Dimensions Affecting Consumer Acceptance towards Artificial Intelligence (AI) Service in the Food and Beverage Industry in Klang Valley

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ARTICLE INFO	ABSTRACT
	Artificial Intelligence (AI) is a computational approach that aims to approximate human intellect in a more simplified way in order to address technical issues that are beyond the scope of traditional computer approaches. According to the evolution of technology, AI had made their presence in almost every business such as food and beverage. The presence of AI is benefiting food makers and merchants by assisting them in better understanding their consumer through AI. Therefore, the objectives of the research to focusing on factors that affects consumer's acceptance towards AI service in the food and beverage industry. Factors that include convenience and service quality adopted from is known as AISAQUAL. It consists of 6 dimensions which are efficiency, security, availability, enjoyment, contact and anthropomorphism. In this study, a total of 401 respondents were collected, specifically respondents who had experienced AI service in the food and beverage industry. All data collected was analyze through Statistical Package for Social Science (SPSS) and various type of analysis which include reliability test, normality test, Pearson Correlation Test and Regression test were used in this study to measure the data collected. In short, the result shown that there is a relationship between convenience, security, contact, availability and anthropomorphism towards consumer acceptance on AI in the food and beverage industry. Meanwhile efficiency and enjoyment dimensions were not affecting much on consumer acceptance towards AI service in the food and beverage industry in Klang Valley.

1. Introduction

Artificial Intelligence (AI) is a computational method that tried to imitate, in a simplified form, human intelligence to solve engineering problems that have escaped normal computer techniques [1-20]. According to Russell and Norvig [2], it has been argued that AI can be linked to systems that able to think like people, behave like humans whereas AI able to think logically and act rationally. As a result, AI might continue to become more prominent in our lives, and a growing number of firms are offering smart services as part of their own products just like Google and Amazon good where they had become more and more interwoven into our daily lives is taken from [2]. The evolution in

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technology, artificial intelligence (AI) had made their presences in almost every business which include food and beverage industry as the industry itself is catching up fast with the trend on-going worldwide. Artificial Intelligence (AI) leverages data from previous records to evaluate it by using AI-enabled algorithms, allowing sales outcomes to be anticipated for a certain period of time. Artificial Intelligence (AI) primarily benefits food makers and merchants by assisting them in better understanding their consumers. Companies will be able to discover the tastes and preferences of their consumers, which will aid them in forecasting probable sales patterns for their items. With the supply chain management proving to be a big challenge for many food and beverage businesses. AI able to help bringing transparency to the way businesses operate by successfully managing the supply chain.

Recently, service industry had rising is taken from Sharma [3] the service sector has been given opportunity to incorporate technological advancements and service automation into its operations as they believe innovations and technology are the key elements to stay ahead of tight competition and overcrowded market. Consumers are looking for a better customer service encounter through ordering to checkout, and staffing had not been able to keep up. Order kiosks are often used in restaurant recently and has proven to provide customer with rapid, contactless experience they demand, which include direct interfaces to POS systems, kitchen display systems and mobile order solution. Restaurants are also looking at the ways of artificial intelligence (AI) might assist them resolve issues including employment, scheduling and expanding talent.

Through this, it can be clearly seen that artificial intelligence (AI) adoption concept has come to reality in several restaurants all around the world as a cutting-edge infrastructure to take the place of human labour which including Malaysia. Currently, some of the restaurants in Malaysia which include Nam Heong Restaurant and Nale The Nasi Lemak Co. Restaurant who has few branches in Klang Valley, had adopted the digital transformation by implementing artificial intelligence (AI) in their restaurant to administer foods and drinks to the customer's seats where it has brought convenience to the customers and benefits the restaurant in reducing movement and created space too.

2. Methodology

The study of methodology includes the understanding of the various methodologies that may be utilized in the conduct of research, as well as tests, surveys, critical studies and experiments is taken from Gounder [4]. The quantitative analysis or qualitative analysis are methods that often been used to conduct of research in methodology. Quantitative research will be used in this research as it helps in quantify and validates these impacts in a wide sample is idealistic or humanistic methods, qualitative research focuses on comprehending a study inquiry is taken from Pathak *et al.*, [5].

2.1 Research Design

This research aims to understand the acceptance of consumers in Klang Valley towards the implementations of Artificial Intelligence (AI) in the food and beverage industry in Klang Valley. Therefore, quantitative research will be used in this research as it helps in quantify and validates these impacts in a wide sample. Quantitative analysis it differs from qualitative analysis in that it works with numerical data or data that able to be translated to numbers. To further illustrate, "statistics" refers to the basic procedures used to study numerical data, where statistical approaches covers the organization, analysis, interpretation and presentation of numerical data, thus it is a vast field of study having applications in a variety of fields which includes information systems and other

areas of data analysis is taken from Sheard [6]. Furthermore, the statistical procedures for handling and analyzing data have become more accessible with the development of computers whereas development of software such as SPSS or NVivo is common software program that are used for statistical analysis.

2.2 Operation Definition

Table 1
The operational definition for independent variables and dependent variable for this study

Variable	Operation Definition
Independent Variable (IV)	
Convenience	Convenience is an element of customer experience that reduce the customer time and effort while they are using certain service provided by the implementation.
Efficiency	Efficiency looks in to the maximum degree of performance that requires the least inputs and generate the greatest amount of inputs.
Security	Security looks into the perceived safety of the artificial intelligence (AI) service from intrusion, fraud and loss of personal information and privacy.
Availability	Availability looks into the ability of artificial intelligence (AI) service to be ready for use in anytime and anywhere.
Enjoyment	Enjoyment looks into the extent to which using the artificial intelligence (AI) service is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated.
Contact	Contact looks into the access to human assistance where customer expect artificial intelligence (AI) service to provide the option for human support.
Anthropomorphism	Anthropomorphism looks into the attachment of human-like characteristics, motivations, intentions or emotions to artificial intelligence (AI).
Dependent Variable (DV)	
Consumer Acceptance	Consumer acceptance looks into the perception on consumer whether they are able to accept artificial intelligence (AI) service in the food and beverage industry in Klang Valley.

Table 1 stated the definition of independent and dependent variables for easy understanding of the meaning of operational.

3. Results
3.1 Gender

Table 2 showed the total of 401 respondents participated in this study whereas 180 respondents (44.9%) of this study are male and 221 respondents (55.1%) of this study are female.

Table 2
Gender of respondents

Gender	Frequency	Percentage
Male	180	44.9
Female	221	55.1
Total	401	100.0

3.2 Age

Table 3
Age of respondents

Age	Frequency	Percentage (%)
20-24 years old	237	59.1
25-29 years old	87	21.7
30-34 years old	31	7.7
35-39 years old	22	5.5
40 years old and above	24	6.0
Total	401	100.0

Table 3 showed the age of respondents which most of the respondents are from age range of 20 to 24 years old, which is 59.1%. Followed by respondents from the age range of 25 to 29 years old which is 21.7%. The remaining 7.7% of respondents were in the range of 30 to 34 years old and 6% were in the range of 40 years old and above. Lastly, the lowest age range obtained in this study is 5.5% were the age range from 35 years old to 39 years old.

3.3 Occupation

Table 4
Occupation of respondents

Occupation	Frequency	Percentage (%)
Student	195	48.6
Employed	191	47.6
Unemployed	12	3.0
Others	3	0.7
Total	401	100.0

Table 4 showed the highest percentage of the respondent's occupation are students which consist of 48.6% followed by respondent with the occupation employed which consist of 47.6%, then, followed by unemployed which consist 3% and others which is 0.7%.

3.4 Total Monthly Income

Table 5
Total Monthly Income

Total Monthly Income	Frequency	Percentage (%)
2000 and below	196	48.9
2001-3500	76	19.0
3501-5000	89	22.2
5000 and above	40	10.0
Total	401	100.0

As shown in Table 5, the highest percentage of respondent's total monthly income is 2,000 and below which consist 48.9%. The following one is 3501 to 5000 which is 22.2%. The second lowest percentage is 2001 to 3500 which consist of 19%, lastly but not least is 5000 and above which consist of 10%.

3.5 Understanding Artificial Intelligence (AI)

As the respondents that are focused in this study are individuals who stays in Klang Valley and had been through artificial intelligence (AI) services in the food and beverage industry, through the questionnaires, some screening question regarding artificial intelligence (AI) had been applied including the perceptions of consumer towards the implementation of artificial intelligence (AI) service in food and beverage industry within Klang Valley.

Q1: Based on your understanding, what do you know about artificial intelligence?

Table 6
Respondents answer towards their basic understanding on artificial intelligence (AI)

Artificial Intelligence (AI)	Frequency	Percentage (%)
Smart Assistants	221	55
Social Media Monitoring	31	8
Visual Travel Booking Agent	81	20
Inter-team chat tool	21	5
Language Translator	47	12
Total	401	100

Table 6 showed most of the respondents had selected smart assistants which consist of 55% to which when mentioning artificial intelligence (AI) in the consumer's perceptions. Next, visual travel booking agent had ranked second in the result with the response of 20% from respondents when artificial intelligence (AI) is mention in the consumer's perception. Followed by language translator which consist of 12% and social media monitoring which is 8%. Last but not least, inter-team chat tool is lease selected by the respondents when mentioning artificial intelligence (AI) at their perceptions which consist of 5%.

Q2: Based on your understanding, what are the implementations of artificial intelligence (AI) in the food and beverage industry?

Table 7
Answer from respondents based on their understanding on implementation of artificial intelligence (AI) had implemented in the food and beverage industry

Artificial Intelligence (AI)	Frequency	Percentage (%)
Robot waiter	298	74
Robot concierge	24	6
Robot chef	22	6
Robot receptionist	48	12
Robot housekeeper	9	2
Total	401	100

Table 7 showed most of the respondents had answered on robot waiter which consist of 74% when artificial intelligence (AI) is mentioned being implemented in the food and beverage industry. The second higher selection selected by the respondents when mentioning implementation of artificial intelligence (AI) is robot receptionist which consist of 12%. Next, it is followed by robot concierge and robot chef which consist of 6% equally selected by the respondents when it was mentioned the implementation of artificial intelligence (AI) in the food and beverage industry based on the respondent's understanding. Last, robot housekeeper has the most less percentage which consist of

2% which is expected that this implementation of artificial intelligence (AI) is still new in the food and beverage industry and consumers are not that familiar with it.

Q3: Based on your understanding, do you think that artificial intelligence (AI) has gradually being implemented in the food and beverage industry in Klang Valley?

Table 8
The result of respondents agreed or disagreed on the statement that is stated in Q3

Answer	Frequency	Percentage (%)
Yes	349	87
No	52	13
Total	401	100

Based on the Table 8, out of 401 respondents that involved in this study, 349 (87%) of the respondent had selected 'yes' which agreed on the statement that artificial intelligence (AI) had gradually being implemented in the food and beverage industry in Klang Valley and 52 (13%) out of 401 respondents had reflected that artificial intelligence (AI) is not gradually being implemented in the food and beverage industry in Klang Valley.

Q4: Based on your understanding, does the implementations of artificial intelligence (AI) in the food and beverage industry made service easy?)

Table 9
The results of respondents agree or disagree on the statement that is stated in Q4

Answer	Frequency	Percentage (%)
Yes	383	96
No	18	4
Total	401	100

Based on Table 9, it is shown that 96% of the respondents that involved in this study agreed that the implementations of artificial intelligence (AI) in the food and beverage industry had made service easy and 4% of the respondents had reflect that the implementations of artificial intelligence (AI) does not made the service easy in the food and beverage industry.

Q5: Based on your understanding, does the implementation of artificial intelligence (AI) in the food and beverage industry benefits in pinpointing customer needs and expectations better?

Table 10
The results of respondents agree or disagree on the statement that is stated in Q5

Answer	Frequency	Percentage (%)
Yes	365	91
No	36	9
Total	401	100

Based on the result shown in Table 10, it is visible that out of 401 respondents, 365 respondents (91%) agreed on the statement that the implementations of artificial intelligence (AI) had benefit the food and beverage industry in pinpointing customer needs and expectations better followed by 36 out of 401 respondents (9%) had reflected that the implementation of artificial intelligence (AI) in

the food and beverage industry does not benefits in pinpointing the customer needs and expectations.

Table 11
Coefficient for regression analysis

		Coefficients[a]				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.257	.163		1.579	.115
	Convenience	.096	.046	.101	2.102	.036
	Efficiency	.061	.053	.057	1.157	.248
	Security	.218	.053	.219	4.148	<.001
	Availability	.119	.048	.128	2.481	.014
	Enjoyment	.084	.043	.089	1.955	.051
	Contact	.300	.045	.294	6.716	<.001
	Anthropomorphism	.088	.032	.098	2.748	.006

a. Dependent Variable: Acceptance

Table 11 showed the result of p-value for all seven predictor variables. Convenience, Security, Availability, Contact and Anthropomorphism has a positive relationship towards the Consumer's Acceptance towards Artificial Intelligence (AI) service in the food and beverage industry in Klang Valley due the p-value for all these variables mentioned are lesser than 0.05 (<0.05). Meanwhile, Efficiency and Enjoyment has negative relationship in affecting Consumer's Acceptance towards Artificial Intelligence (AI) service in the food and beverage industry in Klang Valley due the p-value for two variables has exceed 0.05 (> 0.05).

Moreover, the p-value that has positive relationship in affecting Consumer's Acceptance towards Artificial Intelligence (AI) service in the food and beverage industry in Klang Valley are Convenience (0.36) ; Security (<.001) ; Availability (0.14) ; Contact (<.001) and Anthropomorphism (.006); While the p-value that does not has significant in affecting Consumer's Acceptance towards Artificial Intelligence (AI) service in the food and beverage industry in Klang Valley such as Efficiency is .248 and Enjoyment is .051.

In short, independent variables such as Convenience, Convenience, Security, Availability, Contact and Anthropomorphism has a strong positive relationship in Consumer's Acceptance towards Artificial Intelligence (AI) service in the food and beverage industry in Klang Valley while Efficiency and Enjoyment does not.

3.6 Summary of Hypothesis Testing

Hypothesis 1: Convenience

"H1: Convenience delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley."

Based on the result shows in Table 12, the significant value for Convenience is p=.036 which is lesser than 0.05. Therefore, it shows that Convenience delivered by artificial intelligence (AI) has a

significant relationship towards consumer's acceptance of artificial intelligence (AI) service in the food and beverage industry in Klang Valley while H1 is accepted and indicated that convenience does affect the consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley.

Hypothesis 2: Efficiency

"H2: Efficiency delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley."

Based on the result shown in Table 12, the significant value for Efficiency is p=.248 which is more than 0.05. It indicated that Efficiency delivered by artificial intelligence (AI) does not have significant relationship towards consumer's acceptance on artificial intelligence (AI) in the food and beverage industry in Klang Valley while H2 is rejected. Meaning to say, Efficiency does not affect the consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley.

Hypothesis 3: Security

"H3: Security delivered by brought by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley."

Based on the result shown in Table 12, the significant value for Security is p= <.001 where it is lesser than 0.05, which indicate that Security delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance on artificial intelligence (AI) service in the food and beverage industry in Klang Valley, which H3 is accepted. In short, it means that Security does affect the consumer's acceptance towards artificial intelligence (AI0 service in the food and beverage industry in Klang Valley.

Hypothesis 4: Availability

"H4: Availability delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley."

According to the result displayed in Table 12, the significant value for Availability is p= 0.14 which it is lesser than 0.05. Thus, it indicated that Availability delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance on artificial intelligence (AI) service in the food and beverage industry in Klang Valley, while H4 is accepted. In short, it shows that Availability does affect the consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley.

Hypothesis 5: Enjoyment

"H5: Enjoyment delivered by artificial intelligence (AI) has has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley."

According to Table 12, the significant value for Enjoyment is p=.051 which is more than 0.05 while is shows that Enjoyment delivered by artificial intelligence (AI) does not has a significant relationship

towards consumer's acceptance on artificial intelligence (AI) service in the food and beverage industry in Klang Valley, which H5 is rejected. Through this, it means that Enjoyment does not affect consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley.

Hypothesis 6: Contact

"H6: Contact delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley."
     Based on Table 12 the significant value for Contact is p= <.001, which is lesser than 0.05 to which it shows that Contact delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance on artificial intelligence (AI) service in the food and beverage industry in Klang Valley, and H6 is accepted. Through this, it means that Contact affects consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley.

Hypothesis 7: Anthropomorphism

"H7: Anthropomorphism delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley"
Based on Table 12, the significant value for Anthropomorphism is 0.006 which indicated that Anthropomorphism delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance on artificial intelligence (AI) service in the food and beverage industry in Klang Valley, which means that H7 is accepted. Moreover, it shows that Anthropomorphism affects consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley. Table 12 showed the summary hypotheses testing either rejected or accepted.

Table 12
The summary result of hypothesis testing of this study

Hypothesis	Accepted/Rejected	Results (p,r & B)
H1: **Convenience** delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley	Accepted	P=.036 (p<0.05) r= .651
H2: **Efficiency** delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley	Rejected	P=.248 (p>0.05) r= .601
H3: **Security** delivered by brought by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley.	Accepted	P=<.001 (P<0.05) r=.694
H4: **Availability** delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley.	Accepted	P=.014 (p<0.05) r=.664
H5: **Enjoyment** delivered by artificial intelligence (AI) has has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley.	Rejected	P=.051 (p>0.05) r=.607

H6: **Contact** delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley	Accepted	P= <.001 (p<0.05) r=.673
H7: **Anthropomorphism** delivered by artificial intelligence (AI) has a significant relationship towards consumer's acceptance of artificial intelligence (AI) service in food and beverage industry in Klang Valley	Accepted	P=.006 (p<0.05) r=.387

4. Conclusions

Generally, this research project objective is to determine the influence of the seven identified predictor variables towards Consumer's Acceptance on Artificial Intelligence (AI) service in the food and beverage industry in Klang Valley. At the same time, most of the variables such as Convenience, Security, Availability, Contact and Anthropomorphism has a significant relationship towards Consumer's Acceptance on Artificial Intelligence (AI) Service in the Food and Beverage Industry in Klang Valley.

Meanwhile, with all the relevant findings and result of this research project is able to benefit sectors that related to the food and beverage industry specifically, restaurateurs or hoteliers as this research helps to provide an insight on factors that mainly will affect consumer's acceptance towards artificial intelligence (AI) service in the food and beverage industry in Klang Valley. Moreover, the limitations and recommendations of this study will be discussed in the next subtopic respectively. In other words, resolution for further studies regarding this research topic will be discussed to enable future researchers who are interested in doing research with related or similar topic are able to drawbacks for better achievement of result in the future studies.

In conclusion, through reviewing related journal articles, applying specific research methodology, conducting distinguished survey questionnaire specifically designed to correspond with the research question, it can be said that the study had be conducted successfully as the research objectives and research questions had be supported through findings in previous chapter. Overall, the findings in previous chapter exhibits that the seven studied factors has significant positive impact of affecting consumer's acceptance on artificial intelligence (AI) service in the food and beverage industry in Klang Valley meanwhile Security that delivered by the artificial intelligence (AI) has the greatest significant value in affecting consumer's acceptance towards artificial intelligence (AI) in the food and beverage industry in Klang Valley followed by Contact, Availability, Convenience, Enjoyment, Efficiency and Anthropomorphism.

Whereas looking into efficiency and enjoyment, the hypothesis for both are rejected which indicated that even though these factors having positive influence in affecting consumer's acceptance towards the implementations of it, however Efficiency itself is part of the expectations the consumer used artificial intelligence service. The artificial intelligence itself has the ability to respond faster than human employee, which indicate that artificial intelligence (AI) itself increase the productivity while task being assigned thus consumer is already expected that efficient service enable to be provided through artificial intelligence (AI) in the food and beverage industry in Klang Valley. Moving to enjoyment, is taken from [7] that technology had become an integral part in human lives which indicate that artificial intelligence (AI) is part of the technology and human are dependable towards it, either or not, the current world is implemented mostly by technology thus the society uses technology as common living, therefore, either the consumer is enjoyable or not in using of artificial intelligence (AI) service, artificial intelligence (AI) service itself had become essential for

current society to use. Therefore, most of the consumer uses artificial intelligence (AI) mainly due it is convenience and safe thus without considering the factor of enjoyment while using it.

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