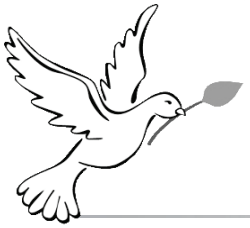
# Influence of Technology on Consumer Behavior in the Digital Era*



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## Abstract

The purpose of this research is to study how technology impacts consumer behavior within the hospitality sector with the introduction of mobile and the Internet of Things and social media. With the rapid development of technologies, the social behavior habits of consumers have significantly changed and are no longer in line with non-internet era. As digital technologies have greater integration in our everyday life, the hospitality sector, in this case restaurants, needs to be adapted respectively with deeper integration of newer technologies within its environment. 203 respondents responded to a questionnaire launched online. Another 1534 were observed to solidify the survey results. Respondents and those observed were classified into three groups – students, working professionals, and travelers. Data were analyzed by statistical program SPSS to show the mean, standard deviation, t-test, and significant values. Our study shows that current mobile applications lack the integration of significant factors found essential to consumers in the hospitality industry. The factors are the venue quality, convenience, transportation time, parking space, and whom to go with. It is vital for the hospitality industry to capture these factors and integrate the Internet of Things.

**Keywords:** Consumer behavior; Mobile applications; Social media; Internet of Things

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## Introduction

Importance of technology in the hospitality industry leads to the study of how mobile application is used and how this can lead to the integration of the Internet of Things (IoT). Tourism and hospitality is an information-intense industry; therefore, it is critical to understand changes in technologies and its impact on consumer behavior. Before the rise of the Internet of Things, the industry was affected by other technological progress. Development in information communication technologies (ICTs) has transformed business practices, strategies, and industry structures (Buhalis & Law, 2008). The business competitiveness then influences decision makers on their investments and decisions (Law et al. 2009; Luftman et al, 2017). Not only does IT creates knowledge that is crucial to business' competitiveness, but it is also influencing the fundamental structure of industry and society (Law et al. 2009; Luftman et al, 2017).

The clients of hospitality establishments including hotels and restaurants use the internet for different reasons, which stems from their need for new information, creativity, pleasure, and activities (Wang et al, 2012). Due to the increased use of social media - Instagram and Snapchat - posting photos and videos have become a norm (Allen, 2017). 89% of media time on mobile devices is spent on the most popular social networks, email, and news apps (Chaffey, 2018). Mobile applications represent one of the most significant areas of growth, and operators in the hospitality industry need to be part of this development (Buhalis & Law, 2008).

The Internet of Things (IoT) is a network that connects physical objects "things" to the internet (West, 2013). IoT increases the connectivity between the physical world and a computer-based system which enhances efficiency, accuracy, and economic benefit (Pena et al, 2017). Since the hospitality industry has benefited from previous technological changes in the past, IoT will likely generate a huge impact (Huey,2014). By taking advantage of IoT, the hospitality industry can increase efficiency in operations and create more personalized experiences for guests (Young,2015). IoT can be a competitive differentiator as it impacts many sectors of the industry, including entertainment, food and beverage, and guest security (Kerravela,2015). IoT also impacts business model innovation and building of smart enterprises (Lee,2017). It allows a boundary-less competitive business market and environment (Buhalis & Leung,2018). This not only brings new opportunities but also cost savings benefit.

The significant integration of IoT technology, digital media, social media, and internet into everyday life requires the understanding of the dynamics of consumer behavior in this changing environment. This paper objective is to understand how consumer behavior is

influenced by the usage of the currently developed technology in everyday life, preference in using integrated technologies, and how this impacts the hospitality industry and future technology development and deployment. By hospitality industry, this includes hotels and restaurants. To investigate consumer behavior dynamics, the researcher approach this from a few different angles. Firstly, consumer behavior dynamics in the industry was investigated to see the influence of modern technologies such as mobile applications and social media. Our case study focused on using one mobile application, namely FoodieTalk and how it is used in restaurants. Secondly, an observation was made to consider consumer preference in technology usage when idle.

## Research Methodology

Even though there are now IoT integrated into mobile applications, many consumers do not realize they are using IoT. The consumer only knows that they are using a mobile application. The questionnaire analyzes the consumer behavior dynamics and direct impact while the observation aims to understand consumer preference in the usage of technology while they are in an idle state.

The research is based on questions about how the integration of technology can enhance customer satisfaction and help businesses and startups in the hospitality industry to utilize technology better. The location-based social dining platform "FoodieTalk" was used as an example of mobile applications in the questionnaire. In order to eliminate the confusion of the term hospitality industry in the survey, the respondents were asked to answer about their experiences with restaurants in particular. The surveys were formed to include three demographic questions, 11 questions about customer behaviors in restaurants, six on the use of social applications, and three open-ended questions. The questionnaire consists of a single response, multi-response, and rated responses questions. The five Likert-scale was used as the measurement scale. This method was chosen based on a critical analysis of existing literature. Surveys are widely used in the business and social science field to gain customers insights.

The link to the survey was launched globally online via Facebook, Twitter, and emails. The sample size is of 203 respondents. The study is not limited by nationality; therefore, it was possible to release it to everyone online who are at least 18 years old, have a mobile phone, uses social media, and mobile applications. The results were input into SPSS software for statistical analysis. The frequency of response in all questions was analyzed as well as the mean, standard deviation, t-test, and significance level. The statistic values compared

respondents by occupation, age group, and geographic. The occupation groups are students, working professionals, and leisure travelers. While the age group is divided between those below and above 35 years old. The last set of data were between respondents from Asia 56.7%, Europe 20.7%, America 19.2%, and others 3.4%. The significance level was scrutinized to find which factors are important to customers.

## Results

The results of the case study based on a mobile application to study the social behavior of consumers in the hospitality industry reveals the following:

**Table 1:** Significant results of respondents from Asia 56.7%, Europe 20.7%, America 19.2%, and others 3.4%

| Significant results | Mean ($\bar{x}$) | S.D ($\sigma$) | t-test | Sig. ($\alpha$) |
|---|---|---|---|---|
| **Eat at a sit-down (full service) restaurant** | | | | |
| Asia | 2.97 | 1.158 | 3.099 | 0.028 |
| Europe | 2.52 | 0.917 | | |
| America | 2.49 | 0.914 | | |
| Other | 2.86 | 0.9 | | |
| **Book a table in a restaurant** | | | | |
| Asia | 2.39 | 1.049 | 3.69 | 0.013 |
| Europe | 2.17 | 1.057 | | |
| America | 1.79 | 0.767 | | |
| Other | 2 | 0.577 | | |
| **Use a social dining platform (web/app)** | | | | |
| Asia | 1.96 | 1.127 | 2.816 | 0.040 |
| Europe | 1.5 | 0.773 | | |
| America | 1.56 | 0.788 | | |
| Other | 1.86 | 1.464 | | |
| **Preferred dining venue**<br>**Branded restaurant and pub (Nando's, Pizza Express, etc)** | | | | |
| Asia | 2.1 | 0.955 | 3.404 | 0.019 |
| Europe | 1.76 | 0.759 | | |
| America | 1.67 | 0.621 | | |

| | | | | |
|---|---|---|---|---|
| Other | 1.71 | 0.488 | | |
| **Fine dining (Le Gavroche, Gordan Ramsay, etc)** | | | | |
| Asia | 1.83 | 0.954 | 3.072 | 0.029 |
| Europe | 1.55 | 0.739 | | |
| America | 1.38 | 0.711 | | |
| Other | 1.71 | 0.756 | | |
| **Main method of communication Face to Face** | | | | |
| Asia | 3.74 | 1.215 | 5.647 | 0.001 |
| Europe | 4.43 | 0.887 | | |
| America | 4.31 | 0.977 | | |
| Other | 4.43 | 0.787 | | |
| **Social media (Facebook, Twitter, Linkedin, etc)** | | | | |
| Asia | 3.53 | 1.150 | 4.97 | 0.002 |
| Europe | 3.69 | 0.897 | | |
| America | 3.1 | 1.410 | | |
| Other | 2.14 | 0.900 | | |
| **Most important factors** | | | | |
| **Convenience (time)** | | | | |
| Asia | 3.9 | 0.868 | 3.429 | 0.018 |
| Europe | 3.48 | 1.018 | | |
| America | 3.56 | 0.94 | | |
| Other | 3.29 | 0.951 | | |
| **Parking space** | | | | |
| Asia | 2.73 | 1.353 | 5.924 | 0.001 |
| Europe | 1.93 | 1.091 | | |
| America | 2.31 | 1.239 | | |
| Other | 1.43 | 0.787 | | |
| **Transportation time (traffic)** | | | | |
| Asia | 3.29 | 1.122 | 4.91 | 0.003 |
| Europe | 2.81 | 0.969 | | |
| America | 2.9 | 1.142 | | |
| Other | 2 | 0.816 | | |

It is crucial from the significance level shown to integrate transportation/traffic time into the system since respondents highly value convenience. Parking space is more important to Asians than the others. Henceforth, different marketing strategy and tactics will need to be used to address the difference in customer behaviors. This will allow businesses in the hospitality industry including both restaurants and hotels to improve their strategy to better target each group. From the results, the significant factors in consumer choosing the appropriate establishments are the establishment itself, convenience, transportation time, parking availability, and whom to go with.

The influence on the choice of hospitality establishments can come from online reviews on TripAdvisor, booking platforms such as OpenTable. Reviews can also be found on social media such as Facebook and through friends' advice via chat applications. While the convenience factor is based not only on time, but table availability, distance, transportation time, and parking space as well. The transportation time and distance can be viewed on mobile applications such as google maps and CityMappers. Finding whom to go with can be through social media applications and instant messaging applications. Parking space availability, however, implements IoT integration and is currently not seen or widely use at the beginning of 2018.

**Table 2:** Demonstrates example of mobile applications with some of the significant factors

| **Mobile application vs Significant Factors** | **Restaurant** | **Convenience** | **Transportation time** | **Parking space** | **Who to go with** |
|---|---|---|---|---|---|
| Google Maps | x | x | x | | |
| Bookatable | x | x | | | |
| OpenTable | | | | | |
| Tripadvisor | x | x | | | |
| OpenTable | x | x | | | |
| iMessage | x | x | x | | x |
| WhatsApp | | | | | x |
| Facebook | x | | | | x |
| Instagram | x | | | | |

At the current state, there is no mobile application that fully integrates all five significant factors. There are, for instance, iMessage that tries to combine chat functionality with easy access to Google Maps and OpenTable booking platform. It still lacks crucial functions to make it all integrated.

The result from the questionnaire demonstrates the increased use of social media and identified the significant factors that influence consumer choice. These factors can be integrated into social media and mobile applications to provide a more informed decision for a consumer with the use of mobile applications with integrated IoT technologies. To further confirm the importance of social media on consumer behavior, an observation that focused on the understanding of the preference of consumer behavior while in an idle state was constructed.

## Observation

The observation aims to confirm the questionnaire results on which consumers mainly used mobile applications. To further support the results from the survey, observations were conducted in London. The locations were chosen based on the availability of the three target groups mentioned above. A total of 1534 people were covertly observed to see what mobile applications they were on when they were idle. This assumes that their behavior will show what mobile applications they use when they have no time constraint. The observer also had to assume the age range of the person observed.

39% of the people observed were seen using instant messaging applications. While those assumed to be in the younger population of under 30 years old are among those that use chat applications and Instagram the most, the middle age group of 30 – 40 years old were mainly on chat applications. Interestingly, the oldest group of above 40 years old were focused on reading news/books or checking their email. The young age group choice of applications was diversified as 93% were seen watching YouTube, 86% on Instagram, and almost the same percentage were seen on Facebook (68%) and chat apps (60%).

From the observation, the most widely used mobile applications are chat messaging applications. This also relates to the result of 179 respondents using a friend's recommendation as the method to find where to eat. Our result demonstrates that social media applications are commonly used with consumers and very often preferred. These findings can be used to improve consumer satisfaction during the booking process with the integration of the significant factors in social media platforms and mobile applications.

## Conclusion and Discussion

The survey, observation, and its analysis helped to gain insight into user's behavior and how they adopt mobile technology. The integration of IoT into mobile and social media applications will be beneficial for consumers to make more informed decisions. The results confirmed the literature review that social media is frequently used on the phone. A friend's recommendation is critical to respondents; it will be necessary to include a function in the mobile application to include this, which will increase both usage and customer satisfaction. When combining the booking platform and hospitality establishments' websites, both of which are online methods, 175 respondents regardless of segmentation booked online. Interestingly, many respondents still make reservation via phone call. Therefore, the application should also include the phone number and calling out function and possibly find a method to track those that call through mobile applications.

The results supported the current trends in the hospitality industry in 2018. Due to the

increased use of mobile applications globally, businesses in the hospitality industry, including hotels and restaurants, will have to cross categories to gain the most benefits. For example, the mobile application showing accommodations will be better off if they allow restaurant bookings/suggestions on the same application as well. More hotels will move towards integrating the use of the internet of things both back and front end. This includes but is not limited to the use of room keys on mobile applications, temperature control, and movement sensor. Voice activation technology and artificial intelligence will also become critical in the personalized consumer experience.

## Implications and Recommendations

This data, however, is subjective to the population within the surveyed age group and might not be a good representation of the entire population. Majority of the respondents in the questionnaire were below 35 years old, possibly because this age group is more active on social networks and are readily available online. In the future, this research can also be conducted offline to include those people who fit the research criteria; however, they are not readily active online.

Furthermore, researchers can look more in-depth into answering the research question by utilizing other research methodologies, such as focus groups and interviews. Besides, a broader scope of respondents can be surveyed. The future survey should develop more towards the use of IoT and how it generates satisfaction and what more customers want to see. The focus groups can be conducted with the customers' side and interviews with stakeholders such as hoteliers and restauranteurs.

Another interesting aspect is the gap between the usage of IoT in the domestic sector and the hospitality sector. Businesses can utilize more of the readily available technology that is already widely used in households.

## References

Allen, R. (2017). *SnapChat marketing statistics*. Available at: https://www.smartinsights.com/social-media-marketing/snapchat-marketing-statistics/.

Buhalis, D. & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet-The state of eTourism research. *Tourism Management*, 29(4), 609–623.

Buhalis, D. & Leung, R. (2018). Smart hospitality—Interconnectivity and interoperability towards an ecosystem. *International Journal of Hospitality Management*, 71, pp.41–50. Available at: https://doi.org/10.1016/j.ijhm.2017.11.011.

Chaffey, D. (2018). *Mobile Marketing Statistics compilation*. Available at: https://www.smartinsights.com/mobile-marketing/mobile-marketinganalytics/ mobile-marketing-statistics/ [Accessed January 5, 2018].

Cohen, Scott A., Prayag, Girish, M.M. (2014). Consumer behaviour in tourism: Concepts, influences and opportunities. *Current Issues in Tourism*, 17(10). Available at: https://doi.org/10.1080/13683500.2014.965665.

Guo, Y., Liu, H. & Chai, Y. (2014). The embedding convergence of smart cities and tourism internet of things in China: An advance perspective. *Advances in Hospitality and Tourism Research (AHTR)*, 2(1), 54–69.

Huey, J. (2014). HOSPA Explains the “Internet of Things.” *Hospitality Finance, Revenue and*

*IT Professionals*. Available at: http://www.hospa.org/en/weblog/2014/03/24/ hospa-explains-internet-things/#.V1gMH2bUUVq [Accessed June 8, 2016].

Kerravela, Z. (2015). How the hospitality industry is embracing the Internet of Things. *Network World*.Available at: http://www.networkworld.com/article/2951474/cisco-subnet/how-the-hospitality-industry-is-embracing-the-internet-of-things.html [Accessed June 7, 2016].

Kumar, K. (2016). A theoretical framework for understanding consumer behavior towards smartwatches. *GE-International Journal of Management Research*, 4(11). Available at: https://www.researchgate.net/publication/311858872_A_Theoretical _Framework_For_Understanding_Consumer_Behavior_Towards_Smartwatches.

Law, R., Leung, R. & Buhalis, D. (2009). Information Technology Applications in Hospitality and Tourism: a Review of Publications from 2005 to 2007. *Journal of Travel & Tourism Marketing*, 26(5–6). 599–623.

Lee, I. (2017). *The Internet of Things: Breakthroughs in Research and Practice: Breakthroughs in Research and Practice*, Management Association, Information Resources. Available at:https://books.google.co.uk/books?id=Zh3GNd9M1oUC&printsec=frontcover&source=gbs_ge_summary_r&cad=0.

Luftman, J., Lyytinen, K. & Zvi, T. Ben. (2017). Enhancing the measurement of information technology (IT) business alignment and its influence on company performance. *Journal of Information Technology*, 32(1), 26–46.

Pena, M.D.V., Rodriguez-Andina, J.J. & Manic, M. (2017). The Internet of Things: The Role of Reconfigurable Platforms. *IEEE Industrial Electronics Magazine*, 11(3). Available at: https://doi.org/10.1109/MIE.2017.2724579.

Wang, D., Park, S. & Fesenmaier, D.R. (2012). The Role of Smartphones in Mediating the Touristic Experience. *Journal of Travel Research*, 51(4), 371–387.

West, D.M. (2013). How 5G technology enables the health internet of things. *Proceedings of the 25th Australian Computer-Human Interaction Conference on Augmentation, Application, Innovation, Collaboration - OzCHI '13*, (July 2016), pp.335–344. Available at: http://dl.acm.org/citation.cfm?id=2541048%5Cnhttp://dl.acm.org/citation.cfm?doid=2541016.2541048%5Cnhttp://dl.acm.org/citation.cfm?doid=2541016.2541048.