Encyclopedia of Tourism Management and Marketing

Edited by Dimitrios Buhalis

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Hospitality IT Applications

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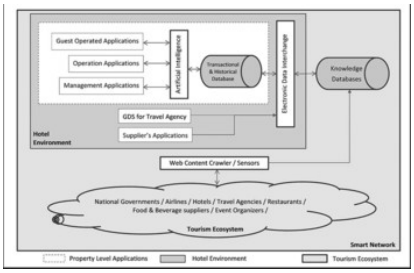
Information technology (IT) is the application of computers and telecommunications equipment to storing, retrieving, transmitting and manipulating data, and has diffused throughout the tourism and hospitality industries. The success of a hotel depends on its ability to utilize real-time information to assist its operations, management and marketing processes. IT empowers hotel staff to deliver quality service to their customers. It helps employees to enhance operational efficiency and control costs; manages information dynamically; and enhances its competitiveness by helping hotel managers to make appropriate decisions. It also acts as a protector and enhancer to influence the experiences and behaviour of guests. IT raises hotel service standards by customizing the product according to the customers' needs and wants. It also increases operating profit through marginal price increases and marginal cost decreases at the same time (Law, Leung and Buhalis, 2009). An interconnected and interoperable tourism ecosystem's IT applications on the smart network is deployed, as illustrated in the figure.



Hotel IT applications on the smart network

IT applications assist hotel managers with revenue management. The two key revenue-generating departments in hotels are room division and food and beverages. The daily operations of the rooms division department operate under a property management system (PMS), while the restaurant operation is via point-of-sale (POS) systems.

Early POS systems handled meal orders and delivered communication messages to kitchen staff. Mobile ordering devices allow the waitstaff to place the order or handle cashless payment in front of customers. This enhances operational efficiency and data security. With the implementation of self-service platforms, customers can directly place an order from touchscreen devices installed at their table. They can customize the ingredients and select cooking method directly via this multilingual support device. Table management systems (TMS) enable restaurant managers to maximize capacity by alternating table arrangements in the restaurant according to the reservations on hand. They can also monitor the dining duration of customers to enhance the turnover rate and to manage the waitlist. Queue management systems allow customers to get on the waitlist via mobile applications and frees them from waiting at the front of the restaurant. Food and beverage cost control systems obtain sales data on each item from POS and combines the cost of each ingredient from the inventory system to calculate daily food cost and provide recommendations for menu engineering (Linassi, Alberton and Marinho, 2016).

With regard to rooms division, PMS is the core hotel application that handles all guest service-related operation procedures, including inventory management, reservation, check-in/out, transaction and payment recording, guest room status updates and accounts receivable. Since the 1990s, yield management and decision support tools have empowered hotel managers in variable pricing strategies, by selling the right room and hospitality package to the right customer, at the right time, for the right price. By consolidating historical business Big Data with business intelligence, managers can base decisions on the scenarios provided by recommendations generated by the revenue management application to adjust their pricing strategy to maximize profit margin. The Internet enables price transparency, so managing online channels becomes one of the most challenging tasks for revenue managers. Web-based channel management applications help revenue managers to maintain the hotel room rates and availability on multiple online channels from one single platform. International hotel chains have developed their own central reservation systems (CRS) that enable inter-country reservations within the organization. CRS are computerized reservation systems used by hotel chains to maintain hotel information, room inventory and room rates. They manage reservation processes and handle membership profiles. CRS act as a bridge that provides inventory quantity to the travel intermediaries' global distribution systems (GDS) and send the reservation details to the hotel's PMS via CRS.

Sales and marketing and customer relations management (CRM) applications handle both corporate and guest profiles and keep track of their productivity history. CRM can help hotels to improve business relationships with customers. They focus on customer retention and ultimately drive sales growth via targeted marketing. Based on their profiles, hotels can personalize travel products to enhance customer satisfaction according to guest preferences and needs (Piccoli, Lui and Grün, 2017). For example, the in-room ambience (room temperature, lighting and atmosphere) can be pre-set according to a guest's historical preferences stored in the CRM. It can be adjusted by guests by means of the intelligent virtual assistant via a voice user interface. With the Internet of Things, the fifth-generation (5G) mobile network, sensor and beacon networks supported by artificial intelligence (AI) and machine learning, in-room ambience can further be adjusted automatically based on external weather conditions (Buhalis, 2019).

Mobile IT applications brought about self-check-in service, and near-field communication (NFC) on mobile devices replaced the room key. The electronic door-lock system provides centralized and programmable security clearance. Self-service technologies (SST) are IT applications that allow customers to produce services independently, without the involvement of service staff, to make service transactions more accurate, convenient and faster. Self-service kiosks with touchscreens allow hotel guests to interact with this pre-programmed computer terminal to carry out pre-defined tasks such as check-in/out, information inquiries and payments. The first robot hotel, Henn-na Hotel, was launched in 2015 in Nagasaki, Japan, and shed light on humanless service in hotels. As a result, hotel operations procedures, revenue and cost management, employee job security and education and training needs have changed (Ivanov et al., 2019).

IT applications act as a tool for cost control. Management applications such as accounting applications can consolidate data from PMS, POS, human resources (HR) and inventory systems and generate financial reports. HRM applications handle employee profiles, on-boarding, leave management and payroll. Supply chains play a crucial role in daily hotel operation but working and communicating with them was mainly done manually. Every supplier is equipped with various computer platforms and IT applications. This wide range of hardware platforms, with different proprietary communication protocols, makes IT applications difficult to interconnect with hotel systems. With the increasing number of IT applications and guest-operating devices that required automation to reduce manual operation, IT suppliers have developed interface programs to enable data interchange. These tailor-made interface customization and upgrade costs were expensive, so many hotels were reluctant to adopt the systems (Leung and Law, 2013). With the increase of cloud-based applications and standardization of communication protocol, stakeholders can exchange information via the Internet more easily. For example, the procurement system between hotel and suppliers can be automated by connecting the hotel inventory system with the supplier's procurement system via online platforms. Whenever any item falls below the minimum stock level, an inventory system will send a quotation request to various suppliers. Purchase orders are confirmed according to pre-defined selection criteria. After the product is delivered and the receiving process is completed in the inventory system, payment can be made automatically from the accounting system. This automated process can diminish the out-of-stock risk and save the workforce repetitive and straightforward tasks (Kothari, Hu and Roehl, 2007).

Operation applications enhance efficiency and service standards. By connecting with GDS systems and suppliers' IT applications, transactional data can automatically be exchanged with hotels. Transactional data in all IT applications among tourism organizations can be summarized and consolidated in the cloud-based database. This centralized knowledge database can also be accessed and updated by web crawlers. Big Data is retrieved from the external environment, among the ecosystem or collected by the sensors that are installed within the smart network. Hotels' AI-enabled business intelligence applications can make use of Big Data to forecast future business performance from the scenarios generated, enhancing the smartness of hospitality (Buhalis and Leung, 2018).

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