APPLICATION OF TECHNOLOGY INNOVATIONIN HOTEL OPERATING DEPARTMENTS

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Abstract - Technology changes, along with tourists, tour operating companies and competition, are one of the main drivers of innovation in tourism.Literature on technology innovation in hoteloperating departments (front office department, food and beverages department and household department) is still scarce. Due to the fact that providing service in hospitalityis more complex than in any other industry and it is always connected with experience, the majority of authors stress thatthere is yet no technology that would replace or diminish the role of human factor, as it greatly depends on the level of tourist satisfaction. However, in recent years, the number of hotel companies which use technology innovation in operating departments (e.g. staff less hotels, service robots) is growing. The aim of the paper is to explore (from theoretical and practical perspective) the extent to which technology innovation can be implemented in hotel operating departments and to identify main positive and negative effects of ICT implementation. The main method used in this study is desk research which includes: critical analysis of the available theoretical and practical findings andcomparison of selected cases of application of technology solutions in hotel operating departments.

Keywords - Technology Innovation, Hospitality, Hotel Operating Departments, Labour Force

I. INTRODUCTION

Technology changes, along with tourists, tour operating companies and competition, are one of the main drivers of innovation in tourism (Čavlek et. al., 2010:201). Tourism consumption and experiences are increasingly mediated by the use of smart devices which enable smart booking, smart advice and navigation, smart destinations and marketing, as well as smart hotels (Tribe and Mnoko, 2017:106). Hospitality firms use ICT as a way to cope with an environment characterized by globalization, competition, high client turnover and rising guest expectations (Melián-González and Bulchand-Gidumal, 2016:30). According to same authors, ICT impacts organizational performance on four main levels: (1) operational productivity, (2) employee productivity, (3) customer service, (4) commercialization.The implementation of ICT in hospitality industry started in background departments, such as sales and marketing, human resources, finance, maintain and supply. It has computerized their work on many levels, simplified tasks and raised the efficiency of employees.However, these changes did not affect tourist experience to a large extent, since tourists are not in the direct contact with the employees of these departments during their stay. On the other hand, ICT implementation in hotel operating departments, which includes front office, food and beverages and household, affects structure and number of employees, but also affects customer's satisfaction to a large extent, since their employees are in the direct contact with tourists.

Due to the fact that providing service in hospitality is more complex than in any other industry and it is always connected with experience, the majority of authors stress that there is yet no technology that would replace or diminish the role of human factor, as it greatly depends on the level of tourist satisfaction. However, in recent years, the number of hotel companies which use technology innovation in operating departments is growing. The first stage of ICT implementation was including devices which were used by employees, while the latest ICT solutions are replacing people with service robots or staff less systems. Therefore, it would be accurate to talk about the changes in way of doing business, rather than just improvement of business activity in hospitality.

The paper is focused on latest technology innovation in the hotel operating departments and divided into three main sections, besides Introduction and Conclusion section.The first main section introduces the existing literature and terminology on technology innovation that can replace employees in hotel operating departments. The second main section is focused on critical analyses and discussion, as well as on positive and negative effects which arise from implementation of recent ICT solutions in hotel operating departments.

II. THEORETICAL BACKGROUND

The literature review on technology innovation in hospitality shows that the majority of research is connected to background hotel departments, while literature on ICT implementation in operating departments still scarce. The majority of research concerning technology implementation in hospitality industry is focused on referring consumer service, improving operations, increasing revenue, minimizing costs and enhancing competitive advantage, while consumer adoption was not in the focus of the research (Wang i Qualls, 2007). Furthermore, due to Tribe and Mnoko (2017:106), there is no shortage of research on the impact of technology on tourism on technical level, but the impact of ICT on tourism at socio-existential level is less represented.However, when it comes to introducing technology to front office departments, the situation should be significantly different. The emphasis in research should be on the consumers and their individual willingness to adopt new technologies.

As Wang and Qualls (2007:562) state, individual´s intention to purchase a product or service is determined by two factors: perceived usefulness and ease of use. This determinantsrepresents central theoretical premise for Technology Acceptance Model (TAM) developed by Davis (1989). The model is based on two scales composed of different items which determine two main factors, and initially was used for the research among white collar workers. With the fast expansion of technology implementation, the initial model was justified and used for the research in many different fields, such as medicine, education, finance or construction (see: Hussein, 2017; Mortenson and Vidgen, 2016; Pitchayadejanant and Boonsiritomachai, 2017; Sepasgozaar et. al., 2017; Verma et. al., 2018). Today, the model is used to predict whether a new technology will be adopted by individuals, groups, or organizations (Mortenson and Vidgen, 2016:1251). Despite the fact that TAM model is frequently used in the field of tourism (Kim et. al., 2008; Ayeh, 2015; Kim and Woo, 2016), when it comes to technology innovation in hotel operating departments, the usage of the model is still scarce and focused mainly on employees. It can be explained by the fact that the vast majority of implemented technology did not change the way service is provided to a large extent, which is not the case with the latest ICT solutions implemented in the hotel operating departments.

First phase of ICT implementation solutions in hotel operating departments has improved the operational efficiency of service staff by including different devices used by employees. Whitelaw(2008) points out the most frequently used solutions: (1) usage of PDA in food and beverage department (orders are placed to the kitchen at the same time they are made; waiter has the information when the meal is ready for serving, etc., which gives more time to employee to provide quality service, and can affect customer satisfaction), (2) check in on the mobile device before arrival (in this case, tourists only need to collect their pre-coded room key in the reception desk, which provides more time for employee to give some additional information or to handle more guests in shorter period of time,(3) usage of PDA in household departments for easier and faster information flow between household and other departments, such as front office department on the one side, or laundry andstorage on the other). Described solutions do not exclude people, but help them to be more efficient in they work.

Second phase of ICT implementation involves staff cost reduction by replacing people with ICT, which includes simple programs, but also complex solutions based on artificial intelligence (AI), which can be defined as „the ability of a digital computer or computer-controlled robot which perform tasks commonly associated with intelligent beings“ (https://www.britannica.com/technology/artificial-intelligence).Today, usage of robots is not limited only on industry production, but can be found in many areas of everyday life, like trade (delivery of groceries, filling shelves, etc.), healthcare(care about older people), education, cleaning, etc. As Gonzalez-Jimenez (2018:18) states, “the level of integration of robots in daily life will increase gradually, but individuals may differ in how open they will be towards self-aware robots”.“Even though technological developments have narrowed the gap between social robots and biological organisms in terms of appearance and behavior, it is unlikely that, in the near future, social robots could reach the level of development in which they could not be distinguished from real life systems” (Rodriguez-Lizundia et. al., 2015:83). The interaction between social robot and customer is very important in hospitality industry, due to the fact that service

provision is an important part of tourist experience.Since the demographics of consumersin hospitality industry is quite heterogeneous, and the expected duration of human-robot interactions are not long enough to allow potential users to get used to the new technology (Rodriguez-Lizundia et. al., 2015:84), implementing AI in hospitality is quite complex. Furthermore, as Kim (2015:230) states, it is very difficult to predict how significant new technology will become. Due to these facts, implementation of latest ICT (staff less hotels and service robots) in hospitality industry depends on many different factors (e.g. hotel category, type of hotel, location, etc.)is still inchoate.

III. CRITICAL ANALYSES OF CHOSEN EXAMPLES

Staff-less hotels can be defined as "a hotel that employs zero to few staff members to get their everyday things done (check-in, check-out, handling guest issues, delivering other important services) (https://medium.com/datadriveninvestor/whats-the-buzz-about-staffless-hotels-how-do-they-operate-f9c8b564124d). These kindof hotels usually have few employees, but they are not in the direct contact with guests. During their stay, guests communicate only with the machines.First example of completely staff-less hotel is low-budget three star hotel Buddy in Munich, which belongs to Cocoon hotels, based on a budget lifestyle hotel concept with a retro design. Hotel located inside a large office complex and has seventy five rooms on several floors. Check in can be done few days in advance. Upon arrival, guests sign their name at the kiosk and take their key. Code-based key card automatically takes the elevator to the right floor. Payment and check out can be done the same way. Car parking system is also managed with software. All of the technology behind these staff-less systems, as well as cloud-based management platform, is provided by software specially developed for hotels. (https://www.lonelyplanet.com/news/2015/11/23/staff less-hotel-in-germany-will-let-guests-rely-on-technology/). This hotel is rated with 4.0 on Trip Advisor. The majority of reviews excludes ICT component, which leads to conclusion that this concept did not affect their experience. On the other hand, one of the main advantages due to reviews is the affordable price, which would be much higher if hotel had more employees instead technology solutions. Second example is a hotel Hennna in Japan, the world-first hotel staffed by robots. Front desk is equipped by multi-lingual robots looking like people or dinosaurs and ready to help with check in or check out. Storing luggage is easy with the robotic arm. Hotel also uses face recognition system, which enables room entrance without key. Smart Kiosk can be used for purchasing snacks or drinks. (http://www.h-n-h.jp/en/) Housekeeping department is only partially robotized. Users' perception on Trip Advisor is quite diverse. Overall grade is 3.5. Part of the hotel quests said that it is worth of seeing and completely functional, while some of them consider that this great idea is still not functioning the way it should. For instance, robots in rooms disturb conversation between guests, but they do not help when they are asked to. Furthermore, some guests complained that they were in contact with too many real employs during their stay, because robots did not completed their mission. When robots are not able to solve the issue, guests can call "real people" to help. This has to be used too often, according to some guests' opinion. On the other hand, face recognition is one of the best rated ICT solutions in this hotel. Unlike Buddy hotel, Hennna is not low budget hotel. The aim of ICT implementation in this hotel was not cost reduction, but provision of new and unique experience which should take their guests one step into the future. However, due to reviews taken so far, there is a lot of space for improvement in order to fulfill the mission and vision of robotized hotel. These examples represent hotels which tend to become as much staff-less as possible, which means that guests do not accomplish personal contact with employees at all during their stay. On the other hand, there is many hotels which are more inclined to replace only a part of the employees (those who accomplish a direct contact with guests) with ICT solutions, which makes them only partially staff-less and robotized. For example, Crowne Plaza hotel in San Jose-Silicon Valley, which recently began using robots to respond basic requests from guests, but has kept the majority of employees, which provides an opportunity to improve the business and reduce costs, but to keep personal touch which can hardly be replaced by technology.

The evidence of growing interest and the importance of ICT solutions in front office departments is the fact that some of the largest and famous hotel brands like Hilton and Marriott are implementing this technology in their business. The implementation was followed by comprehensive research done both in laboratory

conditions and on site. For example, after one conducted survey revealed that 80% of business travelers which stay in Hilton during their trip would like to have the ability to select their room in advance, Hilton invested large amount of money in software for digital check-in. This also enabled guests to enter the room with their smartphones. (https://rctom.hbs.org/submission/digitized-hotels-or-staffless-hotels-that-is-the-question-for-hilton-worldwide/) Furthermore, Hilton launched Connie, a little concierge robot which will be used in part of their hotels, while Marriott crated Mario, which is still in test phase. Bill Marriott said this staff-less hotels are quite interesting and the best part about it lies in the potential of what hotelier can achieve with that (https://medium.com/trilyo-blog/whats-the-buzz-about-staffless-hotels-how-do-they-operate-7f9931f95a3).

As seen in those examples, it is indisputable that replacing employees in ICT solutions is a growing trend. However, it creates some positive and negative effects which are listed and discussed below. First positive effect is related to employees and costs reduction. For instance, according to Cheong et. al. (2016:681), prices of robots can vary. Some versions cost about 17,000 USD (which is half of human waiters' annual salary), while some of them can cost more than 100,000 USD. Implementing such technology reduces costs in the long term. On the other hand, staff-less hotels which do not use robots, but only software solutions developed by some other company, reduce cost in quite short period of time. This results in lower price, which increases customer satisfaction and capacity utilization rate (for instance, hotel Buddy has 90% utilization rate). Second advantage is standardization of provided service. One of the main goals in hospitality is to provide service in quite same way, but it is possible only to one extent, since the human factor cannot be fully standardized. Third, the time spent on front desk for check-in and check-out is reduced. Fourth advantage is breaking the lingual barrier, since the machine can be programmed to understand and speak numerous languages. More and more travelers are used to have and use their devices constantly, so they are quite satisfied to be able to use them not only on, but for their stay in the hotel. Last to be mentioned is creation of database which can provide numerous information about guests. When communicating, machines collect all the data, and give the information about needs, preferences or requests for almost every guest. This creates a platform for future management decisions about doing business.

Along with mentioned positive effect, there are also some negative that need to be mentioned. First one is the most discussed among scientists and practitioners, and is about losing personal touch, which comes as a consequence of replacing people with machines. However, due to responds from users, this seems not to be such a big issue as it was assumed. Of course, it is not possible to ignore or diminish this negative effect, especially without conducting a research which would include not only users, but also potential users and their opinion. Second one is connected with the length of stay in hotel. It is harder to get used to communication with machine during the short stay in the hotel. However, if these solutions will be a part of many hotels worldwide, guests will become familiar with them and this communication gap will be reduced. Furthermore, costs of the implementation and maintaining can be very high, which depends on the many factors. Consequently, if those costs are very high, the room prices will also be higher. Fourth negative effect is connected with the part of demand which is not so familiar with technology and devices. They will choose the "classical" hotel, without these "modern" solutions, which will reflect utilization rate. Last to be mentioned is possible disappointment. Guests who decide to stay in staff-less or robotized hotel have high expectations concerning technology. Previously mentioned reviews showed that this is quite common, due to the fact that those solutions are still in initial phase. This effect will be diminishing with the future development of this technology.

It is possible to predict that the acceptance of these ICT solutions in hotels will green-light hospitality companies' big bet on the Internet of Things (IoT). It became possible to do business 24/7 without employing customer representatives to solve guest queries. (https://medium.com/datadriveninvestor/whats-the-buzz-about-staffless-hotels-how-do-they-operate-f9c8b564124d)

CONCLUSION

Nowadays, the implementation of ICT in hospitality industry become a necessity which enables companies to stay in touch with dynamic changes on the market, to satisfy the need of tourism demand and create competitive advantage. ICT implementation

started in background departments, while operating departments were not so involved in those changes. First stage of ICT implementation n operating departments was including usage of different devices by employees, while second is oriented toward replacing an employee with the machine.

Although the implementation of ICT in hospitality industry the way it replaces employees is still in an initial phase, analyses done in the paper showed that there is a great potential for their future development. There are few hotels in the world which went completely staff-less (guest do not have contact with human employees during their stay). In the paper, two examples are shown, one from Germany, and the other from Japan. Japanese hotel is using robots, but the initial problems which occur have lowered the level of satisfaction among users. On the other hand, staff-less hotel in Germany fulfills the expectations (both guests and owner) and has utilization rate over 90%, which is quite high. The vast majority of hotels are inclined to replace only a part of employees with technology, while some of their service remains provided by humans. This way they follow recent market trends, while, at the same time, do not lose human contact and keep those guests who are not familiar with technology usage. Despite the fact that loss of personal touch was the most emphasized negative effect, brief analyses done in the paper showed that the vast majority of guest do not emphasize this as a negative aspect.

The implementation of ICT solutions in operating hotel departments has many positive effects: employees and costs reduction, standardization of provided service, less time spent on front desk for check-in and check-out, breaking the lingual barrier, satisfaction of users used to technology in everyday life and creation of database. On the other hand, main disadvantages which occur in this phase of implementation (e. g. losing personal touch, costs of the implementation and maintaining can be very high, losing part of demand which is not so familiar with technology and devices, possible disappointment as a consequence of high expectations) can be diminished with the further development and more intensive usage of this technology in hospitality industry worldwide. When considering both positive and negative effects which come from implementation of ICT solutions in hotel operating departments, it is possible to conclude that it is a growing trend which is accepted by the great number of hotel companies worldwide. In can be expected that, in the near future, these solutions will overcome initial challenges and become an important instrument for reaching competitive advantage for a great number of hotels worldwide.

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