Application of Analytical Hierarchy Process in the Comparison of Jollibee, McDonald's, and KFC In-House Online Delivery System

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Abstract

Fast food restaurant has become extremely popular in the modern age as it provides fast service when it comes to food without the customers to prepare their food. Then it was evolved into the digital era, where the fast-food brands started to develop ideas of having an online delivery system in which customers can order fast food without having to go to the actual restaurant. This research study used the analytical hierarchy process to compare the in-house online delivery system of the three fast-food chains, namely Jollibee, McDonald's, and KFC based on the criterion. The criterion identified in this study is convenience, flexibility, accuracy, reliability, user-friendly, and quality. This study aims to distinguish which of the criteria is the most significant for customer satisfaction and which of the three fast-food chains is the most preferred. The findings of this study show that KFC is the most preferred fast-food chain, and the three most influential criterion is the convenience, accuracy, and quality. On the other hand, user-friendly and flexibility show to have the least significant factor.

Keywords
Analytical Hierarchy Process, Fast food restaurant, In-House Online Delivery System

1. Introduction
Fast food industries in the Philippines have played a significant role as successful food industry, especially in Metro Manila. According to a study, the fast-food industry is efficient and quick service in association with quality services serves as a driver to the industry's success (Chen K., 1996). In the Philippines, there are three dominating fast-food industries in the Metro, mainly Jollibee, McDonald's, and Kentucky Fried Chicken (KFC). Jollibee is a popular local fast-food brand that originated in the country that has served the Filipinos for more than four decades of service. It became the largest food-chain branch in the Philippines, and it expanded into multiple branches outside the country. McDonald's Corporation arrived in 1981 in the Philippines that was able to have a steady growth industry in the Philippines, being an international brand known by all, its competitive advantage rivals dominating fast-food chains of a local. KFC reaches the Philippines in 1966, being a fast-food staple in the country, it has maintained a good business venture despite its longevity in the country's top food industries.

Most people tend to value their time and spend preparing or ordering food inside restaurants. Online delivery had been a blast in the food industry, especially to Fast-food chains. Most online delivery caters to business districts and even residential areas as well. This innovation in service helps the food industry to expand their reach to consumers since it gives a lot of options for consumers to buy their food products by providing them convenience. However, the in-house online delivery system of different fast-food industries have different architectural interfaces that mostly rivals other online delivery systems of other fast-food chains. In this research, the researchers will evaluate the in-house online delivery systems of the top 3 fast-food chains in the Philippines by using Analytical Hierarchy Process (AHP).

1.1 Objectives

This study aims to determine which criteria are considered in selecting the most preferred fast-food chain and which of the top 3 fast-food chains website or application (Jollibee, McDonald's, KFC) is the most preferred one using the AHP model. The researchers based on the following criterion: the convenience of the website or application, the user-friendly factor, its flexibility when it comes to the payment options, the accuracy of the orders, its reliability when it comes to the order time, the condition of the delivered food, and the overall satisfaction.

1.2 Significance of the Study

The researchers identify which of the Top 3 fast-food chains in the Philippines (Jollibee, McDonald's, and KFC) is the most frequently used to order online. With this, other fast-food restaurants can identify what other improvements they need to utilize to meet the decision criteria of the customers. The research study focused on the application of the analytical hierarchy process in the comparison of Jollibee, McDonald's, and KFC In-House Delivery through their website and application.

1.3 Scope and Limitations

The data collection will be conducted to everyone who is using the website or application in ordering to the top 3 fast-food chains. The online survey is the source to conduct the data gathering that the researchers need to support this study. The researchers need at least 300 or less respondents for this research study. Each respondent will be asked about their experience based on the following criterion: convenience, flexibility, user-friendly, accuracy, reliability, quality, and overall satisfaction. The results of this study will be used to identify which of the top 3 fast-food chains are the most preferred by the customers.

2. Literature Review

2.1 Service Quality

Service quality of a fast-food chain affects the loyalty of the customers which it includes cleanliness, attitude, and efficiency of staffs. It also provides to the customer satisfaction of customers. (Yildiz, E., & Yildiz, S., 2015).

2.2 Reliability

Reliability is the ability of a business to provide their expected service by the customers. It also provides to the loyalty factor of the customers since customers always think of how reliable a type of service that they are trying to avail. (Yildiz, E., & Yildiz, S., 2015). Selecting proper supplier for a business is a vital decision to the success of your business since it provides the materials needed to supply the needs of your provided service. (Herowati, E., & Rozi, F., 2018).

2.3 Flexibility

Flexibility is the ability of a fast-food chain to have a free-range of choices when it comes to their menu and their provided service to the customers. (Hoe, L.W., et.al. 2016).

2.4 Quality of Food

Quality of food pertains to the characteristics of foods that is expected by the customers. The taste, appearance, and the quantity of food are the main contributing factors that affects food quality. (Yildiz, E., & Yildiz, S., 2015).

2.5 Accuracy

Accuracy pertains to the ability of a fast-food chain to provide accurate service by the food that they serve. Lesser errors to the ordered foods from the customers contribute to the better accuracy of a fast-food chain or restaurant. (Peetawan, W., 2019).

3. Methods

3.1 Conceptual Framework

The researchers used other studies to determine the proper arrangement of each criterion from the most significant to its least significant. However, there is no specific weight that was mentioned from the existing studies. The researchers provided their level of importance of the criteria based on the characteristics of the in-house online delivery system. As the researchers able to investigate through the system of the in-house online delivery service, they determined that

the six criterions were the possible factors affecting customers choice together with the supporting related literature to strengthen its value.
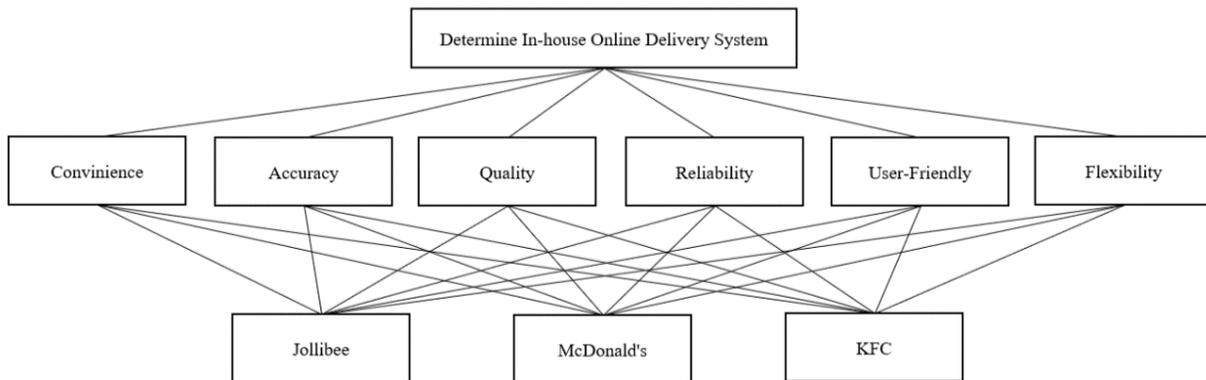

Figure 1. Conceptual Framework

Figure 1 shows the conceptual framework of the Analytical Hierarchy Process of this study. The top-level is the objective of the study, which is the In-house Online Delivery System. Followed by the middle level that had identified the criteria, and these are convenience, accuracy, quality, reliability, user-friendly, and flexibility. This decision criterion will be used as the basis for which alternatives in the bottom level are the most preferred by an individual. Finally, the bottom level is the alternatives chosen to be in comparison with one another.

Table 1. Summary of Respondents' Profile

RESPONDENTS' PROFILE	CATEGORY	N	%
GENDER	Male	158	54.30%
	Female	133	45.70%
AGE	17-30	174	59.79%
	31-45	83	28.52%
	46-60	34	11.68%
	61 and above	2	0.69%
PREFERRED FAST-FOOD CHAIN	Jollibee	102	35.05%
	McDonald's	106	36.43%
	KFC	83	28.52%

3.2 Participants

Table 1 shows the total number of respondents of this research study is 291 respondents. Most of the respondents are ages ranging from 17 to 30 years old, with a total of 174 respondents. It means that newer generations are the majority of users of the online-based in-house delivery system. They may be more technologically inclined than other generations as we can on the trend of the age ranges. As the age increases, the number of respondents decreases. On the other hand, the preferred fast-food chains were divided into three giving it close to equal respondents. This near equality can help the research not form any biases based on the number of respondents. The total number of respondents of this research study is 291 respondents.

3.3 Analysis Tool

This study uses the Analytical Hierarchy Process method (AHP) and Descriptive Statistics. Descriptive statistics were used to help and understand the data by providing a summary of the sample and measure. AHP is then used to evaluate which of the given alternatives is the most preferred. This method is a mathematical tool that supports decision-making when a problem is encountered. AHP created a rational framework for a needed decision by quantifying its criteria

and alternative options. AHP method is categorized into three levels: top, middle, and bottom level. The top level is where the main objective is structured. It is the level that identifies the decision criteria and decision alternatives that are attached like a hierarchy structure. The middle level is the place for the decision criteria which are the basis for the decision alternatives. It is a list of factors that will help determine which of the alternative will be chosen. The bottom level is where the alternatives are recognized.

4. Data Collection

The researchers developed survey questions that will help answer the objective of this study. The survey is comprised of 8 questions that are related to the identified criteria. With the help of the professor, each question was thoroughly constructed and described for the respondents to easily understand questions. The researchers created an online survey using Google forms and were distributed it to 291 respondents. Snowball sampling was used to achieve the number of respondents needed. The data gathered will be used to determine which decision criteria are the basis for an individual to identify their most preferred fast-food chain.

Table 2. Summary of Jollibee, McDonald's, and KFC Average Ratings

	Convenience	User-Friendly	Flexibility	Accuracy	Reliability	Quality
Jollibee	3.1373	3.2157	2.8431	3.5	2.9608	3.4608
KFC	3.2651	3.2169	3.0843	3.6988	2.9157	3.8193
McDonald's	3.4057	3.2170	3.0189	3.4151	2.9057	3.6981

5. Results and Discussion
5.1 Numerical Results

Table 2 shows the average ratings of the three fast-food chains based on their convenience, user-friendly, flexibility, accuracy, reliability, and quality. As shown in the table, McDonald's has the highest convenience ratings that show that the website and app are remarkably similar compared to in-house. But when it comes to its user-friendliness, McDonald's, KFC, and Jollibee have a close outcome in their ratings. Their websites are accessible to all, have well-structured information about their menus, and well-layout content that is easy to understand and scan. Furthermore, based on their flexibility, KFC got the highest rating among the two other fast-food chains. It has different types of payment methods for the customers to choose from such as cash-on-delivery and electronic payments via cash, pay may, credit cards, and many more. As for their accuracy rating, KFC still got the highest rating. Most of the respondents stated that KFC got their order correct and complete when it comes to delivery. On the other hand, Jollibee got the highest rating on the reliability criteria. This means that their delivery is on time that makes the customers satisfied. And finally, the quality with the highest rating is KFC. Most of their products are in excellent condition and maintains the signature of their tastes that everyone loved.

Table 3. Summary of Criteria and Alternative Weight

Objective	Criteria	Weight	Alternative	Weight
Determine In-house Online Delivery System	Convenience	0.267	Jollibee	0.056
			KFC	0.081
			McDonald's	0.117
	Accuracy	0.242	Jollibee	0.046
			KFC	0.106
			McDonald's	0.040
	Quality	0.143	Jollibee	0.020
			KFC	0.062
			McDonald's	0.050
	Reliability	0.127	Jollibee	0.056

			KFC	0.052
			McDonald's	0.051
			Jollibee	0.054
User-Friendly	0.123		KFC	0.054
			McDonald's	0.054
			Jollibee	0.034
Flexibility	0.097		KFC	0.042
			McDonald's	0.027
Inconsistency	0.06			

Table 3 shows that the criterion for the selection of alternatives in the research was ranked depending on the level of importance of each category. Based on the related literature, convenience is the most key factor by 26.7% in online in-house food delivery system since this is the main purpose on why this kind of services is offered to fast-food chain restaurants since it provides convenience to most customers. Second key factor is the accuracy of order, having an online delivery system offered, customers expectation would also rely on the accuracy of order because the ordering of customers only happens through technology, meaning they do not see the overall value of product that will be delivered, that is why customers will value the accuracy next to its convenience having a score of 24.2%. Quality, being the third highest of the criterion by 14.3%, despite fast-food chains quick and efficient delivery system, the customer also wants to see the quality of products that will be delivered to the customers. Even if the customer, want to increase their convenience, they do not want to neglect quality of products through their purchased item as well. For reliability of delivery time and user- friendliness of the website, they have a close importance to this criterion since customers but reliability having a higher weight than user-friendliness. Customers tend to wait a few minutes longer than be served at faster period but with low quality service. Furthermore, one study proved that the design of the overall website (user-friendliness) is the least important factor among users. Lastly, the flexibility of payment is the least important factor to all criterions since customers are does not mind having multiple payment methods offered by the system, but having this flexibility caters a lot of people who rely to distinct kinds of payment options than traditional ones such as cash and credit cards. In this research, creating its own weight on all criterions, the researchers were able to minimize the inconsistency by 6%. For the computed alternative weights for the three fast-food chains will be further explained in Figure 2.
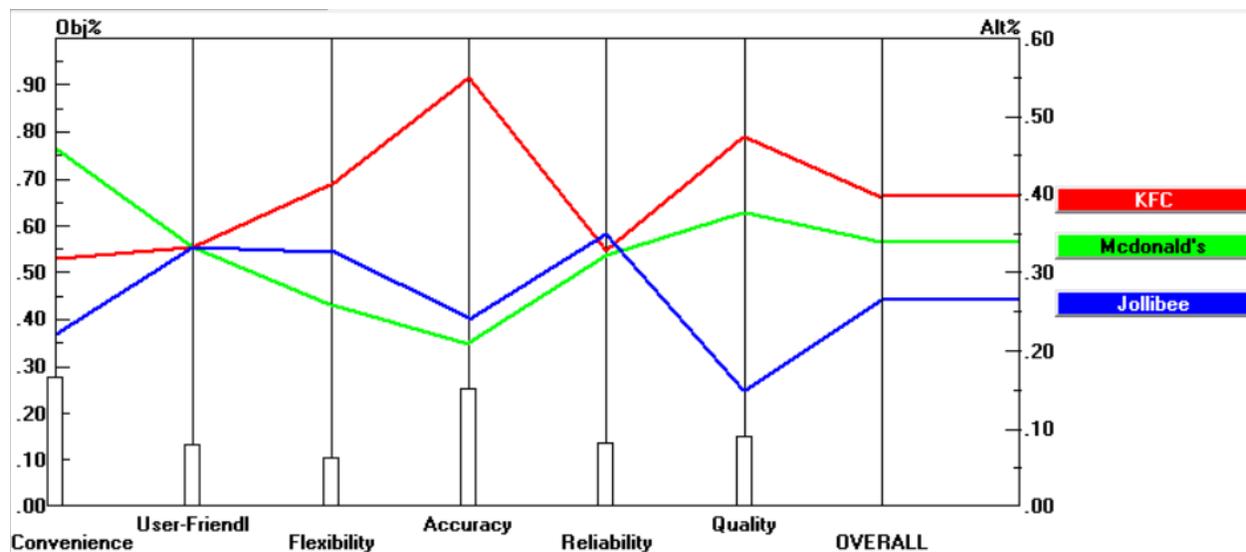

Figure 2. Performance Sensitivity Graph of Jollibee, McDonald's and KFC

5.2 Graphical Results

Based on Figure 2, the three fast-food chains were able to have slight differences to some criterions on that evaluates their in-house online delivery system, while other such as accuracy, convenience, and quality have visible differences with one another. McDonald's convenience rating has the highest rating having a 3.6% difference to KFC being second in line and 6.1% difference to Jollibee. Jollibee having the lowest rating in convenience dictates that it should further improve its in-house online delivery system better, together with KFC with only few changes. The user-friendliness of the website stands in a tie to all fast-food chains since most of them have similar experiences with one another, this finding gave us a better understanding why user-friendliness of the website is the least important factor of the criterions when it comes to evaluating the website of the online delivery system.

For flexibility, KFC was able to offer better payment options than the two, however this could change over time since payment varieties nowadays are on the verge of being dispersed to all businesses and industries such as this. Surprisingly, Jollibee was able to also outrun McDonalds when it comes to flexibility, since Jollibee offers other varieties of payment options especially their own, which is a Happy Plus card which can be used to all Jollibee's corporate food industry. This is where McDonald's have a slight disadvantage since it only offers COD transaction and cards, while only a few branches offer other payment options.

Accuracy of the three food chains have an enormous difference, KFC's rating on accuracy skyrocketed than the two food chains. Observing the food variety difference of the three food-chains, McDonalds and Jollibee has similar variety of menus unlike KFC which focuses on one main ingredient which is Chicken poultry. This could be the reason KFC have larger accuracy rating since there is only a few varieties of menu unlike the two food chains. Furthermore, this could also be the reason McDonalds and Jollibee have closer ratings than KFC. For reliability, the three food chains were able to have close results, since time differences could really vary on factors such as the quantity of order, distance of location from store to customer, traffic, and unavoidable delays. However, these three was able to manage their fast delivery system despite those factors, that is why it is acceptable that they have almost similar ratings to reliability of delivery time.

Lastly, quality of the three food chains have obvious differences with one another. KFC was able to take the lead in terms of quality, this could also be similar reason to accuracy which is the focus of food product which is chicken poultry, while the two obviously have wide varieties of menu. However, unlike accuracy McDonald's was able to keep up and have a higher rating than Jollibee since McDonald's is a multinational company which obviously have higher reputation than Jollibee itself which is a local fast-food chain. In terms of scalability of quality on both food chains, McDonald's will surely have an advantage over Jollibee. Jollibee have the lowest quality rating; however, this could only be to the reason of scale since both McDonald's and KFC globally known competitive fast food chain brands.

Overall, computing all the factors and weights of every fast-food chain it is obvious that the three brands does not have a major difference with one another, their scores are close with one another in terms of the overall rating considering all factors. However, As shown in figure 3, KFC was able to take a lead in terms of the overall rating having a score of 39.7% a 5.9% difference in McDonald's and a 13.2% difference to Jollibee. Possibly due to the focus of KFC's quality of service to its customer by serving few varieties of menu and food products gave it a slight advantage to its competitors in terms of accuracy, flexibility, and most of all quality. McDonald's was also able to keep up with KFC since its scale and its global popularity, it is assured that they also focus in terms of quality of service to keep up with demand. Jollibee on the other hand, have the large difference from the two food chains, however in terms of its popularity to its local community, Jollibee was an acceptable competitor to this comparison since its potential of growing similar to the two brands is close to be achieved by the company, but this could also mean that they also need to improve their quality of service as well. Overall, the preferred online in-house delivery is KFC.
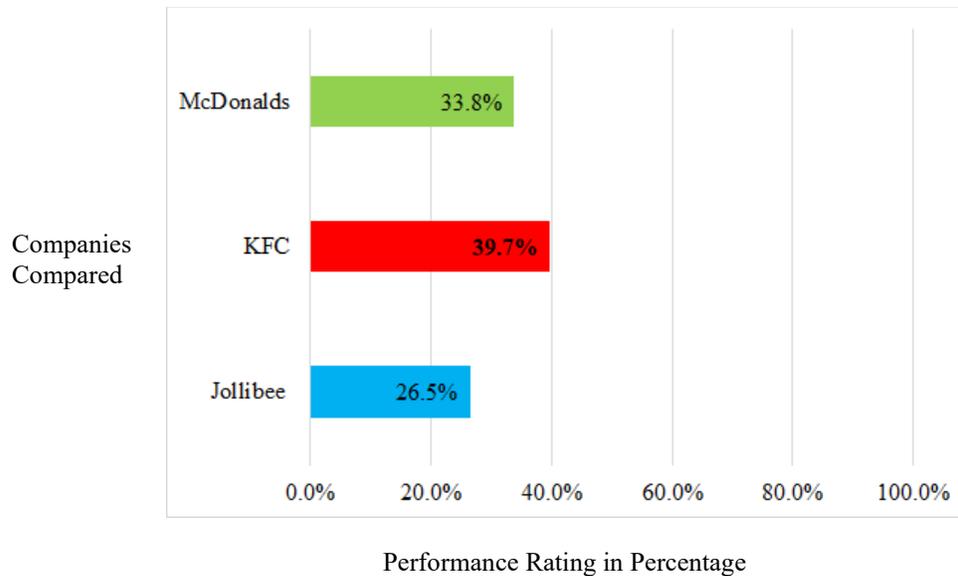
Figure 3. Overall Service Performance Rating of Jollibee, McDonald's and KFC

5.3 Proposed Improvements
Based on the graphical results from expert's choice software, Jollibee and KFC resulted in a lower value than McDonald's in the convenience criteria. Improvements to be applied by updating their menu on their website and application from time to time to be more convenient to their customers and other customers. For the criteria of accuracy, McDonald's and Jollibee got a lower outcome than KFC. The items ordered should be checked if it is correct and complete before they send it out for delivery, to avoid complaint from the customers. On the other hand, Jollibee has the lowest rating on the quality criteria. Suggested improvement is to check if the food and drinks are in good condition before they deliver them, and the riders should avoid driving too fast to avoid damages to the products that they will deliver. In the reliability criteria, the three fast-food chains should improve their delivery time to avoid complaints from their customer about the late deliveries and quality of the products. For the user-friendly, the three fast-food chains have close outcomes with one another. The three fast-food chains should continue to improve the interface of their website and app to have better ratings. McDonald's has the lowest rating among the three fast-food chains in the criteria of flexibility. It is suggested that McDonald's should always check if all their payment method is working and inform their customers ahead of time if one of their payment methods is not working to avoid inconveniences. For the overall improvement, for the fast-food chain to improve their service, they should focus on the criterion that has the lowest rating because this can help them achieve their customer's satisfaction. This study can be used by the fast-food restaurant used in this study to know what area they may improve to satisfy their customers, encourage other people to buy their product, and choose their service. Another suggestion is to have a monthly survey from their customers to help the fast-food chain become better and provide services that their customers will be surely satisfied.

5.4 Validation
This study analyzed and interpreted the data gathered from the online survey that was distributed to 291 respondents. The result and findings that by the researchers are supported by other existing studies that also discussed the use of the analytical hierarchy process in the selection of criteria and preferred fast-food chains. The use of expert choice software was utilized to provide a more graphical and numerical result that will support the objectives of this study.

6. Conclusion
Based on the results and findings, it can be concluded that KFC was chosen as the topmost preferred fast-food chain by the respondents compared to McDonald's and Jollibee. The result obtained by KFC is at an average weight of 0.397 compared to McDonald's with 0.338 and Jollibee with the least rating of 0.265. The identified three most significant criteria are convenience with an average weight of 0.267, accuracy with 0.242, and quality with 0.143. On the contrary, user-friendliness and flexibility are the least significant criteria with an average of 0.123 and 0.097. Thus, customers

considered convenience, accuracy, and quality as the influential criteria in selecting the best fast-food chains. In addition, to further improve the study, future researchers should increase the number of factors and respondents to have a greater outcome in the data gathered.

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