



THINK TANK

SMART HOTEL ROOM

REPORT

School of 
Hotel & Tourism Management
酒店及旅遊業管理學院

 PolyU Design

 Hotel ICON

TABLE OF CONTENTS

Page

2

Introduction

Page

3

Participants

Page

4

Rundown

Page

5

Part I – Knowledge sharing

Page

7

Part II – Knowledge co-creation

INTRODUCTION

On July 16, 2019, the School of Hotel and Tourism Management (SHTM) and the School of Design (SD) at the Hong Kong Polytechnic University organized a one-day Think Tank event to discuss “Smart Hotel Room” as a collaborative project between Tomorrow’s Guestrooms (TGRs) and the Hospitality and Tourism Research Center.

The purposes of the think tank were to share/brainstorm insights about smart hotel room from the perspectives of various stakeholders, including government, academics, and industry (i.e., tech companies and hotels), and to come up with practical/feasible ideas to design “smart hotel rooms”. A total of 24 participants representing stakeholders from the government sector (Hong Kong Hotels Association), five industry vendors, delegates from Hotel ICON, as well as a number of academics from SHTM and SD, joined the event.

The event comprised two sessions: knowledge sharing and knowledge co-creation. During the knowledge sharing session, two academics, Dr. Sangwon Park from SHTM and Mr. Bruce Wan from SD, shared their understanding of a “Smart Hotel” from the management and design perspectives, respectively. In the afternoon, workshops involving knowledge co-creation activities were led by Dr. Daniel Leung from SHTM. The design thinking, a process of human-centered approach to creative problem solving, was applied in these workshops. This approach enabled the participants to envision innovative solutions that contribute to smart hotel rooms. A detailed rundown of the think tank event is presented below.

This report summarizes the outcomes of the think tank. It is expected that this report will be useful (1) to share the findings of the think tank with people in the relevant fields, including academics, industry, and government sectors, and (2) to develop an action plan to implement the TGR project.

PARTICIPANTS

Officiating Guests and Speakers at the Think Tank



- (Front line from left)** Dr. Daniel Leung, SHTM; Dean Kun-Pyo Lee, SD; Dean Kaye Chon, SHTM
- (2nd line from left)** Mr. Bruce Wan, SD; Dr. Catherine Cheung, SHTM; Ms. Jenny Jia, Tuya Smart; Dr. Sangwon Park, SHTM; Mr. Patrick Kwok, HK Hotels Association; Mr. Horace Pan, SD
- (3rd line from left)** Dr. Ada Lo, SHTM; Ms. Hermans Lee, Hotel ICON; Mr. Steven Tsui, KACTUS; Dr. Ryuu Tam, Backers Experience; Mr. Carson Tsoi, HK Hotels Association
- (4th line from left)** Dr. Norman Au, SHTM; Dr. Sylvia Liu, SD; Mr. Damien NG, Backers Experience; Mr. Bower Chen, Tuya Smart; Mr. Nicholas Ho, KACTUS
- (5th line from left)** Ms. Susana Fork, Hotel ICON; Ms. Sangwon Lee, SD; Mr. Calvin Chan, Hotel ICON; Mr. Carson Lee, Hotel ICON; Dr. Brian Lee, SD; Mr. Patrick Ho, KACTUS

RUNDOWN

THINK TANK SMART HOTEL ROOM

📅 July 16, 2019 (Tuesday) ⌚ 9:30 a.m. – 5:00 p.m.

📍 Room TH306 . School of Hotel and Tourism Management

- 9:30 ○ Registration
- 10:00 ○ Welcome
Dean Kaye Chon | School of Hotel and Tourism Management
- 10:20 ○ Part I : Knowledge Sharing
Commentary
Sangwon Park | School of Hotel and Tourism Management
Bruce Wan | School of Design
- 11:00 ○ Networking Break
- 11:15 ○ Industry Insights Session
Aromeo | Hong Kong
Backers Experience | Hong Kong
Broomx Technologies | Spain
KACTUS | Hong Kong
Tuya Smart | Mainland China
- 12:30 ○ Lunch
- 2:00 ○ Part II : Knowledge Co-creation
Daniel Leung | School of Hotel and Tourism Management
Smart Hotel Room Co-creation Workshop I
- 3:40 ○ Networking Break
- 4:00 ○ Smart Hotel Room Co-creation Workshop II
- 4:50 ○ Closing Remarks
Dean Kun Pyo Lee | School of Design

Conceptualizing Smart Hotel Rooms

In the knowledge sharing session, Dr. Sangwon Park gave the first presentation entitled “Conceptualizing Smart Hotel Rooms.” He stated that a smart hotel is a part of service innovation along with technological evolution. In his presentation, he first emphasized that the Internet of Things can be the foundation to understanding a smart hotel room, which he defined as *“a room that uses Internet-connected devices to enable remote monitoring and management of appliances and systems and automatic transmission of data between them.”*



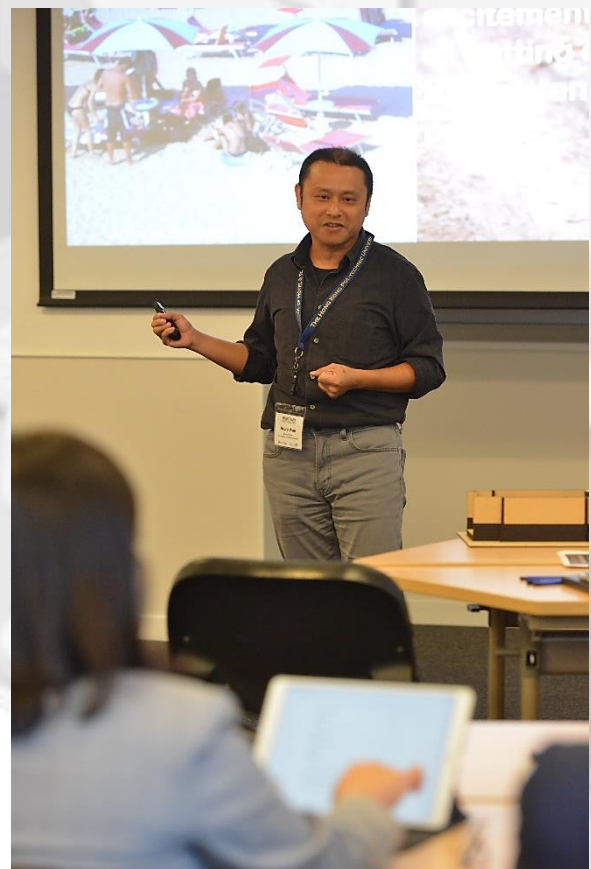
Dr. Park then shared his views on the benefits of smart hotel rooms from the operations and guest perspectives.

According to him, the smart hotel will not only help hotel operators reduce operating costs and enhance management efficiency but also increase guest comfort, offer ultra-personalized services, and ultimately improve guest experiences.

Design for Tourism and Hospitality Experience

The next presentation was given by Mr. Bruce Wan and was entitled “Design for Tourism and Hospitality Experience.” To guide the think tank participants to develop a “customer-centric” design of the future guest room, Mr. Wan first outlined the theory and principles of “experience-centered design.” As the prerequisite for experience-centered design is to acquire a thorough understanding of “what experiences to design for,” he emphasized that identifying experiential factors (e.g., activities, benefits, and values) that lead to a positive experience is of utmost importance.

Besides understanding what experiences to design for, Mr. Wan summarized the design propositions need to address the three levels of human goals, namely be-goals, do-goals, and “motor-goals”. The three levels of human goals, namely “motor-goals”, “do-goals”, and “be-goals”. At the basic level, a design solution needs to be functional and accessible so that users can operate the device features. Besides, the solution also needs to be attractive and engaging so that it motivates users to take action. Lastly, it should resonate with users’ psychological needs and values so that the outcomes are beneficial, desirable, and significant to them.



PART II

KNOWLEDGE CO-CREATION

Method

The knowledge co-creation session adopted a design thinking approach—the cognitive, strategic, and working processes by which abstract experiential dimensions can be explored, valuable propositions can be generated, and innovations can be evaluated before commercialization. The application of design thinking allowed think tank members to explicitly discuss and strategically implement ideas so that smart hotel rooms could be conceptualized with a suitable design approach. The knowledge co-creation session included two co-design workshops.

Workshop I

Workshop I focused on exploring the desirable goals guests would expect in TGRs. To achieve this, the think tank participants were asked to brainstorm guests' possible needs and wants when they are staying in a hotel room. The needs and wants were expressed in two types of statements, starting with "I need" or "I wish." These statements should be related to a specific experience and/or activity.

To facilitate this co-design process, we prepared a large-scale summary table and provided the think tank participants with a deck of post-it notes (Fig. 1). The participants could then write their statements and post them on their corresponding team's board for further discussion. Workshop I was ended by inviting all teams to share their collective thoughts with the other teams (see Fig. 2).

PART II KNOWLEDGE CO-CREATION

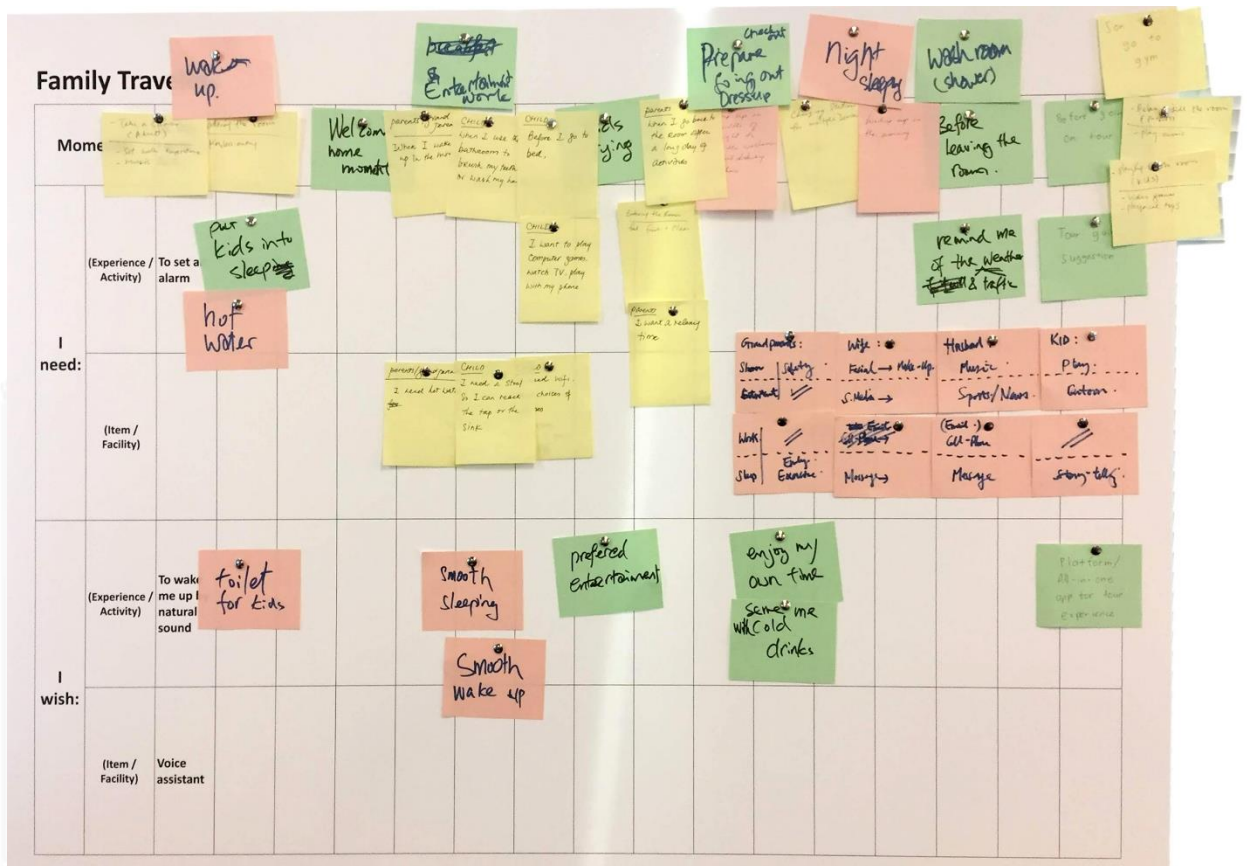


Fig. 1 Needs and Wants Summary Table



Fig. 2 Short Presentations by the Think Tank Participants

PART II

KNOWLEDGE CO-CREATION

Workshop II

In Workshop II, the think tank participants were asked to co-design innovative ideas (including technologies, facilities, or service procedures) to address the needs and wants identified in Workshop I. To provide clear guidelines to implement those innovative ideas, if applicable, participants were also asked to specify where those technologies and facilities should be installed/placed. To facilitate this session, a scale model of the guest room (Fig. 3) and a large-scale printed floor plan (Fig. 4) were provided to the participants. Similar to Workshop I, Workshop II was ended by inviting all teams to share their collective thoughts with the other teams.



Fig. 3
Scale Model of a TGR

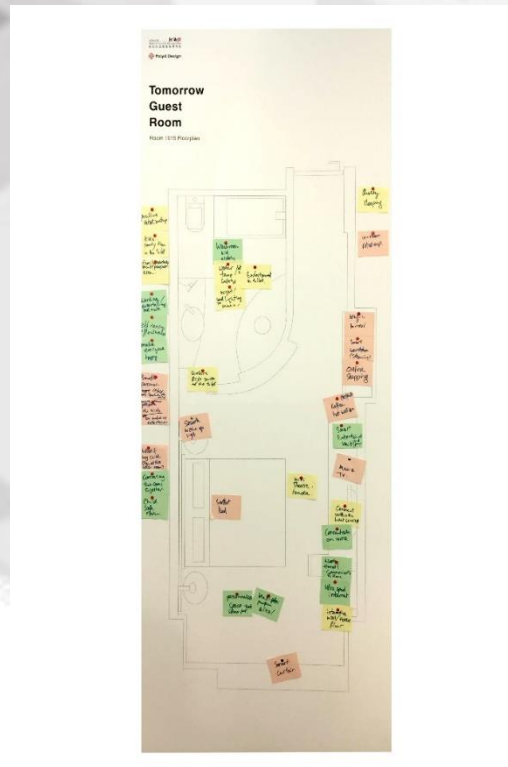


Fig. 4
Floor Plan of a TGR

Key Insights from the Knowledge Co-creation Session



BUSINESS TRAVELERS

- a) **Effectiveness** – When business travelers visit a destination for work-related purposes, they tend to stay in hotels to achieve those purposes. Time and resource efficiencies are some of the most important factors on their business trips. Smart technologies installed in the rooms can not only facilitate the completion of their tasks but also enhance their efficiency. For example, smart technologies (e.g., smart TVs and smart mirrors) can help business travelers check their meeting schedule, review the meeting materials, set up a video conference call, and pre-order hotel services (e.g., laundry and ironing).

- b) **Connectedness/Connectivity** – Business travelers desire to frequently check updates of their e-mails and search for information online. Strong Internet connectivity can enable them to access the Internet uninterrupted and perform their work activates efficiently (e.g., accessing cloud servers and downloading documents). Moreover, business travelers generally have multiple phones. As phones get smarter and busier, their battery life gets shorter. It is thus important for

the smart hotel rooms to offer them enough convenient chargers (e.g., multiple functional sockets and wireless charging boards).

- c) **Customization** – Business travelers tend to repeatedly visit a certain hotel brand/property and can have specific preferences for some settings in a hotel room such as amenities, beddings, and room services. A mobile hotel application can function as an active personal assistant for each guest that saves and remembers their preferences from previous settings or order histories and prepares the same or similar offers for them even before they arrive at the TGR. For example, a smart hotel can flexibly adjust a room setting based on travelers' preferences (e.g., levels of light brightness, room temperature, preferred TV channels, and room services), thus offering customized services to individual guests.
- d) **Personal care** – Similar to customization, business travelers like to have personalized experiences and immediate assistance from hotels. By recognizing the staying patterns and preferences of a business traveler, a smart assistant (or concierge) installed in the room can address a request from that guest and provide personalized services (e.g., smartphone or voice activation systems). The assistant can also suggest ideas via the virtual assistants (e.g., Amazon Alexa, Google Home). The language of the virtual assistants can be matched with the guests' local language, so they need not to speak English or learn the local language of the destination. This will allow them to obtain personalized information more intuitively and effectively.

Business Travelers								
Moments	<i>When entering a guest room</i>	<i>When staying in the guest room</i>	<i>When working in the room</i>	<i>When using the washroom</i>	<i>When returning to the room after work</i>	<i>When wanting to have food not available at the hotel</i>	<i>When going to bed</i>	<i>When leaving the room</i>
Technology	<ul style="list-style-type: none"> Sensors connected to the speakers, TV, lights, A/C, wayfinding 	<ul style="list-style-type: none"> Multiple chargers, wireless charger, smart sockets Voice activation system Motion and weather detector 	<ul style="list-style-type: none"> Smart mirror (conference call setting) 	<ul style="list-style-type: none"> Smart tub, smart mirror Smart mirror on the basin 	<ul style="list-style-type: none"> Smart wine dispenser, smart coffee machine, smart kindle 	<ul style="list-style-type: none"> Smart mirror, personal concierge 	<ul style="list-style-type: none"> Preference save feature of the hotel application 	<ul style="list-style-type: none"> Sensors located near the door, Smart mirror
Benefits	<ul style="list-style-type: none"> The hotel application can provide wayfinding function, so that the users would not be confused about the way to their TGR Guests can get a warm welcome as the first impression. 	<ul style="list-style-type: none"> A business guest who normally brings multiple technological devices can easily find enough sockets or chargers in the room. Guests can get information about the TGR via the voice activation system. Weather and motion detector can adjust the TGR's temperature to provide the most comfortable room settings. 	<ul style="list-style-type: none"> The TGR can offer smart mirror as a tool for video conference calling for business travelers. 	<ul style="list-style-type: none"> A guest can easily adjust the water temperature so as to avoid experiencing unexpected water temperature. This technology will help guests avoid using difficult temperature control adjustments. Business guests can get updated information about their schedules or news as well as enjoy entertainment (listening music). 	<ul style="list-style-type: none"> Business guests can remotely control the rooms. For instance, they can keep hot tea and coffee ready when they return to the rooms. 	<ul style="list-style-type: none"> Smart technology (e.g., smart mirror) can allow a hotel guest to order local food without any barrier (e.g., language difficulties). 	<ul style="list-style-type: none"> A mobile hotel application can save the bedding settings for each guest. 	<ul style="list-style-type: none"> The sensor can recognize the moment when the guest leaves the room. At that moment, the smart mirror can update and provide real-time information (e.g., weather) and remind the guest about taking necessary belongings (e.g., an umbrella)

Insights from the Knowledge Co-creation Session



FAMILY TRAVELERS

- a) **Empathy** – As family travelers often travel with children and/or elderly, hotels should ensure that all in-room facilities and amenities are supportive to everyone to demonstrate their all-round empathy toward this customer segment. For instance, given that some elderly may need to access the washroom during the night because of nocturia, it would be helpful if the light in the washroom lit up automatically after sensing someone get up during the midnight. The height of the sink and other fixtures in the washroom is another area that can reflect the hotel's empathy toward children and elderly. Considering the differences in their heights, it would be helpful if the height of the sink and other fixtures in the washroom could be adjusted automatically. For families in which parents and children stay in separate rooms, the television in the parents' room could be connected with a surveillance system in the children's room. This design will allow the parents to seamlessly monitor their children's status while in a different room.

PART II

KNOWLEDGE CO-CREATION

- b) **Solidarity and Bonding** – As family trips are an opportunity to strengthen the bonding between family members, the design of a future hotel room should be supportive of fostering positive family relationships. One idea suggested by the participants was to provide a gaming console in the room so that the parents and kids can play video games together. Another idea was to replace the typical television with a projector and convert the guestroom into a mini-theatre so that the whole family can watch a movie together. If an interactive projector was installed in the guestroom, it could even allow both the parents and children to jointly participate in the trip-planning task.
- c) **Balanced** – Several participants mentioned that striking a good balance between personal time and family time is important for family travelers. Personal time refers to the time when some members can focus on their own work or entertainment, whereas family time refers to time that can strengthen family bonds. To create this “balanced” atmosphere, a smart hotel room should have a flexible design that can provide “me time” and “we time” for family travelers. For instance, the in-room projector or television should be able to project entertainment separately (by showing one channel for children and another channel for parents) and jointly (by showing one channel for all occupants in the room). Similarly, the lighting system in the room should allow independent control. Although parents may wake up earlier (or sleep later), such a lighting system would allow them to turn on (or off) the light in their area so that their action will not disturb their children, or vice versa.

Family Travelers

Moments	<i>When entering the guestroom</i>	<i>When staying in the guestroom</i>	<i>When planning a trip</i>	<i>When planning to buy some gifts/souvenirs for other family members</i>	<i>When using the washroom</i>	<i>When going to bed</i>	<i>When waking up and looking outside the window</i>	<i>When packing the luggage</i>
Technology	<ul style="list-style-type: none"> • 3D-virtual assistant • Lighting signaling system 	<ul style="list-style-type: none"> • Projector/Interactive projector • Voice-activated assistant + speaker 	<ul style="list-style-type: none"> • Projector/Interactive projector • Virtual guide book (with searchable function) • Smart mirror 	<ul style="list-style-type: none"> • AI-powered recommender system • Voice-activated assistant + speaker 	<ul style="list-style-type: none"> • Smart mirror • Smart tub • Voice-activated assistant 	<ul style="list-style-type: none"> • Smart lighting system • Smart pillow • Smart bed 	<ul style="list-style-type: none"> • Smart mirror • Smart kettle • Voice-activated system + speaker 	<ul style="list-style-type: none"> • Sensors located in the wardrobe, drawer, and bathroom
Benefits	<p>The virtual assistant and lighting signaling system can help guests understand:</p> <ul style="list-style-type: none"> • Where they can place their luggage • Where the power sockets are located • The functionality of all amenities in the room • The functionality of all switches 	<p>Guests can freely:</p> <ul style="list-style-type: none"> • Check what activities can be done in the hotel to spend time with kids • Check what restaurants and activities are recommended for family travelers • Check how to reach recommended attractions and restaurants • Jointly develop the travel plan using the interactive projector 	<p>Guests can:</p> <ul style="list-style-type: none"> • Check and cross-check everything conveniently • Ensure that they do not miss the shuttle bus (if they want to take it) 	<p>Guests can:</p> <ul style="list-style-type: none"> • Acquire suitable recommendation based on what past customers recommended/purchased • Ask the virtual assistant to place the order and ask the vendors to deliver the souvenirs to their rooms 	<ul style="list-style-type: none"> • Smart mirror can turn to “blurry mode” so that a private shower room is created • Smart tub can adjust the water temperature and water pressure to the right level • Voice-activated assistant can control the shower time for kids so that they do not waste the water 	<ul style="list-style-type: none"> • Smart lighting system can sense and adjust the brightness according to parents’ voice command/time • Smart pillow can adjust its firmness according to the guests’ request • Smart bed can adjust its level of firmness or warmth to create a nice sleeping atmosphere 	<ul style="list-style-type: none"> • Smart mirror can adjust the blurry level to wake guests up comfortably • Smart kettle can pre-boil water for the parents to dissolve milk powder for baby feeding • Voice speaker can play soft music (e.g., bird sound) to wake guests up comfortably 	<ul style="list-style-type: none"> • Sensors can check and report whether the wardrobe (or other areas) contains any belongings of the guests