



# New technologies used in COVID-19 for business survival: Insights from the Hotel Sector in China

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Received: 29 September 2020 / Revised: 18 October 2020 / Accepted: 5 November 2020 /  
Published online: 23 November 2020  
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## Abstract

The tourism industry is in a fight for survival during the coronavirus pandemic. This essay was written based upon several interviews conducted with directors and general managers of nine well-known hotels in China with the aim to investigate what new technologies are used to mitigate the impact of the pandemic. DeLone and McLean's Information System Success Model was applied to examine the adopted digital technologies. Live-stream promotion and live-stream conference are introduced to primarily improve information quality, while 5G technology and Wi-Fi 6 are installed to enhance the system quality. Facial recognition, AI, and Robots are integrated to the daily operations to enhance service quality. Challenges and future directions are discussed.

**Keywords** COVID-19 · New technologies · Hotel · Information System

## 1 Introduction

The coronavirus COVID-19 pandemic has exerted a tremendous impact on the tourism industry worldwide. Travel restrictions, quarantines, and closures of transportations has led to a 22% decline of international tourist arrivals in Q1 2020 compared with 2019 and possibly to 60–80% over the entire year (UNWTO 2020). At present, the global travel and tourism industry is in a fight for survival with an estimated 50 million global jobs at risk due to the pandemic. UNWTO Secretary General Zurab Pololikashvili stated that, “The world is facing an unprecedented health and economic crisis. Tourism has been hit hard, with millions of jobs at risk in one of the most labor-intensive sectors of the economy” (UNWTO 2020, p. 1). As of September 2020, in the United States alone, the Bureau of Labor Statistics reported that 4.8 million hospitality and leisure jobs have been lost since February 2020 (AHLA 2020).

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The coronavirus is highly infectious. Natural human exhalation flows such as sneezing, coughing, breathing, and speaking can release the virus that causes infections (Tang et al. 2013). Moreover, a research unit has announced the possibility of the virus mixing with aerosol suspended in the air and being inhaled by humans (Van Doremalen et al. 2020). Clustered infections have been reported in bars (Wong 2020), hotels (Peltier and Minder 2020), hot pot cafes (Su 2020), wedding banquets (Gross 2020), and karaoke parlors (Inada 2020).

As the coronavirus pandemic started, hotel occupancy in China was immediately dropped to nearly zero. Hotel chains were forced to try and examine new approaches/technologies to make money and maintain the cash flow. To investigate the new technologies used in COVID-19, interviews were conducted with Directors and General Managers of eight well-known hotels between April 27 and June 10, 2020 (Table 1). Global hotel chains are in a fight for survival, and the interviewed hotels in this study are of no exception. New technologies are employed to mitigate the impact of the pandemic. Improvement of information and communication technologies can optimize the innovation performance, brand awareness, and reduce the safety risks. All of these can bring great positive impact to the hotels.

Within this context, this viewpoint article aims at providing recommendations and valuable insights for hoteliers to consider as well as review their current operation and marketing strategies. It is hoped that this article can help hospitality practitioners to optimize the values of their operations and enhance their competitive advantages.

## 2 New technologies used in the pandemic

The fundamental role of information and communication technologies is to facilitate business transactions and communicating relevant information to decision-makers. The DeLone and McLean's Information System (IS) Success Model is a widely applied framework for new information technology adoption since its publication in 1992 (DeLone and McLean 2003). The model identifies and describes the relationships among six critical dimensions of IS success: information quality, system quality, service quality, system use/usage intentions, user satisfaction, and net system

**Table 1** Profiles of Interviewees

Interviewee	Gender	Position
1	Female	International chain area office
2	Male	General Manager of state-owned hotel
3	Male	Sales division head of international hotel
4	Male	Sales division head of international hotel
5	Male	Sales division head of international hotel
6	Male	Sales division head of international hotel
7	Female	F&B division head of international hotel
8	Male	IT division head of international hotel

benefits. The following section will discuss about the new technologies used in the pandemic based on this framework.

## 2.1 Information quality

Information quality captures the quality of content that the system presents. According to DeLone and McLean (2003), the content of an information system should be personalized, complete, relevant, and easy to understand. Currently, many interviewed hotels are using live promotion in various live-streaming platforms to help their potential customers to get complete, detailed, timely, accurate, reliable, and selective information.

### 2.1.1 Live promotion in live-streaming platforms

Social media have considerably changed service industries, such as the hospitality and tourism industry. The emergence of Web 2.0 provides online social spaces for real-time connectivity among businesses and Internet users by easily creating and exchanging information. Social media provide low-cost and efficient management of online information exchange and relationships, including social networking, offering information for travelers, and carrying consumer generated content about products, brands, services, and issues. Through social media, companies have more opportunities to reach customers and sell products. During the pandemic, promotions through social media have become the default working operations for many Chinese companies. For example, popular video platforms *Douyin* and *Kuaishou* have each gained 100,000–500,000 new followers in two-week periods since late January 2020 (Fanjin 2020). Many hotels and resorts have turned to the latest popular online entertainment trend—live streaming. They also collaborate with celebrities who act as a tour guide to introduce the hotel or resort offerings and latest discounts. In this study, the interviewed hotels are following this trend. From a networking perspective, live streaming enables viewers to communicate and share ideas. Various hotel operations for live streaming can attract hotel consumers, from food cooking in the kitchen, hotel room tours, to even wedding exhibitions held in banquet halls. Popular live-streaming platforms, therefore, enable the hotel to create online communities and generate meaningful discussions in its product offerings and attract more hotel guests.

### 2.1.2 Live-stream conference to replace face-to-face conference

During the pandemic, Chinese lifestyles have been quickly adapted to a new virtual reality, including e-learning, e-commerce, e-entertainment, live-stream conferencing, and remote working. Since lockdowns and quarantines have been in effect, brick-and-mortar businesses such as restaurants, hotels, retail outlets, and travel companies have been on the losing side. However, new business opportunities have also emerged. Several Fortune 500 companies in Guangzhou, China choose hotels to conduct live-stream rather than face-to-face conferences because hotels have 5G

networks, hardware, and experience. Live-stream or virtual conferences are expected to have a significant impact on the business hotel industry given their unique benefits for both conference organizers and attendees. For organizers, virtual conferences can create new and lucrative opportunities in terms of increased content delivery options, more robust networking, and extend sponsorship options. For attendees, benefits include decreased health risks, travel time, and costs. Several organizations and businesses have already chosen to hold their events virtually. According to the Center for Exhibit Industry Research (2009), 40% of corporate brand marketers and 31% of exhibition marketers hold virtual events; 71% of respondents use virtual reality to accommodate geographically widespread workforces and customers.

## 2.2 System quality

System quality refers to the desired features of a typical information system, including usability, availability, reliability, response time (e.g., download time), and adaptability. During the pandemic, live-stream conferencing and remote working becoming more common for both hotels and their guests. According to the interviewees, the improvement of system quality is one of the key factors for operation efficiency and guest satisfaction. Technologies of 5G and Wi-Fi 6 are introduced to improve the system quality.

### 2.2.1 5G technology

The COVID-19 pandemic has caused more businesses to turn to digital applications to enable a work-anywhere economy and mitigate the risk in daily operations. In a way, the COVID-19 pandemic accelerates enterprise demand for 5G technology solutions, the fifth-generation technology standard for cellular networks. Compared with 4G technology, 5G networks provide the main advantage of greater bandwidth and faster download speeds of even up to 10 Gigabits per second (Gbps). Given that millions of people have to stay and work at home, network bandwidth has become increasingly important.

Although its peak data rate is satisfactory for most of today's applications, 4G is insufficient to support the growing number of devices being introduced into wireless networks every day. 5G networks provide the solution to manage connections for these new devices and apps. 5G networks not only create better connectivity for communications but also enable intelligent connectivity using artificial intelligence (AI), cloud, big data, Internet of Things (IoT), and other platforms. For example, the combination of 5G and AI in the hotel industry can enable swift check-in and payment through facial recognition, which leads to dramatic improvement in service efficiency and security.

4G and Wi-Fi at times encounter network congestion, which is assumed to be a rare occurrence for 5G networks. In one Westin hotel, the fast and stable 5G networks have ensured the online meetings of hotel guests went smoothly and productively. In one IHG hotel, 5G also supports increasingly popular services such as 4 K

or virtual reality (VR) live streaming and allows meeting participants to share text, images, and even short videos in real time.

### 2.2.2 Wi-Fi 6

Wi-Fi 6 is designed for high density implementations and hotel industry will benefit conference areas, lobby and restaurants with faster speed and coverage. Where Wi-Fi 6 focuses on internet indoors, 5G is the preferred solution for outdoor use.

## 2.3 Service quality

Service quality refers to the overall support delivered by the service provider, which applies regardless of whether the support is delivered by the IS department or a new organizational unit or is outsourced to other service providers (Delone and McLean 2003). During the pandemic, hotels are employing AI technology and Robots to improve their service quality.

### 2.3.1 Event facial check-in services with AI temperature checks

AI has proven to be increasingly beneficial to hotel practitioners. For example, the ease and efficiency of check-in and check-out experience are improved by giving hotel guests access to their rooms/venues using facial recognition software. The integration of 5G, AI, and live streaming also presents considerable potential for development of real-time, customized service networking system for hotel guests based on real-time data.

Due to the COVID-19 pandemic, facial recognition hardware companies have developed a solution for noncontact body temperature measurement plus facial recognition to meet the rapid need to control the virus in time. Several Guangzhou hotels have deployed such a system. This technology can not only reduce the risk of cross infection but also improve traffic efficiency, which saves time and reduces congestion of hotel employees and guests.

### 2.3.2 Robots used for F&B room services and housekeeping deliveries

The pandemic is prompting several industries to adopt “contactless” options. Shopping malls, large or small, are expected to use robots to increase social distancing and reduce the number of staff that must physically come to work. Robots are also being used in Guangzhou hotels for roles that hotel staff cannot perform during the pandemic period. From preparing F&B in room dining services, doubling as waiters in hotel restaurants, delivering housekeeping items, dispensing facemasks and hand sanitizers, robots are used on the frontline to protect hotel guests and employees and prevent the spread of COVID-19. The robots not only help protect guest health and prevent the virus spread, but also enhance service quality and customer satisfaction.

### 3 Challenges of the new normal

All technologies have their pros and cons, whether old or new. The abovementioned new hotel technologies should not be seen only as a panacea. Management should always think about the "big picture" when considering these new technologies, such as ROI, requirements for employment training, laws and regulations, and other challenges for the future.

#### 3.1 New business operation model for live stream/food delivery apps

The challenges from the COVID-19 pandemic require hotel restaurants to reinvent their business structure and narrow down their product offerings. For example, a restaurant in one of the interviewed hotels is renowned for fine dining in Guangzhou. Recently, the hotel is shifting focus to food delivery with plans to sell bulk meal boxes through live streaming, social media, and food delivery apps. The next normal business operation model requires dramatic changes in hotel business structures, supply chains, and daily operations. The challenge is not only to balance food inventory with predicting sales in this new business model, but in certain ways, to change the conventional hotel restaurant business model.

#### 3.2 New sales and marketing mechanism for new digital trends

Businesses increasingly carry out their marketing campaigns on live-streaming platforms. For example, *Douyin* is a short-video app with powerful editing capabilities. Users can add music and effects to their videos to increase their attraction and creativity. Viral videos on *Douyin* can gain 30–200 million views in one day. Live streaming can also be accessed via a sign on the top left. Currently, brands are using live streaming to market and sell products. These new sales and marketing mechanisms pose a challenge to the hospitality industry. The hotel has to understand: Who are their viewers? How does *Douyin* live streaming work? How can hotel brands use *Douyin* for marketing? How can the hotel convert the traffic to revenue? In addition, other platforms in the market, such as *Wechat*, *Taobao*, *Weibo*, and *Xiaohongshu*, can be used for sales and marketing. This new mechanism requires tremendous efforts to understand and use for new selling trends. If hotel managers are looking forward to creating a new marketing channel on live-streaming platforms, then they should not forget that it requires tremendous investment in terms of both money and time. In addition, hotel managers should not forget the difficulty in teaching and training their employees to create valuable and entertaining editorial content for the live-streaming.

#### 3.3 Privacy protection

To mitigate the pandemic and accurately identify people with the virus, countries across the globe are tracking smartphone data and using AI for face recognition and scanning body temperature. To reinforce the security procedures against the

pandemic and to guarantee the safety of guests, hotels also employ new surveillance tools to monitor visitor temperatures, use facial-recognition cameras, and cooperate with and report to the authorities the health status of their guests, as requested by local regulation.

The severity of the COVID-19 pandemic no doubt demands these measures. However, ensuring privacy is also essential. Bringing customer data online and connecting them to local authorities introduce enormous efficiencies and applications. However, it also introduces threats like cyber-attacks and security breaches. How to balance guest privacy and public security becomes a new challenge for the hospitality industry.

### **3.4 Government regulations of food and beverages delivery app services**

Food safety regulations apply to each stage of food and beverage production, from processing and manufacture to distribution. Since its initiation of a delivery app service for food and beverage, the interviewed hotels have to comply with government requirements of food and beverages delivery services. The hotels have to understand how their business can meet obligations and comply with these regulations, otherwise they will face the risk of fines. The largest challenge is to renew the operations and hygiene procedures from restaurant kitchen to the customer dining table.

## **4 Looking ahead**

Although this pandemic will eventually come to an end, the hospitality industry will never return to the “old normal”. Traditionally, many luxury hotels emphasize person-to-person contact at every point in the guest journey. However, after COVID-19, all of these methods and procedures may have to change. Hotel guests expect much higher standards of hygiene, show a significantly greater appreciation for contactless services, and focus more on digital marketing. During such a period of uncertainty, hoteliers have a rare opportunity to invest in technology and process improvements to gain competitive advantage in the long run. All interviewees in this study agreed that it is very challenging to manage a hotel property during the COVID-19 pandemic. However, most of them also treat it as a rare opportunity. Since only the fittest hotels would survive, these hotels plan to embrace a variety of new technologies and new business models that can enhance hygiene, promote social distancing, and provide guests with a convenient and personalized experience.

To improve system quality, most of the interviewed hotels aim to step forward and establish a brand of 5G smart hotel by introducing an end-to-end 5G network with integrated terminals and cloud applications. In the future, these hotels can provide more transformative services such as integrating its loyalty program with AI face recognition to identify a guest upon arrival, issue electronic room keys to his/her smart phone, and use 5G-powered service robots to guide the guest to his/her rooms. 5G networks also considerably improve the hotel live-stream conference capacities. To improve information quality, these hotels would continuously carry out live promotions in various live-streaming platforms. Innovative live-streaming content, such as fun and quirky

videos, are used to meet viewer preferences and attract more potential consumers. To improve service quality, these hotels plan to further enhance their food and beverage delivery services, not only providing to individual guests but also to bulk purchase buyers. Operations are to be revised to adapt the delivery services, with close attention to be paid on whether the delivery conforms to the hotel brand image and to be attentive to local regulations. New technologies and equipment will be introduced for a high hygiene standards and cleaner indoor environments. Last but not least, contactless services are one of the next normal measures for these hotels. Self-serving apps, kiosks, and robots are to be deployed to attract customers in the future.

From the hotel industry's point of view, it is forecasted that the business is going to bounce back to the 2019 level by 2023. The pandemic looks to be the catalyst that forces the hotel industry to be more tech-forward. When the storm passes, it would be great to have practitioners and researchers to sum up these experience and lessons to help hotels become more prepared for the next "black swan" event.

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