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ABSTRACT

Technology Enhancement in Hotel Guestroom

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This is an exploratory research paper looking on various types of technology, facilities enhancement and devices adopted by hoteliers for their guestrooms to meet the ever increasing demand and expectations from their guests. This paper also explores the technologies and devices that owners use to leverage on business sustainability for their operations. As part of the corporate social responsibility, hotel owners are exploring the opportunities to increase these activities through the use of modern technology and devices to reduce damage to the environment such as using energy saving devices in their properties. Business and leisure travelers who are environmentally conscious will be interested in this paper as they will have a better understanding on the technologies adopted by hoteliers that have a positive impact on the environment and at the same time without compromising the service level they deliver and at the same time be able to have a memorable experience during their stay in the hotel.

Contents

master program. I really appreciate the sacrifice they have made for me during this

period. I hope to make it back to them by moving forward to provide them a better living

environment.

Part One

Introduction

In the hospitality industry, the main contributor to hotel's revenue comes from Rooms' sales. A few years back, big beds with clean linen, television, iron, hair dryers, and telephone were enough to keep hotel guests happy and satisfied. However, this is no longer true. Changes in lifestyles have also increase the demand on the level of service required in hotels. It is very common for homes to have a high-definition (HD) flat panel television, high-speed internet access (HSIA), Hi-Fi system, and the list goes on. Guests are becoming more tech savvy. All these technologies from the home are slowly creeping into the hotel guestrooms.

Travelers also expect the latest technology available in the guestrooms so that they can stay connected with their businesses and home twenty-four hours a day. According to Ken Kapikian, General Manager of Sheraton University City Hotel, many customers are using latest the technology at home and look for similar resources when they travelled (Microsoft 2008). Forty-eight percent of hotel operators cited in-room entertainment as important (Brewer, Kim, Scarier, & Farrish, 2008).

Hoteliers need to ensure that their guests have a memorable and unforgettable pleasant experience during their stay in the hotel. Hoteliers are aggressively marketing and promoting to attract guests who are increasingly looking for a more up-market experience in their guest rooms.

This paper is an exploratory study on the various technologies and facilities enhancement adopted by hoteliers in their guestrooms to meet the high and demanding expectations from today business and leisure travelers. Areas of study include security,

communications, in-room entertainment, room service, guestroom automation system and environmental control.

Importance of the environment and technology

On the area of climate change, the EU, Japan and United States have committed to cut carbon emissions by at twenty percent, twenty five percent and seventeen percent by 2020 respectively (Ames, 2009). With so much attentions being brought up on the climate change during the Copenhagen Climate Conference 2009, it is not surprising hoteliers and owners is making using of technology to leverage their business sustainability. This paper will also explore into business sustainability using guestroom technologies adopted by both hoteliers and owners.

With the right technologies and equipment in place, owners and management want to ensure that these will create truly memorable experiences for their guests; eventually turn into higher occupancy and higher average room rates. Technology in guestrooms is playing an increasing role in increasing room revenues and building up new business opportunities in the hospitality industry (Microsoft, 2008)

Purpose

The purpose of this professional paper is to explore the different types of technologies and equipment that impact guest-facing technologies in the guestroom. Areas include voice over internet phone, high-speed internet access, guest room entertainment, guest services such as mini-bar, in-room security, communications, and central environment control offered for the hotel guestroom's applications. Information on latest technologies adapted by the hoteliers and the industry in each of the above areas will be included. As travelers are increasingly aware and making daily choices to reduce

their environmental impact on global warming for both at home and in hotels where they stay; they also expect hotels to act and embrace sustainability through both developmental and operational strategies. This paper also looks into how hoteliers prove their green credentials by using both green technologies and at the same time using technology to leverage on sustainability for their daily operations as part of the effort in helping the hotel industry reduce its impact on the environment and move towards business sustainability.

Justification

There are many reasons to think that technology will continue to drive the guest experience, both today and tomorrow. It is the single greatest force driving the change and complexity in the hotel industry (Mills & Rudd, 2008). This exploratory study would be of interest to both business and leisure travelers facing technology and to have a better understanding of the current or near future guestroom technologies in the hotel industry. Independent hotel owners may benefit from this study on the technologies available in the industry to upgrade or enhance the guestrooms in their properties.

Consumers who are environmentally conscious will be interested, as this paper will include technologies adopted by hoteliers that have a positive impact in the environment and at the same time give the guest a memorable experience during their stay in the hotels. Achieving guest loyalty will involve more than simply installing and layering technology after technology in the guestroom. Looking ahead, technology sits at the heart of the guests' demands. Over the last five years, technology has done more to shape future guests' expectations.

Glossary

High Definition Television

High Definition Television (HDTV) is a video having substantially higher resolution than traditional television systems. High definition has one or two million pixels per frame; roughly five times that of standard definition television (High-definition television, 2010).

Internet Protocol Television

Internet Protocol Television (IPTV) delivers television programming via a broadband internet connection using Internet protocols suite. It requires a set-top box to deliver the programs (Internet Protocol Television, 2010).

Liquid Crystal Display

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (Liquid Crystal Display, 2010).

Radio Frequency Identification

Radio Frequency Identification (RFID) is a data collection technology that uses electronic tags for storing data. It comprises of an integrated circuit for data storage known as tags or labels and the other component is the readers. It acts as an antenna for receiving and transmitting the signal. Transmitting in the kilohertz, megahertz and gigahertz ranges, tags may be battery-powered or derive their power from the RF waves coming from the reader (Radio Frequency Identification, 2010).

Near Field Communication

Near Field Communication is a short-range wireless connectivity technology standard designed for intuitive, simple, and safe communication between electronic

devices. It combines the interface of a smartcard and a reader into one device. NFC

communication is enabled by bringing two NFC-compatible devices within a few

centimeters of one another (Near Field Communication, 2010).

Light Emitting Diode

A light-emitting diode (LED) is a light source. When a diode is switched on, it

releases energy in the form of photons. This effect is called electroluminescence and the

color of the light is determined by the energy gap of the semiconductor (Light Emitting

Diode, 2010).

Introduction

Hoteliers are facing a highly competitive environment where differentiation and innovation on customer experiences are key components in improving revenues and building loyalty among customers. In the hospitality industry, guest satisfaction is the key to business success. Guests today are more demanding and expect the best from leading hotels or properties. Average hotel guests are pretty technology savvy and familiar with sophisticated entertainment set-up (Rock, 2010). Everything hotel operators do is designed to improve a guest's experience to ensure that guests will want to return. The need to differentiate from competitors has turned into a multi-million dollar investment for today's hotel companies. While cost cannot be ignored by the properties to carry out a differentiation strategy, it also cannot allow it to become the primary strategic target. Hotels continue to invest in millions of dollars to gain a competitive edge in this industry. A big driver and challenge for hoteliers is to provide guests that would expect their hotel room as a home away from home (Parets, 2004; Brewer, Kim, Schrier, & Farrish, 2008). At the same time, hotel operators have to attract new guests and create new revenue opportunities that go beyond just putting heads in beds. In addition, of course, all this has to be done while optimizing operations and lowering costs.

Literature Review

The evolution of technologies changes the way we live. In fact, the way people use technology becomes part of a change in the way the people live and interact when they travel. Other factors are influencing the way they live and the technologies they use when they are at home. At home, people are profoundly impacted by new technologies on

a regular basis, and these are impacting what they will expect in the hotels when they travel and stay.

Supporting core business strategies, managing constant change, meeting high expectations and demands from guests are constant challenges faced by hoteliers and property management. They have to continuously outperform and be able to differentiate from their competitors through constant innovations and creative ideas. The need to accept innovative technologies to maintain market leadership positions and compete in the market is globally recognized in the hospitality industry. According to Zeliha Aka, Sheraton Hotel and Convention Center Ankara, to be a market leader and win the customers, having efficient service is not enough. It has to be combined with smart room technology (Cisco, *n.d*). Business and leisure travelers are confronted with technologies adopted by hotels, which hoteliers hope to give travelers the feelings that they have the same or better technology in the guestroom as they do at home.

Guestroom security

Guestroom digital door viewer

Hotels are required to provide reasonable care to ensure that guests have a safe and secure stay. However, it is necessary for individual guest to be responsible for their own safety as well when they are in the guestroom. The Overseas Security Advisory Council (2006) has advised that guests use the peephole if available. For increased protection, companies strive to differentiate themselves on every level. First View Security has developed the Digital Door Viewer (DDV) for hotels to increase their level of security in this area. MGM Grand in Las Vegas and Four Seasons San Francisco and London are using this technology. This product has a fully integrated digital camera and a

5.6-inch LCD display, which provides superior viewing outside the door from inside the room. The camera is mounted on the exterior of the door with a LCD screen directly opposite on the inside of the door. A sharp, color image is sent from the camera to the monitor whenever the power button is pressed. It does not require any wiring and operates on a double "A" size battery. The batteries can last for one year under normal operation of one thousand 5-second viewing cycles (First View Security, 2009). The guest does not need to peep through the hole to see who is outside the door but rather has a better and clearer view from the LCD screen. This technology will also help the senior guests to see more clearly from the display rather than to peep through the small view hole of the door. The Four Season Hotel in Silicon Valley uses 5.6-inch LCD view finder in each room so guests can see who is at the door clearly and safely (John, 2010).

Guestroom door keys

Hotel guestroom's keys started off with each key strictly allocated to each room or lock. The changing of any damaged lock will required the change of the key physically. In some instances, guests were asked to change their rooms because of the lock being faulty and the hotels need to change the lock physically. However, as technologies evolve, the need for guests to go through all this inconveniences and hassles was eliminated.

Electronic door lock

This technology is based on the "key" with a magnetic strip on it with the door locks as the reader. It is able to read in both direction when insert and upon removal of the card. The locks use a six hundred event audit trail for optimal security. The

companies that supply this technology and products include VingCard Elsafe (VingCard, 2010a).

RFID door lock

There is a significant trend toward contactless electronic door locks. Radio Frequency Identification or RFID contactless electronic door locks offer highly reliable security features and provide convenience and ease-of-operation for both hoteliers and hotel guests. RFID locks allow for contactless guest room entry and are compatible with next generation NFC cell phones. Each keycard is able to provide updates to the front desk, allowing staff to receive important information in a shorter time.

At the Doubletree Dallas/Richardson Hotel in Texas, they have wireless radio frequency online system together with the RFID contactless radio-frequency identification electronic locks. The RF-online-based system allows remote monitoring of the room doors from the comfort of the hotel's front desk (Assa Abloy, 2009). This locking system not only enhances the security for hotel guests, it also increases staff efficiency by providing SMS and e-mail maintenance alerts.

According to Pando, owner of the InterContinental Montreal, RFID is the technology for the future, as it is a user-friendly system and at the same time able to maximize guest satisfaction and stay ahead of their competitors (Hotelworld Network, 2008). Guests using this technology feel greater sense of security.

The RFID keycards do not have to be inserted into the lock and they are not susceptible to demagnetizing, like their magnetic strip counterpart, and are available to be made into fobs and wristbands. With this technology, owners have the option to have total security control from one central location, utilizing RF-online communication

capabilities. The keycards can be canceled or extended with the guest stay all remotely without having the guest to return to the front desk to make the changes (VingCard, 2010). This technology allows automatic SMS or e-mail alerts as well as low battery alerts, which allows the staff to spend more time to service guests. The overall hotel operations and security level can be improved with this technology. One of the advantages of the RFID technology is that it is Near Field Communication, or NFC cell phone compatibility.

Hotels using such technology include Holiday Inn Express Hotels & Suites in Canada, Grand Millennium Sukhumvit Bangkok and InterContinental Phoenicia Beirut in Lebanon. According to Mazen Salha, owner of Phoenicia, with this technology implemented, their staff can operate more efficiently would be (consistent with Brewer et al., 2008) 79.9% of the managers and directors answered that technology was the second most important for increasing employee efficiency in their operations.

Near Field Communication door security

NFC works is like performing a 'handshake' between two devices that are brought close together, usually within a few centimeters. Once the connection is established, information can be exchanged between the two devices using either NFC directly or via another wireless technology like Wi-Fi, Bluetooth, UWB or ZigBee (NFC, *n.d*). This technology is able to offer remote check-in, with guests receiving their room number and access code for their room key via text message. In this way, they can go to their rooms upon arrival (Gale, 2009). In addition, another advantage is that hotels and their agents can send a text message to a guest's mobile phone, containing the RFID code

for the room's key without physically passing the key to each of the guest especially those travels in groups (Collins, 2006).

Biometrics security door lock

Caesars Palace, one of the largest and most famous hotels on the Las Vegas Strip, uses biometric keys for its customers. The move to fingerprint biometrics makes it more convenient for customers who need not worry about lost keys (Sturgeon, 2005). A boutique hotel in Boston known as Nine Zero, guests staying in the penthouse require a retinal scan to unlock the door. Only approved guests can unlock the penthouse, marking a future trend in the hotel industry (Steinberg, 2009).

 "Sound" activated security door lock

A new application has been developed to open the guestroom door with the use of a mobile phone. This application developed by OpenWays works with more than 4 billion mobile phones worldwide. Your mobile phone is the key to your guestroom. According to OpenWays, the application uses the speakers in the mobile phone to emit a sound. The specific door to be opened will pick up this sound and then the door is unlocked. The security feature here is that the sound cannot be recorded as the data has an encrypted acoustic protection.

This technology can be easily integrated with other locking technologies including smart card, magnetic stripe; proximity card and RFID key locks that are NFC compatible. Another advantage of this technology is that it allows guest to check-in without queuing at the front desk. The guest can check-in, and open the guestroom door with this application all done on his mobile phone. According to Professor Connolly, Gen Y population rely on mobile technology to communicate and get things done efficiently

while on the move (OpenWay, 2010). With this technology and depending on the profile

of the hotel guests, they have the option to use this technology to check-in or to use the

normal way to check-in at the front desk. InterContinental Hotels Group will test this

technology this June at the Chicago O' Hare Rosemont and at the Holiday Inn Express

Houston Downtown Convention Center (Johnson, 2010).

In-room safe

In-room safes have been one of the appliances in the guestroom from the very

beginning. Nothing much has been changed; mainly using four to six digits to lock the

safe. One of the latest technologies available for the safe is using blue-tooth technology

to open and lock the safe through a convenient safe link window-based personal digital

assistant (Ventaza, 2009). Some in-room safes come with internal power supply allowing

guests to charge their laptops while keeping it safe inside the in-room safe.

Communications

Broadband services

Traditionally, the internet was used for simple communications such as reading

and sending electronic mails, getting information by surfing the web. Broadband facility

has started from nice to have to the stage of critical amenity where it may become a

deciding factor to stay in the property for some travelers. Especially for the business

travelers, the importance of having broadband is just like having bed sheets and hot water

in the guestroom (Parker, 2009).

Wireless or wired high-speed Internet access (HSIA) has become the "must have"

amenity for business travelers in both hotel public areas and guestrooms. Every segment

of the hotel industry has recognized that business travelers want and expect access to

internet connections to handle work and personal matters while away from the home or office. According to Brewer et al., 2008, 77.5% of hotels use internet access as one of the most frequently used technology to improve their operations. The demand for HSIA from hotel rooms emerged almost overnight. Seventy-five percent of business travelers travel with laptops and 62% spend 75 minutes daily on line accessing corporate network and surf the internet (Cisco system, 2006). Guests expect every hotel, regardless if it is a luxury hotel or economy hotel to provide readily, reliable internet access that is fast enough to meet their needs.

In addition, broadband has been increasingly use as part of the entertainment experience for the hotel guests. In fact, 82% of lodging executives said guests demand for Wi-Fi, more than any other high technology demand amenity for in-room technology which is also the most common information technology that hotels provide (Wi-Fi is Biggest Tech Demand, 2008). There has been an increasing trend of people streaming entertainment videos into their hotel rooms. There are more than 14,000 streaming radio stations, many of them exclusive to Internet broadcast. Guests can create a personalized radio station and enjoy music from all corners of the globe, in almost any language. Guests can enjoy a little piece of home while traveling and staying in a hotel using internet radio broadcasting. They are able to listen to the radio station in their native language. Network radios offer streaming audio from local shared media as well.

Whether it enhances or detracts the guest experience in the hotel guestroom will depend on the broadband and the amount of bandwidth that the hotel provides for their guests. According to Nick Price, Mandarin Oriental's Chief Information Officer / Chief

Technology Officer, the hotel ensures their guests have a great internet experience and a great cell phone signal everywhere within the hotel (Inge, 2010).

It is now widely accepted that guest internet access is the number deliver to ensure a positive guest satisfaction scores which properties needed to address without fail. Hotels providing broadband access are vital for business travelers to stay in touch with both work and home. Any failure to provide such service can badly affect the customers' loyalty to the properties (Hebert & Warner, 2009).

CtyCenter, one of the latest hotel and casino development in Las Vegas offer the next generation automation with one gigabit of bandwidth to every hotel room. Using one gigabit of fiber, the guests are able to have an internet connection up to eight times faster than the average hotel guestroom in the United States. Through the hotel's high-speed network and these TV widgets, guests will have access to a wealth of entertainment choices. All these amenities with modern technology will definitely enhance the guests' experience during their stay in the hotel.

Voice over Internet Protocol Phone

Long gone are the days when hoteliers relied on revenue from guests making long-distance phone calls. In-house phones are becoming less of a revenue generator for the hotels. However, it is becoming to evolve into a computer device.

For hotels in Las Vegas, having an internet protocol (IP) telephone in a standard guest room is becoming the norm, rather than the exception. With color touch screens, multi-line functionality, and the ability to introduce marketing opportunities into the hotel room, the IP telephone has literally replaced its analog counterpart. With the advance software, this technology gives guests to access a wide range of services available in the

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hotel such as in-room service dining, housecleaning and restaurant reservations. It is designed to help guests to access live information in a new way. With a large color touch-screen liquid crystal display on the phone, guests can use it to make phone calls, set alarms, stocks and weather information, make restaurant reservations, wine lists selection and explore local attractions or special events in town. To meet the guests' preferences, the whole system can be personalized such as their favorite in-room meals or other customized services (Avaya, 2010). Marina Bay Sands Singapore has installed the VoIP phones in all their guest rooms. In the near future, guests can make voice and video calls over Skype using a high definition television for video conferencing or staying in touch with family (Sawyers, 2010).

In-room entertainment

Today's digital lifestyle has led guests traveling with their personal digital devices, such as iPods, smart phones and laptops wherever they go. As guests carry with them an increasing amount of digital contents, hoteliers are looking ways to enable guests to connect their electronics devices and fully benefit from the room's entertainment system such as the LCD television to access their portable contents.

Flat panel display

Hotel room video has entered the digital era. According to Bjorn Hanson, a lodging analyst at PriceWaterhouseCoopers, after the bed and bathroom, the television is the most important thing in the room (Johnson, 2005). Guests may now enjoy a variety of content from sports to movies on a high-definition; a scalable solution that will grow and expand with hotel needs. A 40-inch LCD television has become a basic amenity in today's standard for luxury hotels. Television in a hotel guestroom is not just equipment

that provides movies on demand or television programs. It has become a platform for guests to serve unlimited entertainment portal, a link for guests to high definition contents, movies, music, serve internet, hotel services and amenities. Guests are able to read newspaper of their own country, listen to their customized music platform and work on office work such as Excel or PowerPoint application. Children can access games, watch concerts and view high definition movies and much more. All these facilities made possible through a wireless keyboard with full Web-access capacity.

Internet protocol television

Fully interactive guestroom entertainment, both wired and wireless internet access together with business center services made possible in one single network. This network infrastructure is gaining popular in the hotel industry. Guests can enjoy high definition live television and video on demand with Internet Protocol Television or known as IPTV. Guests can choose from more than 70 channels from all over the world for high definition blockbuster movies and short documentaries shows all from the comfort of their hotel room. Hilton in Frankfurt and Cedar Court Grand Hotel & Spa in York adopted this technology in their properties (Swisscom, 2009). With the recent upgrade at Ritz Carlton Millennia Singapore, guests can look forward to experience the full high definition of LED television for all their 608 rooms.

Mirror television

Ever thought of watching your favorite movies while having a hot bath in the hotel guestroom? One of the key features that have received attention over the past few years is the addition of mirror television in guest bathrooms and suite living rooms. Mirror television is one of the guest-facing technologies with increasing trend. Besides

being located in the bathroom, mirror televisions can be installed in many other areas as well. They can be seen at hotel restrooms, bars, lounges, convention centers and other hospitality locations. More guests will be able to enjoy such facility due to the improving technology and decreasing price level; they will become a standard fixture in most hotels in the near future (Rock, 2009).

Virtual games

Virtual golf is also available for guests who want to practice their swings before hitting the greens. Other gaming facilities include PlayStation 3, Wii as well as Xbox game stations all inside the comfort of the hotel guestrooms (Steinberg, 2009).

Guestroom amenities

Mini-bar

In some incidents, guest complaint about missing items, expired snacks and drinks from the mini-bar and charged for items in the mini-bar that never consumed. Do hotels make huge profits from mini-bar sales? In reality, with the high labor costs, missing items or unreported sales, tampering and other operational problems resulted in a loss or just breakeven scenario for most hotels. However, min-bar amenity is the least the minimum requirement for luxury or even for economy hotels. In order to be able to control the costs and still providing quality products in the mini-bar, hoteliers rely on some of the latest technologies available in the industry to overcome such problems. The use of highly sophisticated computerized stock management system that uses electronics sensors and Radio Frequency Identification (RFID) technology is gaining popularity in the hotel industry. Once the items being removed from the mini-bar, the sensor will be activated and recorded in the system. This technology tracks all products

and transactions across the entire mini-bar network within the hotel. The system also analyses inventory status, consumption quantity and expiry date of all items in the mini-bar. Willard InterContinental Hotel in Washington, D.C uses the wireless system for the mini-bar operation to enhance the guest experience (BWI, 2004).

Another experience the guest will be facing in the near future will be promotions from the mini-bar. For example, if a guest wanted to open a box inside the mini-bar, a video appears on the television showing what is inside the box so that guest does not need to open the box and being charged for the item if he finds that he does not want the item after opening it (Freed, 2009b). Mini-bar promotion with Happy Hour and a Pay-TV interface allowing cross sales. When the guest orders a movie, the mini-bar promotion will flash on the television whereby mini-bar products offered at a reduced price during the period of the movie. Another option available for the guests is a bottle of coke or beer is bundled in a package when a movie is ordered.

This technology also enhances guest experience in guestroom entertainment systems. These new technologies allow hotels to reduce losses while reducing operational costs. The trend has changed from viewing mini-bars as the source of income for milking the guests to service enhancers.

External multi snack displays in guestroom

Guests also have the options to select snacks placed on the automated tabletop trays or baskets outside the mini-bar. Once the guest lifts up the snacks from the tray, it will track the inventory levels and automatically add consumed items to the guest's room bill. This arrangement allows more than two automated snack trays to be placed next to the mini-bar. Guests will have more selections to choose from (Freed, 2009a).

As this technology is fully automated and using wireless platform, the snacks and drink trays can be placed on the table next to the bed or even next to the bathtub. Guests can enjoy a relaxing hot bath and enjoying snacks and drink within an arm reach and at the same time watching his favorite movie on the mirror television inside the bathroom. The use of these technologies not only reduced labor and operation costs for the hoteliers, it will ensure accurate billings as well as improving customer service for the guests. All these made possible by the use of infrared and RFID technologies that trigger when an item being moved (Freed, 2008). Properties that adopt these technologies include Aria, Venetian and Palazzo complex in Las Vegas, Las Vegas Sands Corp.'s Venetian Resort Hotel Macau and Marina Bay Sands in Singapore.

Empty food tray tracker

Guests will not have to face dirty dishes cluttering along the hallways. The detection system, Tray tracker installed by some hotels to signal staff in real time the exact location of the used food tray so that they can be cleared in the shortest possible time without having to locate or leaving the smelly food unattended for hours along the corridors. Mandarin Oriental at CityCenter in Las Vegas is one of the hotels using such tracking system (Axxess, 2009).

Guestroom Automation Systems

Personal valet

Hoteliers are focusing automation systems in hotel guestrooms to provide their guests the convenience of controlling multiple functions in the guestroom via a single controller console, also known as personal valet. It enables seamless integration with air-conditioning, lights, door security, and electronic safe, automated curtains operation as

well as video and audio systems. Besides improving the operational efficiencies, reduced energy costs and effective management of resources, guests were able to enjoy total comfort and convenience with a single controller. Properties with such technology include Shangri-La Dubai and Sheraton Jumeirah.

Guests are no longer afraid of getting lost on their first visit to the hotel. The personal valet console placed in the hotel room allows the guest to select images of the hotel at their fingers tip. Just by a few touches on the screen, it allows the guest to place order on a food menu for in-room dining, information and scheduled for a spa service. Placing reservations to restaurants and hotels is a breeze; including a request for a car to be retrieved from valet parking (Lovitt, 2010). If guests needed their coats or jackets to be dry-clean or pressed, a touch of a button will send the laundry's attendant to pick-up the clothes. Guests can view the charges on the items they consumed in the mini-bar on the screen of the personal valet. Together with multi-lingual option, guests can choose the requested language. All information is in real-time updates.

Guests will also have the opportunity to view messages through the screen for any in-house promotions such as happy hours, food and beverage promotion to access the full menu of choices available to them (HotelWorld Network, 2009). These are just some of the guest-facing technologies guests can expect.

Another guest-facing technology opportunity is guests can view and set his preferences such as lighting levels, room temperature, audio and video systems, control of blinds and guest service menu through the main television screen via a single remote controller (Howe, 2010). MGM Mirage Aria Hotel in Las Vegas features this technology in their guestrooms.

ICE Touch – In-room concierge

Another platform hoteliers are using is known as the Interactive Customer Experience or ICE. It allows hotel guests to arrange all services within the hotel such as in-room dining, room make-up, dinning reservation and valet or bell-desk services all through a single system. Guests can book a car rental, purchase event tickets and local tours through this system. All these made possible instantly via a touch screen console, laptop or a mobile device (Ostrowski, 2009).

In the middle of the year 2011, guests in JW Marriott Indianapolis will be able to enjoy high-speed Internet access (HSIA), high definition video on-demand, and high definition internet protocol television also known as IPTV. Together with the ICE, guests can make restaurant reservations, view airline flight schedules, place orders for in-room dinning via a single remote controller and view on the high definition television screen inside guestroom (Hospitality Upgrade, 2010). The Roosevelt Hotel, NYC is one of the hotels that provide their guests with this technology in their property.

As guests enter into the room, they will be "greeted" with lights that fill up the room, curtains drawn to show the view outside the hotel, and television will display greeting messages using the guests' names with a list of automatic control menu for guests to personalize. All settings recorded and incorporated whenever a guest is in the room. Aria Resort and Casino and the Mandarin Oriental hotel provide such facilities to their guests (Lorden, 2009).

Microsoft surface technology

One of the technologies gaining popular in the hotel guestroom is Microsoft Surface. Guests can reserve tickets to events, review the dinning menu from nearby

restaurants and book a luxurious spa treatment; putting all the offerings and experiences through the guests' fingertips with the interactive virtual concierge. It also enable guests to browse and listen to music, create their own playlists, send photos home, download electronics books, and even order food and drinks. Guests can view pictures and videos previously taken during the day and insert their own memory cards into the system. With the collaboration with Control4 Corporation, Hotel 1000 in Seattle uses such technology in their property (Steinberg, 2009). Guests can also experience this technology at Sheraton Hotels & Resorts as well as Caesars Palace and Rio All-Suite Hotel & Casino in Las Vegas.

Central Environmental Control – Energy Management Systems

In the United States, American hotels generated more than 1,300 tons of plastic key waste each year (Green Lodging News, 2009). Millions of plastic key cards landed in landfill yearly. Most hotel keys are made of PVC, which is non-degradable and polluting the environment. It is highly toxic when burned in waste treatment plants.

Energy management systems

U.S. business travelers are increasingly making daily choices to reduce their carbon footprint and environmental impact. According to a survey, commissioned by Deloitte, shows business travelers have begun to follow some green practices routinely. Thirty-eight percent will make effort to locate "green" hotels before travelling while 60% voiced concern about global warming. Forty percent of respondents would be willing to spend more to stay at a "green" hotel (Camanelli & Rizzo, 2008). Nearly 7 of 10 business travelers say they always turn off the lights and one out of three always adjusts the heat/air conditioner when leaving the room. In the same survey, 28% say they would be

willing to pay 10% more to stay in a green lodging facility (Sustainable business, 2008).

Energy management systems can reduce energy consumption up to 45 percent (Rock,

2010). About 43.4 % of properties installed lighting in low traffic occupancy

programmable on/off timers or sensors in their guestrooms with 16% installed occupancy

control for guestroom thermostats (AH&LA, 2008).

Business sustainability

Hotel going green will have a marketing bonus that crosses from business to

leisure travelers. One of the energy management system developed by VingCard Elsafe

provides energy saving between 20 to 40 percent on a yearly basis; helping hotels around

the world to "go green". This system allows the management to control and set the

guestroom temperatures remotely from a central location such as the front desk. Upon the

guest check in at the front desk, the staff can remotely activate and switch on the air-

conditioning before the guest reached the guestroom. Once the guest leave the room, a

sensor in the room will send the signal to the controller in the room and then in turn set

the temperature back to unoccupied status.

While ensuring guest comfort is the top priority, this system designed to reduce

energy costs using the new intelligent thermostat with the ability to integrate into a

hotel's wireless online locking system for the doors (VingCard, 2010). As travelers are

increasingly concerned about the environment and chose to stay in hotels, which had a

positive impact on the environment, hoteliers, were doing their part to attract this group

of customers.

RFID locks used by Hotel Okura Amsterdam are environmentally friendly

product. The energy-efficient locks require fewer battery changes than traditional

electronic locks, meaning less waste and reducing battery costs for the hotelier. RFID hardware design also requires less maintenance because the mechanism does not require cleaning (Assa Abloy, 2010). This technology is definitely an environmental friendly product and created a sustainable business for the hotel.

LEED certification

The inside and outside of the guestrooms in CityCenter are leveraging technology to be significantly green. It is one of the largest projects ever to obtain LEED-certification for its Leadership in Environmental Energy and Design. In-room technology will offer guests a non-obstructive way to conserve resources. Guests have the option to adjust the room temperature and light settings that reduce the energy consumption (HotelWorld Network, 2008). With the advancement of in-room technology, the need for paper-based materials, such as the guest directories, morning breakfast ordering cards, in-room dinning menus, and dry-cleaning forms will not be required. These green savings can be as much as $100,000 annually for a typical 300-room hotel (Avaya, 2010).

Leveraging technology for business sustainability

Hotel companies are being prompted by rising energy costs, government pressure, consumer expectations and the competitive landscape to increase sustainability a top priority. Meanwhile, green concerns have made their way on to the business traveler's agenda. Business travelers understand the issues on sustainable business and carbon footprint. They are trying to do their part in being more environmentally responsible when they are on the road. Sustainability is a market imperative as customers increasingly hold the nation's hotels accountable for green practices

Hotel companies are increasingly encouraging environmentally friendly practices and embracing sustainability through both developmental and operational strategies. The most simple of the modern energy controls and sensors is a thermostat with a setback function, which gives guests control of the temperature in the room and gives hotels control when guests are out of the room. Besides these simple and quick solutions, hoteliers also adopt more advance technologies as mentioned above to leverage towards environmental practices and sustainable business.

Long-term resolutions

In addition to changing the design of the hotel, technologies adopted by hoteliers outlined above are positive steps towards the achievement of environmental goals which hotels can attain lasting environmental targets. Those that do the best job of delivering on their promises of sustainability will win the day with tomorrow's increasingly discerning business travelers.

<center>**Part Three**</center>

Introduction

        For hospitality design, whether a guestroom with latest technologies, or a new destination for a hotel, it starts and ends with one basic question: Who will be the guest? It is a simple question but demands considerable attention to consider in this competitive industry. This question will lead to an in-depth analysis which will have a vast influence in deigning hotel guestrooms. Hoteliers have been experiencing an increase in guests bringing their personal electronics devices with them when they travel. Devices such as laptops, portable game consoles and entertainment devices such as iPod are a common sight in hotel guestrooms. There has been an increasing trend on the number of tech savvy guests connecting their personal devices into the in-room entertainment systems. This can be further explained why hoteliers, according to Brewer, Kim, Schrier and Farrish (2008), that one of the most important goals to enhance the guest experience was to use technology such as Wi-Fi hotspots.

        Hoteliers and management are constantly facing the challenge to keep up with the rapid changes in technology; especially for the in-room technology. With the increasing in wired and wireless consumers who use the latest technology in their own homes, the need to keep up and provide such sophisticated systems in the hotel room continues to grow in order to meet the guests' expectations. However, in such a complex and dynamic environment, knowing and deciding what systems and infrastructures to invest in is a real challenge; not to mention limited budget allocation and to determine the return on investment has become increasingly difficult.

<center>32</center>

Deciding hotel in-room technology

Part of the problem with guestroom technology has always been is providing enough of it to meet the guest's expectations without letting it become obtrusive and at the same time to be friendly-user. This has become more acute as guests' expectations have risen with the increasingly sophisticated technology they have at home and carry with them.

Hoteliers may install their guestrooms with latest technologies such as a walking alarm clock, a digital guest room console with built-in energy management system, a high-definition LED television, and audio/video ports for guest use. Other amenities such as universal cell phone charger, an automatic mini-bar system, an RFID enabled beverage dispensing system, and an electronic concierge. All these technologies could be ideal for business travelers but will these be enough for them or are they "over loading" with the different types of electronics devices or technologies in the guestrooms for the guests? How about leisure travelers? Will all these technologies appeal to them? Regardless of the types of guests, they have high expectation of guestroom services, with high functionality and easy to use.

Finding the right selection of guestroom technologies has always been a balancing act between functionality, budget and the different types of target market segments which hoteliers will have to consider before investing into technologies to upgrade their hotel guestrooms or enhance their guests' experience.

The desire to create the guestroom a home away from home has become more difficult with increasingly sophisticated modern technologies and devices use by consumers. It is not realistic to duplicate the home environment into a guestroom as most

home installations are customized individually while the hotel guestrooms need to be carried out in large scale. However, the traditional wired telephone will not go away according to Bill Hazelton of TeleMatrix. This is because the telephone is primary for security and safety. This is also echoed by Mike Timar, director of new product and solution development for Panasonic; which the phone is required for an emergency situation (Freed, 2009a). However, providing quality fundamental items that are easy to use and connect with the guests' portable devices will result in a satisfying and fully acceptable guest experience.

Meanwhile, hoteliers expect the return on investment for these technologies invested will have a positive impact on their bottom line. Those technologies they selected to enhance the guests' experiences must also be able to generate revenue (Brewer et al., 2008).

Balancing the hotel in-room technology
Constrain on hotel infrastructures

Some hotels have less flexibility as their infrastructures cannot enable strategy, connectivity, and new technology. Today's hoteliers know that one of the ways to enhance guest experiences, create new revenue opportunities, and optimize operations resources is to have modern technology that is able to integrate and converged communications network that leverages advanced wired and wireless voice, high speed Internet access (HSIA), video on demand (VoD), and Internet Protocol Television (IPTV). In addition, as both the format of content and range becomes more sophisticated, the infrastructure needed to support it has also grown. More sophisticated contents will usually require higher bandwidth. This will eventually requires the hotel to upgrade or

replace their existing old version of infrastructure network. All these upgrading and replacement will require a huge investment from the owners. Many of the existing hotels have their in-room amenities designed and developed since the mid- 1980s. For some hotels, technologies and amenities could have been updated, but many have never been redesigned or reconfigured to take advantage of the technology innovations of recent years nor could they? Most hotels are not able to upgrade to the latest technologies due to restriction on the building designs, the rooms layout and the old existing computer support systems infrastructures. The challenge for the hoteliers will be to change existing infrastructures so that it will be able to accommodate new technologies.

If hoteliers are able to establish communications infrastructure to provide connectivity for hotel based applications and effectively manage the communications infrastructure with modern technologies; besides reducing cost of infrastructure and interfaces, it will provides a more reliable interfaces to their in-room devices as well as the ability for guests to connect their entertainment devices that they carry with them during their stay in the hotel.

Different generations of guests

Baby boomers

For the next 10 years, the three generations, baby boomers, Generation X and Generation Y will bring three different sets of technology requirements into the hotel. The baby boomers belong to a group that requires something reliable and consistent. They are less experimental or adventurous. They would prefer devices and technologies that allow them to "plug and play" without going through the process of reading the

operating manuals. However, they will have more income at their disposal and will be willing to spend it on luxury travel experiences as they enter retirement age.

Generation X

Generation X is now adults between the ages of 29 and 41. Key characteristics of Generation X include: quest for emotional security, independent, informality, and entrepreneurial ("Generation X," 2005). Generation X is entering their peak-earning years and they are the future business travelers.

According to D.K. Shifflet & Associates, Generation X is already the most free-spending of leisure travelers. They outspend baby boomers on trips involving a hotel stay. In 2004, Generation X spent roughly $1,297 per trip per person, compared with baby boomers' $1,155 (McMahon, 2005; De Lollis, 2005).

Generation X wants branded items. For example, they want Starbucks, not just regular coffee. As they are not brand loyal, they are willing to search persistently to find a place to stay that has style, rather than book the same chain hotel they used on family vacations in the 1980s (De Lollis, 2005). Gen X is the current business traveler and the traveler of tomorrow. Hoteliers are already working on how best to design their guest rooms to accommodate them.

Generation Y

The up and coming of Generation Y is also a large population and will be more dependent on the portability and connectivity of their technology devices in the near future (CeME, 2005). Gen-Y guests are an emerging market that is unique from Gen-X and the baby boomers. They execute their tasks, purchase event tickets, movie tickets and book hotel rooms through their mobile devices and not so much through the websites.

Hotels must offer mobile-friendly online contents such as online room reservations and amenity booking which must be mobile-enabled. Therefore it is necessary for hotels to ensure reliable internet connectivity throughout the hotel premises.

With the market consists of different generations, how and what the hoteliers can do to attract this different generations of guests with their different designs and technologies they can adopt for their guestrooms in order to attract and build a long term relationships with this group of guests? The question for hoteliers to consider is which of their characteristics are present because they are young and which will persist as they age. If hoteliers are looking to separate their design entertainment habits by generation, recent studies also show this cannot be identified easily (McGinty, 2009). However, within the three very different generations, they are unified in their use of technology by one attribute, that is their desire to access contents – whether voice, video, or data – wherever they are, whenever they want (CeME, 2005).

The Green generation

The next generation of guests has an inherent awareness of environmental responsibility and expects hotels they stay will somehow engaged in activities that will reflect social responsibilities and have positive impact to the environment. In view of this, hotels going green are no longer a trend, but rather a necessity so as to be part of the integrated decision made by guests to stay in the hotel. In order to have a sustainable business model for hotels, not only the hoteliers must have the right devices and the technology such as energy saving equipment or devices in the guestroom, but also able to meet the daily operational strategy for the property (Chandnani, 2010).

Market segments

In today's market, it is not enough for a hotel to cater just for business travelers or just for the leisure travelers. People are doing business while they play, and they are playing while they travel for work. Leisure travelers also work while they are on vacation. People want to go beyond their routine: They want a promise of transformation. In-room technology is one of the most important design considerations for hoteliers to leverage on in order to enhance the guest's experience in their hotels.

Multigenerational travel

The trend of playing-while-working will parlay into multigenerational travel. As the trend for parents having to work even during vacation being more common, there will be an increased in situations where extended families will be traveling together. For this group of travelers, besides having larger rooms, hoteliers will need to have different amenities and different in-room technologies to meet their needs since they have different age segments which require different unique experiences, needs and expectations from both as a family and also as an individual.

Moving target

Investing in in-room technologies not only improved the property business, it is a necessary cost of doing business in today's market. Hoteliers understand that there are inherent risks in making significant technology investments because it is a moving target. The upgrading and changes of modern technologies for the guestrooms are mostly guest driven, such as the flat screen televisions, Internet protocol television (IPTV), and self service kiosks. Higher end properties and a more refined customer initiates the changes made within the industry (Connolly, Sigala and Buhalis, 2001). However, with customer

market segments being so diverse, will hoteliers upgrade their in-room technologies and amenities just to cater only for the more refined customers? How about the leisure travelers, do they need this modern technologies and high-tech amenities and are they willing to pay for it if they do not need them?

In today's hospitality industry, it is very difficult to identify or guess if they are business or leisure travelers. There is no clear indication to separate these two groups of guests. In this aspect, what type of in-room technologies and amenities can hoteliers be able to offer to these guests since it is not easy to identify the difference between the business and leisure's travelers?

More bandwidth

Guestroom technology has become more complex due to proliferation of guest-facing services for entertainment, environmental controls, internet protocol phones and internet access. To simplify compatibility, enable two-way communication and catch up with what guests have in their homes, most hoteliers chose to converge through IP platforms. Guests are utilizing the Internet for almost everything from general web surfing to streaming movies to high end gaming. The Internet is leading the way for new entertainment technology. Online entertainment devices such as smart phones, laptops, and gaming consoles are used to download movies, games, music, photos or access to social media; all through the use of internet access (McGinty, 2009). In order to have all these connectivity, hotels will need to have more bandwidth to meet the demand.

Proliferation of contents

The proliferation of content modes – from short-form, mobile optimized content to long-form HDTV, together with the growing number of unique ingest and multiple

output channels is taxing not only the content providers but also the increasing demand for more bandwidth.

The demand for high speed internet access (HSIA) continues to grow with guest internet use, and hoteliers need to be armed with more bandwidth to meet guests' needs. This is an area where hoteliers; both luxury and economy properties must not neglect. Hoteliers need to have more bandwidth due to the demand for high speed internet (HSIA) (Parker, 2009). HSIA has become the fundamental technology offering in hospitality as the "fourth utility" in the guestroom. It becomes so essential in the hotel room as light and water (Hopkins, 2009). With the continuous evolvement of high-tech technologies and devices, will there be also an ever increasing demand for more bandwidth? How do hoteliers continue to meet the increasing demand for more bandwidth required by the guests?

Increasing Guest Expectations with Technology

Beyond the need to update infrastructure, there's a growing demand from technology-dependent business travelers for greater connectivity and functionality in hotels and guest rooms. For these travelers, Smart phones, pocket PCs, tablet PCs, and wireless connectivity are standard equipment at work and at home, and the ability to stay connected while on the road is a central factor in decisions about where to stay. To remain competitive, hotels must be able to provide the same technology capabilities that guests have come to expect in the office and at home.

Having more bandwidth, however, is just one piece of the puzzle. If a guest cannot or have difficulties to connect to the network, then more bandwidth does not make a difference. In order for high-speed internet access (HSIA) to be successful for a hotel,

the internet access connection must be reliable, stable and secured when it is used to complementing and enhancing the guest experience and expectations.

Planning for the future

Not many hoteliers had the means to invest in replacing the legacy systems and proprietary technology they rely on to manage operations due to limited budget or other constrain from the management. More recently, organizations across the lodging industry have begun to take a serious look at the long-term value that investments in technology infrastructure may offer. However, they face a wide range of important questions. Is client-server still the answer? Should Web-based technologies be considered? What about hosted products? Will the technologies they invested in be phased out before they can recover their return on investment? Many in the industry are looking for guidance from major technology players to help them determine the best choices for new technologies to enable them achieve their business goals.

Integrated network

Today, with the evolution of technology, hotel operators know that one of the ways to improve guest experiences, create new revenue opportunities, and optimize operations is with an integrated, converged communications network that leverages advanced wired and wireless voice, high speed Internet access (HSIA), video on demand (VoD), and Internet Protocol Television (IPTV) (Alcatel-Lucent, 2009).

Technology verse human

Hoteliers ultimately must not forget that they are in the hospitality industry. It is a people business. While technology offers great opportunity for the hotelier to enhance guests' experience in their guestroom and increase room revenues, the humane touch from the

staff providing the services to the guests are extremely important as well. . According to Mr. Simon Cooper president and COO of The Ritz-Carlton Hotel Company, the company will never want to place a check-in kiosk in the lobby of a Ritz-Carlton; nor will the guest receive a wake-up call from an automated machine but from the staff themselves. No matter how advance is the technology, it will never replace or engage better than the staff who serve the guests (Financial Times, 2007).

Technologies as drivers of business

According to Connolly et al., 2001, information technology must be aligned with key strategic drivers of the business. Hoteliers should not deploy technology for technology's sake. There must be a sound business model to support the use of technology in order to enhance the organization values, enhances customer service, and lasting loyalty while differentiating and stand out from the competitors.

Conclusion

With technology evolving in such a rapid pace, the key requirement for hotel's general managers and information technology directors in enhancing the guest experience is staying ahead of changes. The challenge here is in keeping up with the customer. Increasingly, technology is being taken out of the hands of the hotelier and put into the hands of the guest allowing them greater control over their individual experience. Technology is changing rapidly and it is far easier for an individual to adapt than a corporation however forward thinking it may be.

Choices and options

Like most service industry, it is exposed to overwhelming set of choices, options, and price levels. These resulted for the average traveler with no clear difference in value

between a limited-service property, a long-term stay property, a luxury hotel, and an all-suites hotel. Hotels that depended to capture a large portion of a certain segment have seen a persistent erosion of their market share.

Brands and trends

The proliferation of new brands, concepts, and trends in the hospitality industry has made it difficult for consumers to clearly understand the price and value proposition that any particular property offers. Guest Empowerment Technologies, or commonly known as GET is make up of various types of technologies. One such technology is the in-room entertainment systems. Hoteliers not only reduce costs but also increase customer satisfaction through the use of multiple types of GET. It is found hotels applying these technologies are gaining market shares to those that do not (Erdem, Schrier, & Brewer, 2009).

Uphill tasks

There is a need for lodging organizations to create new differentiation strategies to retain today's loyal customers and attract a new generation of repeat guests. Making use of technology to provide a memorable guest experience is so simple. However, "guest experience" is pretty ambiguous, and what is becoming very clear is that the guest experience is fast changing and selecting the right technologies and devices will increasingly be a prerequisite in making it a success as well as a challenge and uphill task for the hoteliers and owners.

Hotels cannot afford not to invest in technology; whether it's the latest gimmicks or the behind the scenes bits that make operations run smoother. Getting technology right so as to enhance rather than impairs guest experience is a balancing act, however, but a

necessary one. Entertainment technology is dynamic. Whatever technology hoteliers invest today, they must be scalable for the future. They have to look for the common denominators in their entertainment habits of the guests now and their needs for tomorrow (McGinty, 2009).

Ultimate solutions

Therefore there is no one right answer for what an in-room entertainment systems or technology should consist of. Guest facing technology is part of what make the property unique. One of the major tests is the need to charge for internet usage. The costs will continue to increase due to the ever increasing demand for more bandwidth and also the need for high-definition multimedia systems. Regardless of their purpose of travel, traveling alone or with their families, or age, having the base technology to cater to the entertainment desire of each individual is not an option but a necessity.

The goal of the hotel room of the future will be to address the needs and anticipate the expectations of all travelers, including business and leisure. However, the focus on the guestroom of the future begs the question of whether hoteliers can accurately predict what is coming up in the future as far as technology, and whether it is possible to prepare for it.

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