and Pizza Hut and 254 respondents (68.1%) visit McDonald's frequently. McDonald's is the fast-food brand that has the highest amount of favourites among the respondents (158, 42.4%). The result obtained is similar with [9] and [14]. 291 respondents (78%) stated that McDonald's is the fast-food brand that represents good quality and service while 36 respondents (9.7%) stated that KFC is the fast-food brand that represents bad quality and service. Figure 8 shows the Word Cloud that presents the most favourite fast food brands at UTHM Pagoh.

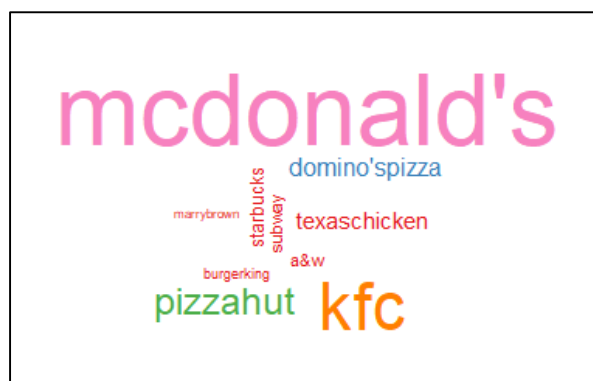


Figure 8: Word Cloud of Most Favourite Fast-food Brand by UTHM Pagoh

4. Conclusion

Fast food is high-density food that is served in only taking a little time. Fast food is so convenient as people can get food quickly. Based on the nutrition content, KFC has higher calories and fat content in their food menu items while most of the beverages and desserts served in McDonald's are high in sugar. 8 factors have been determined as the factors that influence fast-food consumption among UTHM Pagoh students and staff, which are "Quickness of Fast Food", "Price of Fast food", "Reputation of Fast food", "Fast Food Types and Quality", "Fast Food Advertisement", "Convenience of Fast food", "Unique Taste and Items of Fast Food", and "Environment of Fast Food Restaurant". From Word Cloud, McDonald's is the favourite fast-food brand of UTHM Pagoh students and staff. Some recommendations from this study can be made to solve the limitation. The first recommendation is to include the interview session in this study. Next, the study location should be finding the area with more fast food restaurants nearby to increase the generality and easy for the respondents to recall the fast food experience. Finally, the research should make a comparison of different satisfaction on different fast-food franchises to find out more factors that bring satisfaction to the customers from the fast-food restaurant.

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