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Special Issue on Smart Services and Internet of Things

Smart Services and Internet of Things

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ABSTRACT

This editorial on 'Smart Services and Internet of Things (IoT)' focuses on the topics related to the applications of IoT to consumer products and services, which have become 'smarter' thanks to IoT. This special issue explores, in different ways, the phenomena of smart services and the role of IoT in business innovation across different contexts such as product-service system, car auction, tourism industry, communicating platform, online travel agency, self-service retail, and bike sharing. We hope that this special issue will provide a significant step forward in enabling researchers and practitioners to understand smart services and IoT.

Keywords: Smart Services, Internet of Things, Digital Innovation

Ⅰ. Introduction

Internet of Things (IoT), which refers to "the networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence" (Xia et al., 2012, p. 1101), is now being implemented to many consumer products or services and applied to many different industries (Kranz, 2017). Things that are previously not much to do with the Internet connectivity are now connected to the Internet and provide 'smart services' to consumers of many industries (Zanella et al., 2014). These smart services should not have been possible (or even been imagined of) without the implementation of IoT technologies.

In recent years, many industries have adopted IoT to provide smart services to their customers. Among numerous examples of IoT-enabled smart services, just to name a few, wrist-watches with wearable technologies have become smarter (i.e., smartwatches) and have enhanced consumers' lives in various ways (e.g., fitness tracking, health monitoring, scheduling, communications support, etc.). Smart speakers (e.g., Google Home and Amazon Echo) have improved consumers' experience in searching information,

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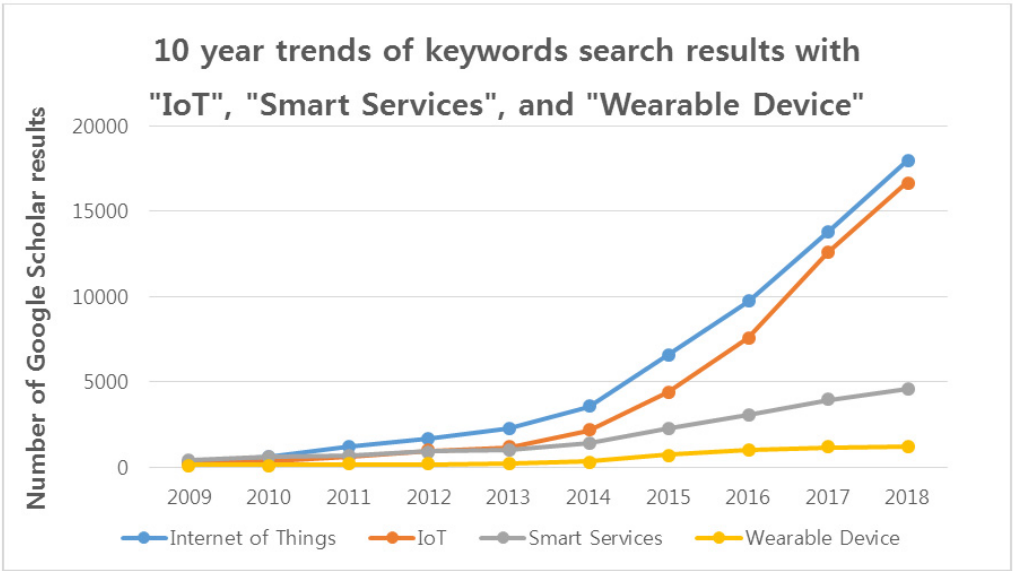
managing their schedules, communicating with others, and using various web services for entertainment, shopping, etc. Smart home (appliances) technologies (e.g., smart switches, thermostats, etc.) have helped us save energy consumption and have provided more comfort in everyday lives. Various types of vehicles (e.g., passenger cars, electric scooters, and industrial trucks) and flying drones are connected to the Internet and these connected vehicles are rapidly changing the way we own or rent, travel with, and deliver things with them, with self-driving cars, car- and scooter-sharing without any human agents (e.g., Car2go, Bird, etc.), delivery done by flying drones or self-driving vehicles, and many other industrial applications with Internet-connected self-driving vehicles.

Recent statistics and industry reports also provide us with these upward trends in the adoption of IoT and smart services. Gartner expected that the number of Internet-connected things will increase from 14 billion in 2019 to 25 billion in 2021 (Horowitz, 2019). It is also predicted that by the year of 2022, over a quarter of the U.S. population will be using at least one wearable device (e.g., smartwatch) or thing (e.g., smart clothing), due to the growth in the penetration of wearable devices from 18% in 2017 to 25% in 2022 (Wurmser, 2019). Smart voice assistant systems (i.e., smart speakers) are the fastest growing IoT-enabled smart devices and it is reported that in the U.S., already more than 25% of Internet users are using smart speakers, and more than 10% of Chinese Internet users (85.5 million Internet users) are using the devices and their numbers will be exponentially growing in next few years (McNair, 2019). Finally, for smart home segments, the market is also fast growing and the market size will grow from 32 billion in 2017 to 140 billion in 2024 (More, 2019).

In academia as well, there has been exponentially growing interest on the topics of IoT and smart services by researchers for the last 5 years. Just to explore growing trends in these research topics from academia, we conducted a simple keyword search using the following keywords at Google Scholar: Internet of Things, IoT, Wearable Device, and Smart Services (the summation of search results with the keywords - Smart Home, Smart Watch, Smartwatch, Smart Service, Self driving car(s), Voice Assistant, Alexa, and Google Home, etc.) for last decade (from 2009 to 2018) and came up with the trend chart shown in <Figure 1>. Although these keyword search results do not proportionally correspond to the number of academic journal articles published, nor we are able to know in which journals (from which disciplines) those keywords are presented, this chart definitely shows that since the year of 2014, there has been an exponential growth in the interests in the topics of IoT and smart services from various academic fields. We believe that academic interest in these topics will continue to grow for several years, as long as more IoT-enabled smart services are introduced, adopted, and populated by users from all over the world. Especially, Asian countries have more optimistic expectation about the impacts of IoT on their economy, so they are setting the faster pace in adopting IoT and smart services than the rest of the world (Vodafone Group, 2017). For this reason, we believe that the topic of this special issue in *Asia Pacific Journal of Information Systems* (*APJIS*) is very timely and is well aligned with topics of previous special issues such as electronic word of mouth and user generated content (Yang et al., 2015), knowledge management, business intelligence, and business analytics (Choi et al., 2015), and social media for business and society (Kim et al., 2015).

In this context, this special issue deals with the



<Figure 1> 10-year Trends of Keywords Search Results

opportunities of IoT as well as various smart services platforms/industries including rent car, tourism, communicating apps such as WeChat, online travel agency, self-service retail technology, and sharing economy such as bike sharing. The objective of this special issue is to offer a more profound understanding on the role of IoT and business opportunities of smart services. To the best of our knowledge, there are lack of academic research on these topics from the perspective of business and management domain. By covering various smart service industries and related topics, we hope that the reader may get an insight on how to respond to and live in the fourth industrial revolution.

Ⅱ. Selected Papers in This Special Issue

This special issue aims to enhance our understandings of IoT itself and smart services driven by IoT by introducing recent findings in various research contexts. In response, the following eight papers are selected for the publication. The first paper, entitled "*Exploring Opportunities of IoT for Product-Service System Conceptualization and Implementation*" by Mohammad R. Basirati, Jörg Weking, Sebastian Hermes, Markus Böhm, and Helmut Krcmar, conceptually suggests the framework of IoT opportunities for product-service systems (PSS): an integrated system of physical products and services. By utilizing expert interviews and systematic literature review, the authors articulate four degrees of IoT involvement (i.e., transmitting, optimizing, interacting, and tracking) in different PSS business models (i.e., product-oriented, use-oriented, and result-oriented). This study provides new insights for PSS providers and increases their awareness regarding the potentials of IoT for PSS and their current progress of IoT realization.

The second paper, entitled "*Smart Pricing in Action: The Case of Asset Pricing for a Rent-a-Car Company*"

by Seongmin Jeon, Chang Hee Han, Sangchul Shim, and Byungjoon Yoo, proposes a prediction model by analyzing multiple data sources including a data set from one of the largest online open-market sites for used cars in South Korea to valuate used cars and identifies the key factors for price determination in the used car market. By using a multiple regression model, this study finds that a smart pricing technique is useful for both efficiently collecting online reference price information and effectively predicting future prices of used cars for purchase and rent. Since this study informs what factors are most relevant in estimating future prices of used cars, the result of this study provides valuable information on how marketers and sellers in the used car industry effectively communicate with consumers of used cars.

The third paper, entitled "*Smart Tourism Capability Maturity Framework: A Design Science Research Approach*" by Chaeyoung Lim, Kazuki Baba, and Junich Iijima, proposes a smart tourism capability maturity model that includes a guideline for smart tourism governance to enable sustainable tourism innovations. Adopting dynamic capability theory, the proposed maturity model is composed of five levels of capability maturity (i.e., ad hoc, basic, intermediate, advanced, and optimizing) and six critical capabilities (e.g., managing data and tourism resources, realizing tourism values, etc.). We believe that this study will provide not only a new evaluation method for smart tourism governance, but also a valuable practical framework that helps practitioners address new challenges in their smart tourism services and manage various capabilities for sustainable tourism management and development.

The fourth paper, entitled "*The WeChat Mini Program for Smart Tourism*" by Ao Cheng, Gang Ren, TaeHo Hong, and Chulmo Koo, investigates the WeChat Mini program's role in tourism activities, based on affordance theory. Using social network analysis with the R programming language, this study finds that WeChat Mini programs related to travel services play crucial roles in Chinese users' social network activities related to their travel, by providing both perceived affordance and real affordance to the users. As an academic contribution, this study shows how affordance theory can be applied to explain the phenomenon related to the use of a Mini program (a type of 'within-app' embedded in a large social-media chatting service) and its impact on users' smart tourism activities.

The fifth paper, entitled "*Assessing the Influence of the Online Travel Agency on Consumers' Continuance Intention: A Heuristic-Systematic Model Perspective*" by Hyunae Lee, Iis P. Tussyadiah, and Namho Chung, suggests the multiple factors of online travel agency (OTA) which affect the tourists' continuance intention to use OTA. The authors classify these factors into heuristic cues and systematic cues, based on heuristic-systematic model. This study provides an insight how both hotels and OTAs formulate strategies to retain their customers, as an important platform of smart service.

The sixth paper, entitled "*Exploring the Movements of Chinese Free Independent Travelers in the U.S.: A Social Network Analysis Approach*" by Lin Li, Yoonjae Nam, and Sung-Byung Yang, studies free independent travelers (FITs) in a new age of smart tourism. By focusing on the movements of Chinese outbound FITs in the U.S. in the year of 2018 and utilizing social network analysis, the authors identify most central tourist destinations (i.e., cities and natural attractions) and their relationships (i.e., movement patterns). This study contributes to smart tourism development by examining tourist destination movements.

The seventh paper, entitled "*The Relationship between Service Quality and Revisit Intention: Based on*

Self-Service Retail Technology" by Fang Lyu, Hyun-A Lim, and Jaewon Choi, investigates customer acceptance of self-service in the retail industry. The authors study the relationship between service quality and customer intentions to revisit the self-service retail stores in future and the intentions to positive word-of-mouth. By utilizing a survey from self-service convenience stores in China, the authors show that improving the service quality is a very important factor for customers to accept self-service retail stores. This study helps companies inject new technologies and enhance the provided experience in order to further attract customers to self-service retailers.

The last paper, entitled "*Riding a Bike Not Owned by Me in Bad Air: Big Data Analysis on Bike Sharing*" by Taekyung Kim, empirically finds that temperature change is tightly associated with bike sharing activities. The author finds that the concentration of particulate matter is weakly related to bike sharing but suggests that the trend should be carefully examined. By shedding light on the topic of bike sharing based on big data analysis, the findings of this study provide insights for policy makers and entrepreneurs.

Ⅲ. Conclusion

These eight papers explore, in different ways, the phenomena of smart services and the role of IoT in business innovation. As briefly introduced above, this special issue handles a variety of issues regarding smart services and IoT in the context of diverse platforms and industries such as product-service system (the first paper), car auction (the second paper), tourism industry (the third and sixth papers), communicating platform (the fourth paper), online travel agency (the fifth paper), self-service retail (the seventh paper), and bike sharing (the last paper). In addition, the eight selected papers apply different research methodologies using different types of data.

By introducing relatively new and diverse approaches to the issues of smart services and IoT, we hope that this special issue, although not comprehensive, can serve as a stepping stone for further interesting, important, yet challenging research. In sum, we hope this special issue will provide a significant step forward in enabling researchers and practitioners to understand smart services and IoT.

In conclusion, we acknowledge the valuable contributions of the authors who kindly choose this special issue as the outlet for publication. We also thank our review team for devoting their time and efforts to provide helpful and constructive comments. Finally, we would like to give special thanks to the editor of *APJIS* for supporting to successfully complete this special issue.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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