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GUESTS' ACCEPTANCE OF SERVICE ROBOTS IN HOTELS WITHIN KLANG VALLEY, MALAYSIA.

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ABSTRACT

Service robots are machines that complement or improve human activities. This research aims to provide an insight for managers, decision maker, and engineers to recognize the importance of the factor that influence guests acceptance of robotic service in the hotel industry. Quantitative method using inferential analysis has been utilized in the study where 300 respondents participated for this research. Survey has been used for primarily data collection method and self-administration questionnaire has been used as the main instrument. Questionnaires were distributed to guests in hotels around Klang Valley in order to investigate the key factors that affecting guests' acceptance towards service robots in a hotel. Data collected were analysed using correlations and regressions analyses to determine the influential factors. All above mentioned techniques allow authors to introduce their own findings concerning this issue in terms of service robots acceptance. The research outcomes will contribute insights for advancement in the hotel industry.

***Keywords**: Service robots, acceptance, hotel, Klang Valley.*

INTRODUCTION

It is undeniable that technology plays crucial role in human life, the needs and demands for technology is also keeping increasing. Humans depend on it when travel, communicate, learn, do business, share information and live in comfort. Meanwhile, the hospitality industry is a dynamic environment in a constant state of movement and evolution. Through technology, the last several years have witnessed the industry change at an unprecedented pace. To remain competitiveness in the hospitality industry, hoteliers must have to adapt and react promptly to the changes in order to reach or increase satisfaction in both leisure and business travellers. Lending a hand to the industry, technology developer has really make a good effort to provide intangible goods such as systems and applications that bring benefits such as mobility, accessibility, integrity, efficiency, effectiveness and globalization. Yet, the industry is still facing the difficulty on the shortage of seasoned staffs. Technology developers have foreseen the future of the hospitality industry and hence introduce the service robots to perform useful tasks for humans or equipment excluding industrial automation application (International Federation of Robotics, 2012). Still, the robotics service is a controversial issue in the field. Some hospitality experts argue that the robotics

service eliminate the core of human interaction which leads to a lower personalized service and customer loyalty. Hence, Steve Choe, General Manager of the InterContinental Los Angeles Century City believed that there will be few hoteliers accept such automation, especially at high-end locations where guests expect staff to serve them with tailored attention and practiced obsequiousness; Lynn Mohrfeld, president of the California Hotel and Lodging Assn, agreed and suggested that robots would be popular at hotels that cater to millennial with a fascination for high-tech gadgets such as a four-star hotel in Silicon Valley (Martin, 2016).

LITERATURE REVIEW

The United Nations Economic Commission for Europe (UNECE) and International Federation of Robotics (IFR) together working out and giving the robot definition as it with actuated mechanism programmable in two or more axes with a degree of autonomy, moving within its environment, to perform intended tasks. Hence defines a service robot is a robot that performs useful tasks for human or equipment, and divided it into two different usages: personal use and professional use. They further illustrated that a personal service robot is used for a non-commercial task, while a professional robot is used for a commercial task. A personal service robot such as automated wheelchair, personal mobility assist robot is usually used by layman. A professional robot cleaning robot for public places, delivery robot in offices or hospitals, fire-fighting robot, rehabilitation robot and surgery robot in hospitals are usually operated by a properly trained operator who designated to start, monitor and stop the intended operation of a robot or a robot system (International Federation of Robotics, 2012).

By implementing professional service robot in hotel, it allows the staff more time to provide personalized services to guests (Gregor, 2016). By progressing toward hotel automation without sacrificing human interaction, staff can now spend more time creating unique experiences for each guest based on their personal preferences, such as advising them on where to eat. Meanwhile, robots can focus on tasks better suited to their abilities, such as delivering items — humans may go to the wrong room or even bring the wrong item, but robots are less likely to make that mistake (Gregor, 2016). The robot isn't expected to take jobs away from human employees, Tom Beedon, Residence Inn General Manager said. Instead, it is more likely to free up front desk staff to do more complicated hotel chores (Martin, 2016). It is found that hoteliers are recently trying to apply service robots in hotels in order to speeding up and improving service. Taking the lesser risk, the hoteliers tend to incorporating robots to a lesser extent into the customer-interface tasks. Aloft Cupertino, Residence Inn and Holiday Inn hotels are using robots to deliver room service. Royal Caribbean's Quantum of the Seas has a Bionic Bar with robot bartenders. KLM's 'Spencer' can be found dealing with customer service at Amsterdam's Schiphol airport. Unlike other, Henn-Na Hotel in Nagasaki, Japan are the world's pioneer hotel that completely staffed by robots. They will first be greeted, checked in by multi-lingual robots (receptionist), delivered luggage by the porter robots (Henna hotel general concept, 2016). To wrap up, the core of hospitality has been now shifted and robots are penetrating into the industry sooner.

Technology Acceptance Theories

Davis (1986) has developed Technology Acceptance Model (TAM) and supported by Davis, Bagozzi and Warshaw (1989), that explain why users accept or reject information technology. TAM is widely used by many researchers to study about the adoption of different technologies and it has become the most important theory in this field. Davis (1989) explained perceived usefulness whereby the individual perceived it is useful and will enhance his/ her job performances while perceived ease of use whereby the individual's perceived it as user-friendly. Between these two, perceived ease of use has a direct effect on both perceived usefulness and technology usage (Adams, Nelson & Todd, 1992; Davis, 1989). Davis (1989) has also found that there is a relationship between users' beliefs about a technology's usefulness and the attitude and the intention to use the technology. In addition, an individual may adopt a technology if he or she perceives it as convenient, useful and socially desirable even though they do not enjoy using the technology (Saga & Zmud, 1993). Thus, there might be a possibility of a direct relationship between beliefs and intentions. Further supporting on the findings, by presuming information system usage behaviour is mainly explained by behavioural intention that is formed as a result of conscious decision-making processes (Shroff, Deneen & Ng, 2011). The attitude towards usage has also been clarified as a determinant to that guide future behaviour or the cause of intention. It can be referred as an evaluative tool of positive or negative feeling of individuals in performing certain behaviour. However, Giovannis, Binioris & Polychronopoulos (2012), argued that TAM constructs are insufficient to explain both the variance of consumers' behavioural intention adequately although there are several research efforts on supporting TAM.

The TAM has been continuously studied and expanded-the two major upgrades being the TAM 2 (Venkatesh & Davis, 2000 & Venkatesh, 2000) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). Venkatesh & Davis (2000) enhanced the TAM TO TAM 2, by adding in other factors such as social influences and cognitive instrumental processes. It keeps the concept of perceived ease of use from the original TAM as a direct determinant of perceived usefulness. Davis has argued that in the TAM, the influence of subjective norms on behavioural intention to use can be ignored and so subjective norms were not considered. A TAM 3 has also been proposed in the context of e-commerce with an inclusion of the effects of trust and perceived risk on system use (Venkatesh & Bala, 2008). Venkatesh et al. (2003) develop the UTAUT model to explain technology acceptance, which uses behaviour intention as a predictor of the technology use behaviour. In Ivan (2013) researcher, he practiced this model as his research model and agreed that it is the best model to understanding of the factors of travellers' acceptance of new hospitality and tourism technologies. TAM and UTAUT have been suggested as a potentially robust predictor of acceptance of performance-directed robots (Ezer, Fisk, & Rogers, 2009), yet Beer et al (2010) claimed that those TAM and its extension model are insufficient to understand and predict robot acceptance as personal robots have the potential to engage in interactions with users that are more socially complex than interactions with other technologies.

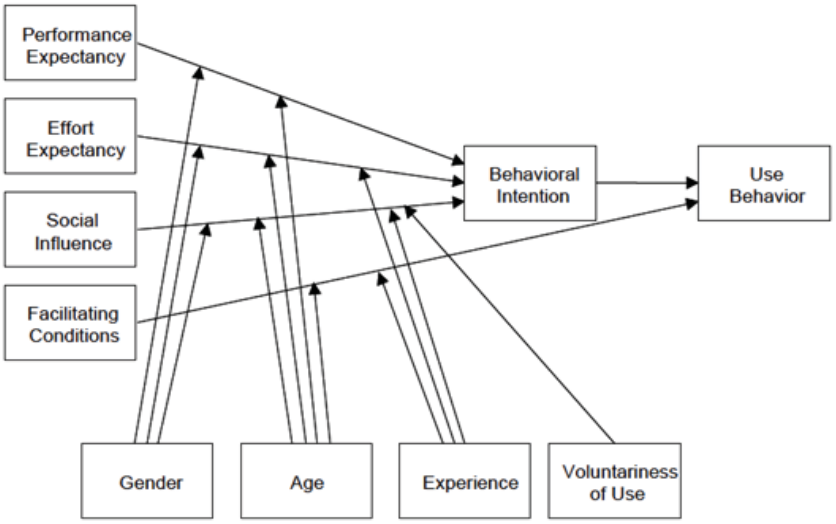

Figure 1: The Unified Theory of Acceptance and Use of Technology Model (Venkatesh et al, 2003)

Below are the research questions of the study:

RQ1: What are the factors affecting the acceptance of robotics service in hospitality industry?

RQ2: Is there a relationship between robot's functionality the guest's acceptance of robotics service in hotel?

RQ3: Is there a relationship between robot's social ability and the guest's acceptance of robotics service in hotel?

RQ4: Is there a relationship between robot's appearance and the guest's acceptance of robotics service in hotel?

Below are the objectives of the research:

RO1: To identify the factors affecting the acceptance of robotics service in hospitality industry.

RO2: To evaluate the relationship between robot's functionality and the guest's acceptance of robotics service in hotel.

RO3: To study the relationship between robot's social ability and the guest's acceptance of robotics service in hotel.

RO4: To study the relationship between robot's appearance and the guest's acceptance of robotics service in hotel.

Theoretical Framework and Hypothesis

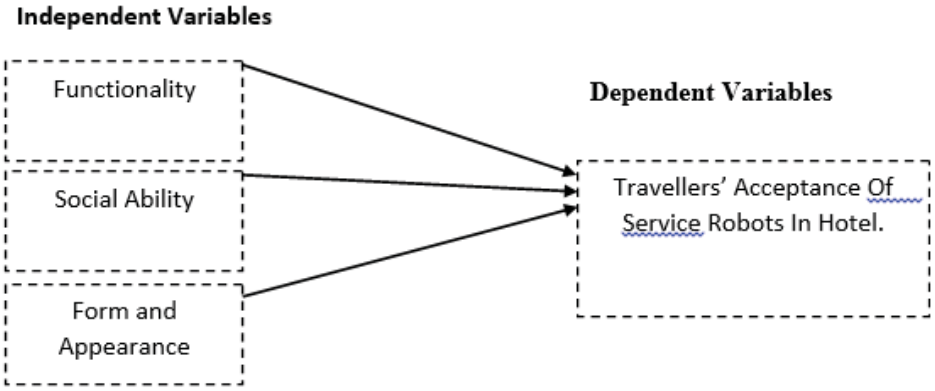

Figure 2: Theoretical Framework model from Beer et al. (2010)

In this paper, the framework created by Beer et al. (2010) will be used as the framework to explain the factor that affecting guests' acceptance of robotic service in the hotel industry in Klang Valley.

H1: There is a significant relationship between robot's functionality and the guests' acceptance towards robotic service in hotel.

H2: There is a significant relationship between robot's social ability and the guests' acceptance towards robotic service in hotel.

H3: There is a significant relationship between robot's form & appearance and the guests' acceptance towards robotic service in hotel.

METHODOLOGY

Inferential study has been adopted whereby it was undertaken in order investigate the characteristics of the variables of this research. The targeted hotels are located within the Klang Valley, Malaysia. Klang Valley can be described as the most density area with higher degree of acceptance of innovation in Malaysia compared to others. Since the neighbourhood country such as China, Singapore and Japan have started to adopt robot to serve their guests in recent years, therefore it is believed that Malaysia will be soon adopted in the future. The targeted respondents for this study were those at eligible age of 18 years old and above and they were on voluntary basis. Moreover, online questionnaires distribution was utilized by sending invitation emails to potential respondents. The presence of vary lodging options have strengthen Kuala Lumpur as a city for both leisure and business travels with the completion of 6 hotels, of around 1,248 rooms outside the city centre had increased the count of hotel/serviced apartments to 170 hotels, and 49,299 rooms in 2015. The room supply of 5-star hotels remained dominant in the Klang Valley hotel sector, providing 17,040 rooms (40 hotels) as of 4Q 2015 according to the report of Property Market (2016). Malaysia had received approximately 71,666,295 hotel guests staying at properties across the country in 2014, of which nearly 63% comprised of domestic travellers (Shen, Vadehra & Singh Mann, 2015)

The sample for this research was drawn from individual sampling frame. It is to undertaken 300 respondents as the size of the sample in order to achieve minimum sample size during the data collection. Besides, the study will adopt non-probability sampling method where targeted participants will be selected randomly. Therefore, it is selecting from a random sample from the target population that the respondents who stay in Klang Valley with staying experience in a hotel before. This study has utilized communication method whereby survey has been used as the primary data collection method in acquiring the sample and questionnaires has been the main instrument. A self-administration question adapted from Beer et al. (2010) has been used to study the factor that will affect Malaysian whether to accept or reject the robotics service in hotel in future. The reason of selecting online questionnaire was due to the efficiency of data collection which is easily accessible to more potential participants. Respondents were asked for their willingness to participate in the survey before questionnaire being distributed. Respondents were asked to rate their opinion using a 5-point Likert scale ranging from 1=Strongly agree, 2=Agree, 3=Neutral, 4=Disagree and 5=Strongly disagree to measure the Malaysian traveller's acceptance level towards service robot's adoption. Data was analysed based on the research questions and objectives. SPSS used to analysis the primary data that collect from questionnaire. A questionnaire was used to gather the information required for the study. The data received was analysed by using descriptive statistics such as distribution tables, frequencies and percentages. The questionnaire elicited information about Demographic, Robot Functionality, Robot Social Ability and Robot Appearance.

RESULTS AND FINDINGS

The results show that the data are normal as both skewness and kurtosis are within the acceptable range. Skewness is normal when the data shows between -3 to 3, while kurtosis is normal while the data between -10 to 10. The data above show the highest skewness is 0.694, and the lowest is -0.201. The highest kurtosis is 0.262 and the lowest is -0.806.

Correlation

Table 1: Correlation

		Mean_DV	Mean F score	Mean SA score	Mean FA score
Mean_DV	Pearson Correlation	1	.524**	.844**	.679**
	Sig. (2-tailed)		.000	.000	.000
	N	300	300	300	300
Mean F score	Pearson Correlation	.524**	1	.584**	.621**
	Sig. (2-tailed)	.000		.000	.000
	N	300	300	300	300
Mean SA score	Pearson Correlation	.844**	.584**	1	.681**
	Sig. (2-tailed)	.000	.000		.000
	N	300	300	300	300
Mean FA score	Pearson Correlation	.679**	.621**	.681**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	300	300	300	300

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1 shows the correlation between dependent variable between three independent variables. It shows that the second independent variables has the highest correlation among

others, which is social ability variable. It interprets that the social ability has strong correlation (r = 0.844) on the acceptance of service robot's adoption. Follow by the lower variables, the form and appearance variables (r = 0.679).

Lastly, the functionality variables (r = 0.524) has the lowest correlation among other variables, yet the result interprets that the strength of correlation on functionality towards acceptance of service robot's adoption is strong correlation.

Regression Analysis

Hypotheses are tested using multiple regression analysis. Below are the results computed from the regression analysis using SPSS.

Table 2: Summary Output

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.856[a]	**.732**	.729	.47705	.732	269.591	3	296	.000
a. Predictors: (Constant), Mean FA score, Mean F score, Mean SA score									

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	184.055	3	61.352	269.591	**.000**[b]
	Residual	67.362	296	.228		
	Total	251.417	299			
a. Dependent Variable: Mean_DV						
b. Predictors: (Constant), Mean FA score, Mean F score, Mean SA score						

Table 4: Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.678	.187		-3.625	.000
	Mean F score	-.096	.184	-.021	-.520	.604
	Mean SA score	1.550	.092	.718	16.768	.000
	Mean FA score	.375	.082	.203	4.569	.000

According to Sekaran and Bougie (2011), R square (R^2) is the percentage of variance in the dependent variable is explained by the variation in the independent variable. Based on the Table 3 above shows the value of R square is 0.732. Therefore, it can be deduced that 73.2%

of the variance of Malaysian travellers' acceptance towards service robot's adoption in hotel can be explained by the variation of the three tested independent variables: functionality, social ability and form& appearance while 26.8 % cannot be explained. The results in Table 5 shows that variable 1: Functionality (p-value = 0.604, β = -0.021), variable 2: Social ability (p-value < 0, β = 0.718), variable 3: Form & Appearance (p-value < 0, β = 0.203).

Table 4 indicates that social ability and form & appearance have a relationship with Malaysian travellers' acceptance towards service robot's adoption in hotel since both of the variable has the same p-value of 0.000. Therefore, both Hypothesis 2 and Hypothesis 3 are supported. Table 4 shows that functionality has no relationship with Malaysian travellers' acceptance towards service robot's adoption in hotel (p-value of 0.604). Therefore, Hypothesis 1 is rejected.

Discussion

The results show that Malaysians are not yet ready to adapt and adopt a service robot in this idea. It is believed that the different cultures and country profile. Many Japanese people who grew up watching robot anime such as Astro Boy and Doraemon in their childhood tend to define a robot as a partner having a human-like shape and living together with humans. Therefore, the acceptance rate of service robot is higher (Nitto et al., 2017). The result shows that social ability and form & appearance have relationship with Malaysian travellers' acceptance towards service robot's adoption in hotel, while functionality has no relationship with Malaysian travellers' acceptance towards service robot's adoption in hotel. The result is supported by Heerink et al. (2009), they illustrated how perceived ease of use is the mere influence on its acceptance. However, when it comes to functionality, they explained that the robot is only in a very limited way assistive and usefulness may indeed not be its most outstanding characteristic. Future studies can be carried out by using larger sample size and also take individual's background, personality, belief and attitude to understand the current intention and future intention on service robot's adoption in hotel. It might take a long process for societal acceptance of service robot. However, it would be exciting to see the development of this innovative technology and how it could possibly change hotel and foodservice experiences as well as processes in the future.

CONCLUSION

As the technology is growing tremendously in Malaysia for the past 10 years, people have changed their lifestyle. From the traditional human-human interaction check-in process to mobile check-in application, people tend to fasten up the checking in process. Besides, the hospitality industry is always lack of talent employees and facing high turn-over rate. Seeing the opportunity, technology developers constantly introduce new technology to public in order to provide the convenience for both, hotels and hotel guests. There are increasing country has adopted service robot in hotel performing job such as room service provider, housekeeper, porter, waiter, cooker which the lease human-interaction is needed in the process. Our neighbour country, Singapore starts to adopt the service robot in F&B establishment.

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