

The Impact of Information Communication Technology and it's Application's usage in Lodging Industry: An Exploratory Study

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Abstract

In 21st century, technology has made its impact on each and every aspect of our lives. There is no field where technology is not used. More and more advance technology came and people become addicted. So it also becomes important for hospitality industry to keep the pace with changing environment. Now hospitality industry adopts each change of technology very quickly. It becomes a symbol of brand differentiation. Hotels are using new or unique technology as a USP tool. This paper focuses on the impact of technology on hospitality and find out Hi-tech USP of hotels. Now hotels provide such types of facilities that we never imagined. Robots are serving in hotels mirrors are used as TV, mobiles are used as room keys and much more. I tried to put some light on latest technologies used in hotels.

Key Words- Technology, Information Communication Technology, USP, Hospitality industry.

Introduction

History of technology in hospitality starts from 1950's with the reservation system. Since then it continues grow. In today's world, technology is not only grown in hotels but also in everyone's life. From big computers to desktops, desktops to laptops and now from laptops to Smartphone, every information is easily available on internet and can be accessed anytime 24x7x365. We can get up to date and current information over internet. Technology is used in every operation in the hospitality world, such as spy and security cameras, reservation systems, point of sale systems, meeting matrix, property management systems, mobile communication, , energy management systems, electronic and wireless keycards, etc. Advancement of technology changed the way we conduct business by saving time, manpower and workload. Hotel Technology Next Generation, reported on June 21, 2005, details the progress made by Hotel Technology Next Generation (HTNG) in defining and implementing "... the first ever branding and certification program for hotel technology..." The article gives an indication that

technology will help the hotel industry to meet the changing needs of next generation of hotel guests. Hospitality industry is changing its mentality for technology adoption. Improving guest satisfaction is the motto of this industry and for guest satisfaction industry is ready to invest in technology. Hotels need creative and innovation to get competitive edge. One guest may like hotel services while others may not. So it is very difficult to standardize hotel services. There is always urgency to sell hotel rooms because these are perishable. Hotels are bringing more and more new technology to attract guests. First we were using metal keys to open a room but now there are no visible locks, we can open them even with smart phones. Disney resorts are using a magnetic band as their ticket or room keys. All luxury hotels are having HD TV, high speed Wi-Fi, mirror TV etc. some of the hotels are using fingerprint scanner to pay for everything and opening rooms. All successful hotels or chains are adopting technology very quickly even before they come to market. Space theme hotel and Yotel, Newyork are using robots for guest service. These hotels are not just selling rooms; they are selling an experience to guests. All hotels whether they are small, medium or large are trying to incorporate technology of one short or the other. Technology is not only helping in guest satisfaction but also give benefits to organization. Lifestyles of the people are greatly affected by the technology. Technology made life very convenient. Technology plays a crucial role for guest satisfaction and revenue management (Gurnoor Singh Bhangu, 2012). In 2000, online reservations, websites information, virtual concierge, Wi-Fi were uncommon. But now there will be no luxury hotel without these facilities. It is important to understand all these technology so that we can install the proper one in our hotel. Installing technology without thinking is total waste and also not understanding the technological change will be suffered by organization. Technology is used for getting operation excellence. Technology and hospitality services are directly involved in the positive attitude of the guests which reflects in the guest satisfaction and customer loyalty (Muhammad Shaham Bakhat et al, 2012). (Arash Fartash et al, 2012) stated that hospitality industry is changing speedily around the world due to technological changes in information and communication technology. The sale and income is the lifeline of any organization. There are many technology applications which are beneficial. The customer always search supplier who will give better goods or service. The hospitality industry has widely adopted technology to reduce costs, increase operational efficiency, and to improve service quality and guest experience. The successful outcome of an organization, to certain level, depends on its ability to obtain and utilize updated information to assist its marketing and management processes. Hence, Technology serves organization to manage information dynamically and affect business competitiveness through assisting management to make appropriate investments and decisions.

Technology has recently increased at an unprecedented rate in hospitality and tourism business (Singh & Kasavana, 2005; Connolly & Lee, 2006). In the hospitality industry, technology plays a critical role for raising customer's awareness, developing a realistic promise and delivering a complete service. Management should therefore use technology to manage their offers according to their guest's behavior circle. For example, managers must ensure that their website information focuses on customers' demands and needs, and should maintain a high search engine ranking. Law and (Jogaratnam,2005) stated that technology can change the nature of hospitality business, products, processes and competition, and hospitality organizations that have failed to master the right technology would find difficult to direct and manage their organization. Due to the high-turnover and training cost in hospitality industry, computer-assisted instruction (CAI) is an effective way to deliver training programs to employees. Internet-based technologies will be helpful for information exchange between all types of employees (Zakrzewski et al, 2005). (Cooper et al ,1998) enunciate that technology were used in the hospitality industry from the late seventies in the form of Computerized Reservation systems and Global distribution systems, it was only in the 90s that the technology began to make a difference in the hospitality and will continue be a dominant factor in hospitality industry. The information and communication technologies are transmuting the hospitality sector over the years. This study looks at the readiness for adoption of technology based facilities in the hotel industry. The advancement of Information and Communication Technologies for the travel and tourism industry has instigated hotels and other enterprises in this sector to increasingly adopt these technologies.

Objectives

- To identify latest technology used in hotels.
- To identify positive and negative impact of technology advancement.
- To identify hi-tech USP of major hotels.
- To identify challenges before adopting new technology.

Review of Literature

As Martin Senior (2012) said that, Revolution in technology has been recognized for around a 100 years and this recognition is still continuing in businesses around the world even today (Tidd & Bessant, 2009; Economist, 2007). (Eraqi, 2006) concluded that technology is becoming the first priority for hotel owners so that that they can increase their service quality. it also works as a tool to get competitive

advantage. It enhances our service level and helps in better management. Hence, (Buhalis and O'Connor, 2005) further added that e-hospitality in the future will be concentrated on consumer-centric technologies, and that hospitality organizations need to adopt technologies to be able to offer this level of service and remain competitive and innovative. Connolly and Olson (2000) described that Information and Communications Technology is only greatest force affecting change in the hospitality industry. The reason behind this is the customers who look forward to specialized, flexible, accessible and interactive products and services with principals (Buhalis, 1998). (DiPietro, 2010) described that technology has been quickly changed or enhanced from time to time and many hotels invest a lot of money to make sure that they have the latest technology. (Sigala, 2003) suggested that by fully depending on technology use will not generate the maximum result. Technology has advantages as well as disadvantages. We need human touch and technology simultaneously. Many hotels are gradually increasing their investment in technology for planning in order to enhance the efficiency of their business support management, processes, improve productivity and decision-making (Kim et al. 2006). Also installing the technology results in great productivity, decreased costs and increased revenues in the hotel industry (Siguaw et al, 2000; Huo, 1998), by improving customer service and business operations (Van Hoof, Verbeeten and Combrink, 1996 ; Sweat and Hibbard, 1999; Barcheldor, 1999). A new technology could help in stress management, quality of work life, job satisfaction and other work related outcomes with favorable consequences for the efficiency of operations and productivity. Technology in the hotel industry has increased productivity, improved service quality, reduced costs, improved guest satisfaction and long-term profitability (Cobanoglu et al, 2001). (Lam, Cho and Qu, 2007) also said same about technology that hotel industry have broadly relies on technology to improve their employees' efficiency and productivity as well as customer satisfaction. Not only the internet or reservation system but Wi-Fi technology also becomes necessary for every hotel. Wireless technology experienced an unprecedented growth despite the increasing concerns about security issues (Kasavana, 2005). Not only wireless but also hi speed Wi-Fi. Wyndham hotels include Internet protocol television, which allow guests to watch almost unlimited number of TV channels via the internet from all over the world (Borcover, 2010). The increasing features and systems of technology allows for the getting of additional information to facilitate management of revenue rather than solely per room yield (Vinod, B, 2004). Hotels moves from paper based systems to computerized storage. Computerized technology is helping hotels maximize profits and giving a seamless guest experience. The process of check-in, from managing room inventory to reservations, pricing and guest data capture can all be done easily and

effectively (Delahousay, 2013). New innovations and technology may remove the front desk personnel. Automatic check in and image capture technology can be used for taking image of the guest and giving a room number. Kiosk's are already placed in many hotels which by pass the Front desk personnel. Credit cards can be used to pay and open rooms directly. Mobile phone can be used for opening a door. Inside the room, automatic motion sensor technology can be used for controlling room temperature according to body temperature. This brings convenience and comfort to the guests and reduces the hotels costs (Borcover, 2011). With all these developments in technology, one might surprise what the hotel room of the future will look like. There are various innovations and technologies that have already been tested but implementation yet required and there are some which are still just concepts (Jacobs, 2010). (Poon, 1993) described in his that how technology has helped resolving hospitality and tourism industry issues over the last few decades. He defines information and communication technology as collective expression given to the most recent developments in the mechanism (computers and communications technologies) and mode (electric) that used for acquisition, processing, investigation, storage, retrieval, and use of information. Purchasing Systems Solutions (2004) describes how technology can assist in managing purchasing and inventory. A principle inventory item for a hotel is the number of rooms available. Although, rooms are fixed, Information technology can help maximize the use of this inventory item. Customer Relationship Management Solutions (2005) discussed how Information technology can help in the collecting and use of guest data to be used to personalize the guests stay in the hotel. By personalizing the service, the guest feels "special" and is more likely to return to the same hotel, thus aiding in the maximization of revenue on the inventory asset (the room). Hotel industry needs to take care while implementing a new technology. Hotel must study its customer's standards, habits, paying capacity and the level of service they demand. There are so many technical systems but before purchasing we must take market review (Magnini et al, 2003). Technological advancements focus on the innovation of products, procedures, services and how these can affect the hospitality industry (Harrison, 2003; Yang & Fu, 2007). For example, online and central reservations have grown exponentially over the past years (Jin-Zhao & Jing, 2009). Moreover, technology dramatically changes with new features and capabilities, moving away from the data processing era to strategic information systems era. Technology has the greatest impact on the distribution of travel and marketing but leaves untouched the human-intensive areas of guest-host relations and supplier-consumer relationships. Information technologies applied to the hospitality system will increase the efficiency and quality of services provided and leads to new combinations of hospitality services (Azdel Abdul Aziz et al, 2012). (Siguaw and Enz, 1999) concluded

that companies that effectively use technology will have the biggest affect on the customer satisfaction and loyalty. In the past few years there has been a great increase in realizing the importance of technology to become more effective and competitive in managing the business (Ansel & Dyer, 1999). The level technology being developed and implemented by hotels is ultimately going to increase the level of customer satisfaction and service quality. As was seen by many studies conducted in the hotel industry, a primary focus was always to enhance the level of service to the guests (Siguaw & Enz, 1999). Studies have successfully shown the hotel industry drive to enhance customer service and quality through the use of technology (Siguaw & Enz 1999; Garver 2002; Jin-Zhao & Jing, 2009). Technology make the internal and external process more dynamic as well as making the business development easier through new innovations (Telefónica, 2008). “During the past few decades, nothing has enhanced the professionalism nor increased the productivity of the hospitality industry more than technology.” (Kasavana, M & Cahill, J, 1997). Technology overcomes issues such as booking and reservations, marketing, food and beverage management, yield management and accounting systems worldwide.

Challenges before Adopting New Technology

The challenge in adopting technology is to stay up to date and relevant. In this ‘Age of Great Change’, technology is changing even faster than we can imagine. Technology everything possible for guests to experience a world as they like it. Technology makes balance between how personal one can get and privacy of the information. But this technology can be misused by many ways. So it becomes more important to have strong policies and procedures that protect information and do not allow misuse of technology. With technology getting outdated by the second, hospitality industry is facing tough competition in meeting guest expectations. Hotel chains spend a large amount of money and time in researching user-friendly technology systems to remain in competition. Hotels are disappointing technology in every area of guest experience. Everything in hotel like Management technologies, applications (apps), software’s, gadgets and furniture are being attached in such a revolutionary manner to make sure that guests are able to make the most of their time in the hotel. Manish Vishwa, Director of Engineering, Jaipur Marriott Hotel, said, “In these highly competitive times, one needs to ensure that there is everything in your property to keep today’s widely-travelled and well-informed guests truly happy, satisfied and pampered. Challenges with regard to manage new-age technology gadgets are keeping up with changing trends in technology and timely maintenance and servicing of gadgets and technologies.” It is advantageous for hospitality and marketing managers in general to be aware of the

recent changes in technology and their relationship with guest service. Daily new technology and quick updates makes it more sophisticated for industrial practitioners, policy makers, educators and other organizations in selecting, analyzing, implementing, and operating new technology systems (Rob Law et al, 2012). Business travellers are the primary target for many luxury hotels. With increase in technology systems they want value in terms of technology when it comes to connectivity, comfort and entertainment. The next generation is going to be very demanding. Hotels need not only just a room but a nice room with a view, entertainment and latest hi tech facilities. Hotels need to keep up with gadgets and devices-obsessed guests to win their hearts. Although demand for technology in hotels is rising; hotels have been relatively slow to adopt new technology. The reason for slow adoption is the fear that by the time it is implemented, it would already be outdated. Technology is changing very fast and also it is costly to implement. The biggest challenge for hospitality industry is to keep pace with technology and implement technology in a cost-efficient manner and know where to draw a line.

Technology in Hospitality Industry

Most of hotels have booking rooms and reservations over the phone, but technology has expanded well beyond that (Nikolis, N, 2008). Today, e-distribution systems include, yield management, Central Reservation Systems, and web bookings systems, all used to sell the product or services to the guests. In this regard, computers with hi tech systems are not just used for new ideas and innovation, but also to maintain the ‘status quo’. Many companies and adopted electronic computers so that they would not have to innovate; so they would not have to find new ways to achieve their objectives. Using computers, big organizations could get more control over their operatives, their employees, and eventually their clients (Holmes, 2006).

Major Events of Technology in Hospitality Industry

Sr. No.	Event Year	Event Title
1.	1970	Hotels installed ice machines and refrigerators
2.	1972	Hotels installed telephones in their guest rooms.
3.	1974	Internet was born!
4.	1975	Color TV's and Air conditioning were placed into guest rooms.
5.	1979	Electronic air cleaner
6.	1980	Mechanic coded plastic key card

7.	1982	Satellite TV
8.	1986	Electronic Door Keys
9.	1986	Voice mail system
10.	1986	Gene Mosher introduced the first graphical point of sale
11.	1990	Electronic in room safe/wake up system
12.	1990	Interface between TV system and PMS
13.	1993	Remote check in and out system
14.	1995	Hi speed internet access (wired)
15.	1996	Wireless internet access available for guests
16.	1996	Microsoft Corporation launches Expedia.
17.	2011	Hotels introduced I-pad check ins.

After 2013-14 we see many changes and daily updates. It is not easy to count them. Now in Hotels we use High definition televisions (HDTVs), High speed internet access (wired and Wi-Fi), Portable Wi-Fi scanner and printer, MP3 docking station, Apple i-pod, Lighting and climate control, Energy management systems, Guest sensors, Guest sensors, Smartphone app. etc. are commonly used in luxury hotels. Mirror televisions are more commonly found in bathrooms, saunas and swimming pools at luxurious hotels.

Hi- Tech USP of Few Hotels

Some of luxury hotels are much known because of their technology system. Space themed hotel in china is entirely staffed by robots and a really good experience. Not only this have many others also those are known for their unique technology and guest loved to go there.

Some of hotels are:

Sr. No.	Technology	Hotel/Brand	Description
1.	Lighting Technology	Six Senses Hotels Resorts and Spas	The unique physics of Light Emitting Diode (LED) lighting to eliminate wavelengths of light proven by medical research to be bad for our

			health but present in almost every other source of electric lighting. Six Senses claims to be the first spa and hospitality organization to feature this new lighting technology.
2.	Smartphone app	Andaz Liverpool street, London	With this Ordering App, you can give service order with specific delivery times. Best of all, you can use this app when you're not in your room but you want room service when you return.
3.	SPG app for Google Glass	Starwood hotels	Voice search, turn-by-turn directions, stay details, recognize arrival etc.
4.	Smartphone as room key	Aloft Hotels	In Starwood Preferred Guest program, guest will be able to test a Keyless Mobile Check-In via the SPG Smartphone app.
5.	Magic Bands	Disney Resorts	The electronic bracelets not only serve as park tickets as well as you can use these bands as your hotel room key.
6.	Robots Service	Spaced-Themed Hotel, China	Hotel is nearly entirely staffed by ROBOTS . A robot greets you at reception and at the front desk and even serves you drinks and food in the lobby lounge. However, there are some humans on hand in case the short circuits.
7.	Robots Luggage Service	Yotel, New York	A robot stores your luggage.
8.	Body heat sensor	Hotel1000,Seattle (Washington)	Body heat sensor alerts staff you are in the room
9.	Go Board 4.0	Courtyard Baton Rouge Acadian Thruway (Louisiana)	Go Board 4.0 in room lets you check flight, send navigation to phone and other Microsoft integrated services.

10.	Temperature Control	The Wit, Chicago	Sensors in room; adjust room temperature to body temperature
11.	Fingerprint Scan	Ushuaia Ibiza Beach Hotel, Ibiza, Spain	Pay for everything with a biometric scan of your fingerprints.
12.	I Pads	The Magdalen Chaper, Exeter, UK	The Magdalen is a paper-free zone. Guests are checked in on I Pads and given one for use during their stay. You can order room service on your I Pad. In short everything in hotel like booking events, ordering, and information etc all are in I pad.
13.	Touch screen tables and a mirror-cum-Facebook camera	W Hotel Sentosa Cove, Singapore	Touch screen tables and a mirror-cum-Face book camera in the bar
12.	Pool system	The Rezidor Hotel Group	Maintain pH of the water at 7.4 – 7.5 without using pool acids and make it safe for human skin. It reduces the back wash time from five minutes to one minute which means a saving of 3000 liters of water per day in one pool.
13.	Robotic sleep painter	Accor's brand - ibis	A robotic artist that paints a guest's sleeping data gathered from a re-designed mattress. The robotic artist system is the result of collaboration between Accor, ACNE robotics and BETC Digital for a project known as 'Sleep Art'.

Technology Which Can Be Made As USP

There are some latest technology within budget which hotels can adopt for making better services and better marketing tool.

Sr. No.	Technology	Company	Description
1.	Invisible door lock	VingCard Elsafe	Interior electronics include Radio Frequency Identification (RFID) and Near Field Communication (NFC) compatible locking technologies
2.	Multi-functionality	Swisscom Hospitality	It can be used by any mobile application vendor to interface with Swisscom Hospitality's IPTV, Connected Hotel TV or any third-party IP application on a Swisscom-managed network.
3.	SpineKare mattress	Kurlon	This mattress is meticulously designed and developed using ZPP i.e. Zero Pressure Point Technology with therapeutic and healing benefits to provide the right support to back
4.	Chromo showers	Queo	Chromo series emulates the dynamics of water from nature and uses Chromo therapy, the science of using colors to improve one's mental and body health. The Chromo shower is fitted with seven LED lights – Violet, Indigo, Blue, Green, Yellow, Orange and Red, each denoting unique properties.
5.	Wi-Fi Portable Scanner	Portronics	pairs with any mobile phone, tablet or laptop having a Wi-Fi connection; using a browser or an Android / iOS App. Scanny 6 Wi-Fi scans and then sends the scans instantly via Wi-Fi to the Wi-Fi scan app on the computer, where one can

			organize, create searchable PDFs or send images to the cloud.
6.	Refrigerator with plasma cluster technology	Sharp	Sharp patented new plasma cluster Ion technology which sterilizes air inside the refrigerator and fight against mold, thereby preserving food for longer period. Bread stays fresh for seven to ten days without fungus or mold.

Conclusion

In the race of a high-tech hotel, selecting the right technology for a hotel is very difficult. Hotels need to make sure their guests are satisfied using the technology and are not forced to fight with systems or products that are too complex. Guests staying for just short time period specially business travelers do not have the time, or the patience, to understand and master a complicated process to accomplish a task. Keeping the technology simple and user-friendly is the key to in-room technology. Also guests who are having latest updates in changing technology are more likely to share their hotel experience on social media like twitter, facebook etc and in indirectly helps in promoting the hotel. It is good to have technology but it must be guest oriented.

References

1. Ansel, D., & Dyer, C. (1999). A framework for restaurant information technology. *Cornell Hotel and Restaurant Administration Quarterly* , 40, (3), 74-84.
2. Arash Fartash, Nazanin Nassir Gharechedaghi, ||Evaluating the Effect of Contact Center on Customer Satisfaction in Iran Khodro Company||, 2012.
3. Barcheldor, B., (1999). Hospitality and travel: a trip to Grandma's goes high tech. *Information Week*, September 27, p. 189.

4. Borcover, A., (2010). 'Imagine a front desk without people' accessed via http://articles.chicagotribune.com/2010-12-19/travel/ct-trav-1219-hotel-tech-20101219_1_front-desk-room-service-guests on December 24, 2012.
5. Buhalis, D (1998), "Strategic Use of Information Technologies in the Tourism Industry", *Tourism Management*, Vol.19, pp.409-421.
6. Buhalis, D., & O'Connor, P. (2005). Information Communication Technology Revolutionizing Tourism. *Tourism Recreation Research*, 30(3), 7-16.
7. Buhalis, D., & Law, R. (2008). Progress in Information Technology and Tourism Management:20 Years on and 10 Years after the Internet—the State of e-Tourism Research. *Tourism Management*, 29(4), 609-623.
8. Chathoth, P. K. (2007). The Impact of Information Technology on Hotel Operations, Service Management and Transaction Costs: A Conceptual Framework for Full-Service Hotel Firms. *International Journal of Hospitality Management*, 26(2), 395-408.
9. Cobanoglu, C., Corbaci, K. and Ryan, B. (2001). "A comparative study: the impact of technology in lodging properties in the United States and Turkey", *International Journal of Hospitality Information Technology*, Vol. 2 No. 11, pp. 23-40.
10. Connolly D. J and Olsen M. D(2000) "An Environmental Assessment of How Technology is reshaping the Hospitality Sector", *Tourism and Hospitality Research*, Vol.3 (1), pp.73 to93.
11. Connolly, D. J., & Lee, S. (2006). Developing Information Technology Proficiencies and Fluency in Hospitality Students. *Journal of Hospitality & Tourism Education*, 18(3), 15-29.
12. Delahousay, J., 'Technology Used by Hotel Front Desk Agents' accessed via <http://smallbusiness.chron.com/technology-used-hotel-front-desk-agents-35952.html> on November 6, 2012.
13. DiPetro, R. B. (2010). Impacts and implications for hospitality operations: Key issues for ICT applications, 19, pp 47-67.
14. Eraqi, M. I. (2006). IT as a Means for Enhancing Competitive Advantage. *Anatolia*, 17(1), 25-42.
15. Garver, M. (2002). Using data mining for customer satisfaction research. *Marketing Research*, 14, (1), 8-13.
16. Gertner, R. K., Berger, K. A., & Gertner, D. (2006). Country-Dot-Com: Marketing and Branding
17. Destinations Online. *Journal of Travel & Tourism Marketing*, 21(2/3), 105-116.

18. Go, F., The role of computerised reservation systems in the hospitality industry, *Tourism Management*, 1992, 13(1), 22-26.
19. Huo, Y., (1998). Information technology and the performance of the restaurant firms. *Journal of Hospitality and Tourism Research* 22 (3), 239–251.
20. Jin-zhao, W. & Jing, W. (2009). Issues, Challenges, and Trends, that Facing Hospitality Industry. *Management Science and Engineering*, 3, (4), 53-58.
21. Kasavana, M. L. (November, 2005). The next big thing. *The Bottomline: The Journal of Hospitality Financial and Technology Professionals*, 20 (7), 12-13.
22. Kim, T. G., Lee, J. H., and Law, R. (2006). An extended technology acceptance model. An empirical examination of the acceptance behavior of hotel front office systems.
23. Law, R., & Jogaratnam, G. (2005). A Study of Hotel Information Technology Applications. *International Journal of Contemporary Hospitality Management*, 17(2), 170-180.
24. Lam, T., Cho, V., and Qu, H. (2007). A study of hotel employee behavioral intentions towards adoption of information technology. *International Journal of Hospitality Management* 26(1), 49–65.
25. Leung, R., & Law, R. (2007). Information Technology Publications in Leading Tourism Journals: A Study of 1985 to 2004. *Information Technology & Tourism*, 9(2), 133-144.
26. Magnini, V., Honeycutt, E., & Hodge, K. (2003). Data mining for hotel firms: Use and limitations. *Cornell Hotel and Restaurant Administration Quarterly*, 44, (2), 94-105.
27. O'Connor, P., & Murphy, J. (2004). Research on Information Technology in the Hospitality Industry. *International Journal of Hospitality Management*, 23(5), 473-484.
28. Senior, M., (2012). 'Innovation in the Hospitality Industry'
29. <http://asiancorrespondent.com/75910/innovation-in-the-hospitality-industry/> accessed on January 23, 2013.
30. Sigala, M. (2003). "The information and communication technologies productivity impact on the UK hotel sector", *International Journal of Operations & Production Management*, Vol. 23 No. 10, pp. 1224-1245.
31. Singh, A. J., & Kasavana, M. L. (2005). The Impact of Information Technology on Future Management of Lodging Operations: A Delphi Study to Predict Key Technological Events in 2007 and 2027. *Tourism & Hospitality Research*, 6(1), 24-37.

32. Siguaw, J., Enz, C., and Namasivayam, K., (2000). Adaptation of information technology in US Hotels: strategically driven objectives. *Journal of Travel Research* 39 (2), 192-201.
33. Siguaw, J. A., & Enz, C. A. (1999). Best practices in information technology. *Cornell Hotel and Restaurant Administration Quarterly*, 40, (5), 58-71
34. Van Hoof, H., Verbeeten, M., and Combrink, T., (1996). Information technology revisited- International lodging industry technology needs and perceptions: a comparative study. *Cornell Hotel and Restaurant Administration Quarterly* 37 (6), 86-91.
35. Vinod, B. (2004). Unlocking the value of revenue management in the hotel industry. *Journal of Revenue and Pricing Management*, 3(2), 178-190.
36. Yang, H. O. & Fu, H.W. (2007). Creating and Sustaining Competitive Advantages of Hospitality Industry. *Journal of American Academy of Business*, Cambridge, 12, (1), 113-119.
37. Zakrzewski, C., Sammons, G., & Feinstein, H. (2005). A New Approach to CAI: Online Applications for Procedural Based Activities. *Journal of Hospitality & Tourism Education*, 17(1), 47-54.

Websites Links

38. <http://www.hospitalityperformancegroup.com/index.php/resources/78-history/84-history.html> (07/05/14)
39. <http://www.timetoast.com/timelines/historical-events-in-technology-within-the-hospitality-industry> (7/05/14)
40. <http://hospitalitytechnology.edgl.com/news/Industry-Outlook--78720> (06/04/2014)
41. <http://kylaboulin.wordpress.com/> (02/01/2014)
42. <http://www.ivoryresearch.com/samples/tourism-essay-example-it-and-internet-impact-on-tourism-and-hospitality-industry-implementation-of-technologies-for-hilton-hotels-group/>(06/03/2014)
43. Telefónica, 2008. Sociedad de la información en España 2008. Available from: http://e-libros.fundacion.telefonica.com/sie08/aplicacion_sie.html [Accessed 20/12/2013]
44. Evolving Technologies To Drive Competitive Advantage in Hospitality Industry By Erik Lars Hansen Raymond M. Owen (<http://www.hotel-online.com/Trends/Andersen/tech.html> , 07/05/14)
45. 'The Hotel Room of the Future' by Jacobs, K., (2010) accessed via <http://www.travelandleisure.com/articles/the-hotel-room-of-the-future-2010> (25/04/2014)

46. Nikolis, N. (2008). Information Technology in the Hospitality Industry. Available: <http://www.articlesbase.com/computers-articles/information-technology-in-hospitality-industry-665067.html>. Last accessed 2nd March 2014.
47. Mintel (2010). Hotel Technology. Available at ;
48. http://0academic.mintel.com.emu.londonmet.ac.uk/sinatra/oxygen_academic/search_results/show&/display/id=482886 . Last accessed 28th March 2014
49. Customer Relationship Management Solutions. (2005, March 16). Retrieved February 6,
50. 2007, from <http://www.microsoft.com/industry/hospitality/solutions/crm.mspix> (05/02/2014)
51. Paul, R. A. ((2003, June). Let's Get Talking. Hospitality Technology Magazine Feature
52. Article. Retrieved February 6, 2014, from <http://www.htmagazine.com/archive/htjune/art7.htm>
53. Purchasing Systems Solutions. (2004, November 11). Retrieved February 6, 2014, from
54. <http://www.microsoft.com/industry/solutions/purchasingsystems.mspix>
55. Impact of Technology and Social Media on the Hospitality Industry 2013 Gurnoor Singh Bhangu
<http://www.manipal.edu/institutions/hotelmanagement/wgshamanipal/cehtr/documents/gurnoor%20singh%20bhangu%20%20091401073.pdf> (15/05/2014)
56. Hotel Technology Next Generation (HTNG) Making Significant Progress Towards its
57. Objectives of Improving Systems Interoperability in the Hospitality Industry.
58. (2005, June 21). Hotel Online. Retrieve February 7, 2014, from http://www.hotelonline.com/News/PR2005_2nd/Jun05_HTNGrelease.html
59. com/News/PR2005_2nd/Jun05_HTNGrelease.html
60. The Impact Of Information Technology & Hospitality Services On Customer Satisfaction-A Case Study Of Fast Food Industry In Pakistan. Muhammad Shaham Bakhat And Sajjad-UI-Aziz ;
<http://journal-archieves24.webs.com/360-390.pdf> (10/04/2014)
61. Interdisciplinary Journal Of Contemporary Research In Business Copy Right © 2012 Institute Of Interdisciplinary Business Research October 2012 Vol 4, No 6
62. <http://journal-archieves24.webs.com/oct12.pdf> (12/04/2014)
63. Information Technology Applications in Hospitality and Tourism: A Review of Publications from 2005 to 2007 by Rob Law, Rosanna Leung, and Dimitrios Buhalis
64. http://www.academia.edu/195679/Law_R._Leung_R._and_Buhalis_D._2009_Information_Technology_Applications_in_Hospitality_and_Tourism_A_Review_of_Publications_from_2005_to_2007_Journal_of_Travel_and_Tourism_Marketing_Vol.26_5_pp.599-623 (02/05/2014)
65. ICT Adoption Propensity In The Hotel Industry:An Empirical Study

66. Pongsak Hoontrakul and Sunil Sahadev ;
<http://papers.ssrn.com/sol3/papers.cfm> (22/03/2014)
67. Information and Communication Technology Application's Usage in Hotel Industry by
68. Azdel Abdul Aziz et al (Journal of Tourism, Hospitality & Culinary Arts)
Vol. 4 Issue 2 (2012)
69. <http://www.jthca.org/Download/pdf/V4%20IS2/chap%204.pdf>
(05/05/2014)

Books

70. Inkpen, G (1998) Information Technology for Travel and Tourism, Addison Wesley Longman, Essex UK.
71. Sheldon, P (1997) Tourism Information Technology, CA International, Wallingford, UK and New York, USA.
72. Poon, A (1993) Tourism, Technology and Competitive Strategies, CAB International
73. Cooper, C., Fletcher, J., Gilbert, D and Wanhill, S (1998) Tourism Principles and Practice, Pearson, Essex.