

## Hotel Digital Services Innovation: The Digital Space Services

Galayapha Lekvanijthamvitak<sup>1</sup>, Suchai Thanawastien<sup>2</sup> Suwannee Thoobjeen<sup>3</sup> and Thaksina Khongsomlap<sup>4</sup>

<sup>1,2</sup> Faculty of Information Technology  
Shinawatra University  
Bangkok, Thailand  
suchai.th@gmail.com

<sup>3,4</sup> Faculty of Science and Technology  
Rajamangala University of Technology Suvarnabhumi  
Ayutthaya, Thailand  
s.thoobjeen@gmail.com

*Abstract* — In this paper, the hotel digital space concept is defined and digital space services are proposed. New digital space services can provide a new perspective in constructing enhanced capabilities to service hotel guests. The hotel digital space provides a seamless connected space within the hotel, the neighbor space, and the selected city POI space by means of Digital Footprint, e-Commerce, Alert & Warning, Emergency Notification. The connected entities must be registered with the hotel servers. Hotel digital space services are a significant contribution and these are new services that will enhance the experiences of guests., It will provide guest with a save and secure environment including staying, visiting, sight-seeing, and shopping experiences.

**Keywords** – Digital Hotel; Digital Space; Digital Footprint; Hotel E-commerce; Neighbor E-commerce; City POI E-commerce; Hotel Digital Services

### I. INTRODUCTION

The tourism industry is one of the top industries in Thailand with more than 600 five-star hotels with more than 164,015 total rooms available which can accounted for more than 36% rooms available for tourists. With this important industry, it is imperative that a strong research foundation regarding marketing strategies is needed to strengthen the competitiveness of hotel services. There is definitely a need for new business models, new innovations and the application of the right technology.

From a study by Cornell University in 2005 [1] concerning service innovation, they found that service innovation is a key factor in determining the success of a hotel. It is one of the key factors regarding reasons a guest select a hotel. İplik, F. N., Topsakal, Y., & Doğan, O. (2014) [2] studied the strategy to use innovation as a competitive advantage in hotels in the city of Antalya. They found that innovative services can provide satisfaction to the guests. The trend of developing new

innovations to gain a competitive advantage is a must for hotel. The efficiency of hotel service will be reduced as well as competitive advantages being reduced. (Ilyenkova& Kuznetsov, 2009) [3]. This research aims to develop an innovative hotel service.

### II. PROBLEM DIFINITIOIN

From the current direction of technology development for hotel services, it is critically important for guests to use a single mobile phone or tablet as a means for interacting with the hotel business systems for every business service offered by the hotel [4]. This includes, but is not limited to, the following services: 1. Reservation, 2. Cancellation, 3. Change of room, 4. Deposit, 5. Check-in and Check-out, 6. Room keycard, 7. Room services, 8. Hotel Services, 9. Payment, 10. Hotel ERP. Basically, these are typical hotel operations and they are supported by many commercial software products. The current expectations of guests concerning hotel operations, there is a demand for room to be innovated. New innovations can be developed to increase the efficiency of hotel operations and to provide expanded services for guests. This will be the main research focus.

First of all, at present, no system takes the hotel life cycle of a guest into account in the context of providing services to guests. The hotel life cycle of a guest includes, guest arrival to register, guest check in to stay, guest visiting places, and eventually guest leaving. The activity before the guest arrival can be the reservation activity. But many guests are also walk-in type or they book through OTA.

New innovations must cover the life cycle of a hotel guest with certain innovations that will give the guest the best experience during their time spent at the hotel. The technology that should be applied includes the context awareness so as to render the best needed services to the guests. Hence, the research questions are:

#### A. Questions of research

1) What new innovations can provide the guest with a safe and ease of mind staying experience ?

2) what are some new business models that enable the hotel to provide extended services while generating non-room-based revenue ?

To answer the above research questions, the following concept will be systematically exploring to discover the right innovation, architecture and processes that will exhibit the operational features as the answer to the research questions. The main idea is to expand the virtual coverage of the space as perceived by the guest. The guest's accessible space is no longer limited by the size of the physical space as bounded by the hotel premise. It is possible to expand a hotel's space to include vicinity and city point of interests

As for the implementation aspects of the system, it should be noted that any new services must be integrated into the overall workflow so that it will provide experiences to guests in a seamless manner. Additionally, this integration would not create any weakness in security. The protection of the privacy and provision of security the guests is the utmost important concerning these the new innovative digital services of the hotel.

#### B. The importance of this research

This research will examine a few new digital services that have not been realized and are relatively unknown among hotel operators. Consequently, the result of this research can be the foundation of creating a commercial strength add-on system for proving expanded hotel services.

### III. PREVIOUS WORKS

The innovation trend in the service industry is evident through the ability to create a variety of innovations that will ensure the successful development of the hotel. Applying new knowledge including the integration of services, will result in new products, services, and technologies. If the hotel does not participate in any new innovation processes, the performance of the organization will be reduced and the ability to compete will disappear (Ilyenkova & Kuznetsov, 2009) [3], IPLIK, the FN, Topsakal, Y., & Doğan has, the O. (2014) [ 2 ] All types of innovation and innovation levels figures are shown Table 2.2 (Orlova., 2016) [5]. Sebastjan Repnik [6]

### IV. HOTEL DIGITAL SERVICES

This research is to propose new services for hotels. Let us call the hotel with these digital services the "Digital Hotel." In a hotel, the basic operations as mentioned before are as follows: Reservation, Check-in, Check-out, Room management including key card or other security systems, Restaurant Management with POS system, Hotel Inventory Management, Customer Information System, ERP system covering financial, accounting, human resources, purchasing, and the IT infrastructure such as internet, Wi-Fi system, internet user management, hotel

website and other social media including Facebook. Moreover, nowadays, there is a need to connect to OTA or other global tourism services portal. Hence, these are the basic digital operations of the hotel. This type of hotel digital operation has been in use for decades and is very mature. However, none of which can be considered as innovative services to hotel guests. In this paper, a new class of services and architecture will be proposed. These new class of services will directly serve hotel guests and make their stay a memorable experience.

#### A. Digital Space

The term digital space of a guest represents the physical areas, inside and outside of the hotel, that are frequented by a guest when staying in a hotel. The digital footprint of the guest as related to the activities of the guest has significant impact on building the next generation digital hotel service platform. The digital space can be divided into three groups of digital spaces including:

- Digital space within the hotel: Guest Room, Lobby, Bar, Hotel Shops, Massage Rooms, Swimming Pool, Joking Track, Business Center (or Co-Working Space), Restaurants, etc.,
- Digital space between hotel and the neighbors: This space will bring the neighbors as part of the guest ecosystem.
- Digital Space between the hotel and the city: The guest will venture out to visit many places or carry out some personal business affairs in the city. The City-POI will be registered and become the guests' extended space.

Each space is connected through several functions. The realization of the hotel digital space is through the Digital Space Services comprising the following.

1) The Digital Space App that provide Footprint functions for tracing back of traveled routes, short trip planning inside the connected digital spaces, and recording of events (live and recording).

2) The Alert & Warning and Emergency functions.

3) The E-Commerce functions for Hotel e-commerce, Neighbor e-commerce, and City POI e-commerce. All shops and services must be pre-registered with the Hotel Server. Figure 1 shows the diagram of The Hotel Digital Space Services. Figures 2-6, the workflow of guests using the system are shown. First, we define the following POIs (Point of Interests)

- *Hotel POI* is the place where hotel guest can access such as his own room, the lobby, restaurants, spa, swimming pool, etc.
- *Neighbor POI* are the interesting business establishments within a short walking distance that is contacted by the hotel and has obtained an

agreement to be an extend POI registered with the hotel Space Server. Also other businesses are shrines, temples, etc.

- *City POI* are interesting tourist attractions, interesting people, shopping, special restaurants, and business entities that have been contacted by the hotel and get an agreement to be an extended POI registered with the hotel space server so that the guest can directly interact with digitally.
- *Create Digital Space*: Register all hotel POIs, Register all neighbor POIs, Register all city POIs, Input graphic map of hotels showing all service space, Input graphic map of neighbors and Input graphic map of the city.
- *Footprint App*: Activate footprint (track the whereabouts of the guest), Major functions (Track forward to the destination), Track back to the origination, Set multiple destination, Print footprint of this trip to show graphic and footprint of the trip superimposed on the graphic map.

#### B. Space e-Commerce

Space e-commerce is comprised of three distinct e-commerce system, namely- the hotel ecommerce, the neighbor e-commerce, the city e-commerce. These e-commerce systems offer ease-of-mind service to the hotel guest to buy services and merchandise online. Only the registered entities can be the service providers or merchandise suppliers. The guests can buy souvenir from these sites. The hotel will be able to earn extra revenue from the space e-commerce operations with payment system and pre-agreed business model.

- Create Space e - Commerce Sites
- Register the Hotel Space e - Commerce suppliers
- Authorize n items in the catalogue
- Authorize only active hotel guest can access and purchase
- Setup any promotion and privilege
- Register the Hotel Space Neighbor E-Commerce
- Authorize n items in the catalogue from each of the registered business entities
- Authorize only active hotel guest can access and purchase
- Allow to setup promotion and privilege
- If it is neighbor service provider, track real-time service rendering (begin and end)
- Register the Hotel Space City E-Commerce
- Authorize n items in the catalogue for each of the registered City POIs
- Authorize only active hotel guests who can access and purchase
- Allow to setup promotion and privilege
- If it is city POI service provider, track real-time service rendering (begin and end).

#### C. Safety Space

One of the most concerned aspects in staying in a hotel as a tourist is the issue of safety. For the Hotel Digital Space where the tourists stay and travel, the Safety Space will provide the following functions.

- *Emergency* function displayed on the mobile phone will be used to alert the hotels and nearby police station including 199, 1668, and other emergency agencies.
- *Alert function* is used by the hotel to alert the guest of certain impending events or event to be occurred or already occurred as preset by the guest.
- *Warning function* is used by the hotel to warn guests of any un-usual events that is already in progress or about to happen that can affect the safety of guests who are in the vicinity.
- 

#### V. CONCLUSION

The current hotel information system mainly functions to support key operations such as reservations, check-in, check-out, website for marketing, and back office using some ERP software and interfaces to the global tourism and hotel value chain systems. This type of information system is designed to support these traditional functions. As technology evolves, it pushes the hotel boundary far beyond the physical space of the hotel. It extends the presence to the neighbors and to certain POIs of the city. Also, the guests nowadays are savvy in using social media and hence it might be useful to provide another limited channel for guests to know each other on the personal permission basis.

The workflow architecture of a Digital Hotel shown in Figures 2-6 will provide functionalities for hotel customer services far superior to the existing hotel management information system. Hotel guests will be able to be taken care of and can obtain the required information and services as needed immediately or in a timely manner. Both service requests and information requests are available.

The implementation of the Digital Hotel Architecture as described in this paper can be done using many off-the-self standard components. However, implementing the digital space of guests through the various digital spaces must appear to guest as being seamless; transiting from one space to another will be tracked and hence a footprint is always available to either go back or go forward. The guests can use the social engagement system announcing the intention of finding a friend or friends to discussion some business issue, or go to a short trip, or attend an event, or go to a restaurant, or on a permission basis. The e-commerce components, will allow the guest to find a last-minute souvenir, to find local best seller or to buy unique products.

The Digital Hotel architecture proposed in this paper will provide a conceptual design idea for the next generation hotel. In the report "The Hotel of the

Future,”[7] the hotel guest social engagement is described as the matchmaker role of the hotel to connect people to the hotel and the area surrounding the hotel., The expansion of space to the neighbor is described as the integration of culture with the local community. This paper has noted some of these concepts and has created a Digital Hotel Architecture that is implementable. It is under the digital twin paradigm to enhance the services of the physical hotel by providing additional functionalities from the cyber counterpart. As a final note, for the successful implementation and deployment of this system, hotels needs to design a training program for the guests so they understand the concepts, features and use-cases. For the hotel a few staff members must be trained to provide support to the guests so that they can enjoy the extra services provided by the digital hotel.

REFERENCES

- [1] Victorino, L., Verma, R., Plaschka, G., & Dev, C. (2005). Service innovation and customer choices in the hospitality industry. Retrieved [November, 29, 2017], from Cornell University, School of Hotel Administration site: <http://scholarship.sha.cornell.edu/articles/528>.
- [2] İplik, FN, Topsakal, Y., & Doğan, O. (2014). Strategic innovation: An operation in the Antalya region. *Advances in Hospitality and Tourism Research (AHTR)*, 2 (1), 16-29.
- [3] Ilyenkova, SD., Kuznetsov, VI (2009). *Innovation Management*. Moscow, Eurasian Open Institute, p.183.
- [4] Grant Thornton. (2016). Thailand: Hotel Survey 2016.
- [5] Orlova, LN (2016). Approaches To Management Of The Principles And the underlying on Sustainable Development Innovation Of Economic systems's. *Management in Russia and abroad*, 3, pp. 3-9.
- [6] Sebastjan Repnik, (2008). Case studies of innovation in the hotel industry, *Quaestus Multidisciplinary Research Journal*, pp.141-163.
- [7] Deloitte Consulting, *The Hotel of the Future*, Doblin, 2016Electronic Publication: Digital Object Identifiers (DOIs): Article in a journal:

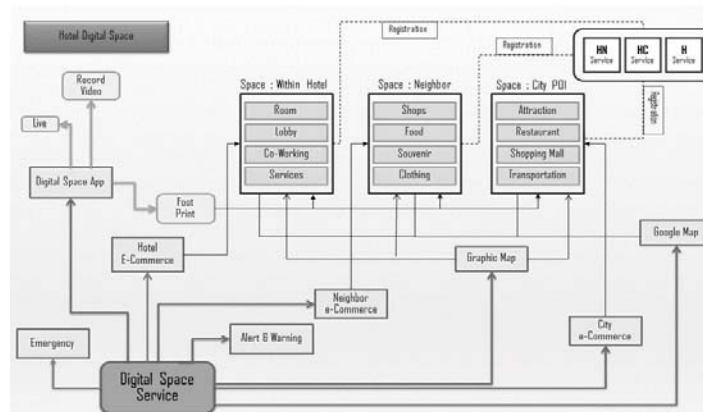


Figure 1. The diagram of the Digital Space showing the digital footprint, e-commerce, alert and warning

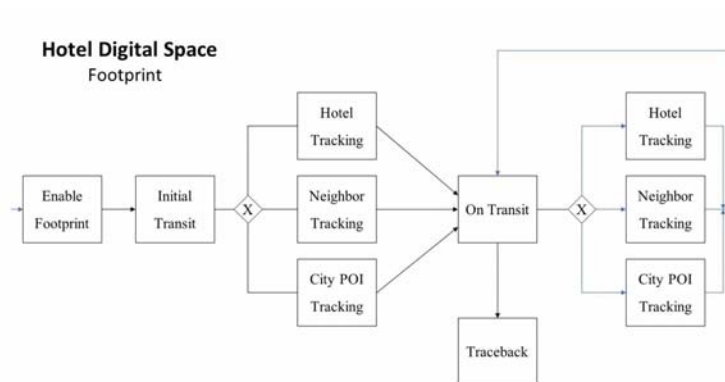


Figure 2. The workflow architecture of the Hotel Digital Space Services: Footprint

**Hotel Digital Space**  
Admin Process to Alert & Warning

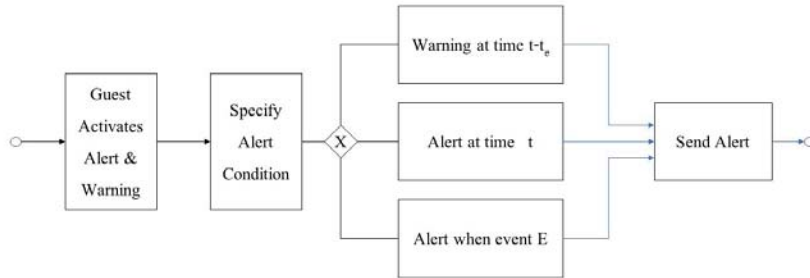


Figure 3. The workflow architecture of the Hotel Digital Space Services: Alert and Warning

Hotel e-Commerce

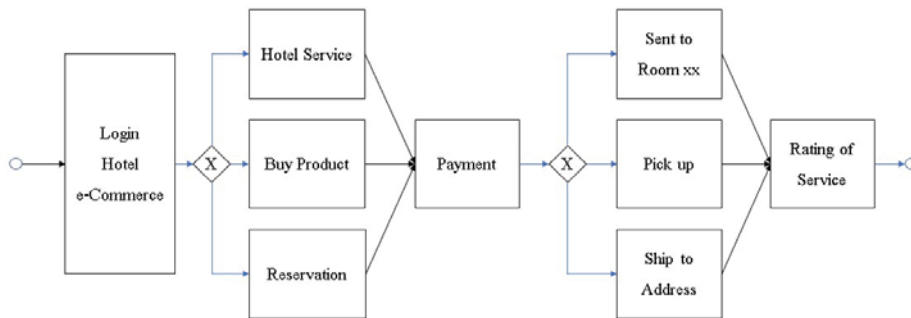


Figure 4. The workflow architecture of the Hotel Digital Space Services: Hotel E-Commerce.