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An Importance-Performance Analysis of Multigenerational Preferences in Guestroom Technology

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AN IMPORTANCE-PERFORMANCE ANALYSIS OF MULTIGENERATIONAL
PREFERENCES IN GUESTROOM TECHNOLOGY

By

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of the requirements for the

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William F. Harrah College of Hotel Administration

The Graduate College

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ABSTRACT

An importance-performance analysis of multigenerational preferences in guestroom

technology

by

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This study focuses on generational preferences in terms of guestroom technology. The hospitality technology industry has indicated guestroom technology as their highest priority in terms of hospitality technology investment. Previous studies have investigated in-room technology amenities and ranked them in order of importance and performance. However, it is uncertain which guestroom specific technologies should they invest in when it comes to different generations. Each generation is fundamentally different from the others because each generation was born in different eras with different societal changes. These generations have different values, ideas, needs, and communication skills. Hoteliers are investing time and money into technology but are they making the correct investments for their desired target markets? In order to shed light in this area of research, this paper presents a thorough review of the literature on guestroom technology studies and proposes research on guestroom technology's importance and performance across generations.

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PART ONE: INTRODUCTION

The hospitality industry is a slow adopter of technology (Harmer 2013; Inge 2014) even though technology has been present in hospitality ever since the 1970s (Collins & Cobanoglu, 2008; Erdem, Schrier, & Brewer, 2009). Hotels frequently use outdated technology that could be unreliable and inefficient, but do not choose to replace it with newer technology. What justifies their decision is that their current technology continues to provide adequate function to everyday operation (Inge 2014). Inge (2014), a property technology consultant, discuss that hotels do not invest in technology because hoteliers are not familiar with technology items and relatively few top level managers are technology literate. Other common reasons for not adopting new technology include high financial cost, difficulty to adopt, and the rapid obsolescence of present technology (Singh & Anjana, 2012). Nevertheless, investing in technology is critical to the hospitality business since it can increase revenue, enhance guest experience and market the product accordingly (Vining 2012). In addition, hoteliers should use technology to improve efficiency and service quality based on customer profile (Ruiz-Molina, Gil-Saura, & Moliner-Velazquez, 2011) and one form to categorize customer profile is through generational cohorts. However, hoteliers do not have data on the technological needs of the generational cohorts for their guestroom. Each generation is fundamentally different from the others because each generation was born in different eras with different societal changes; their differences include values, ideas, needs, and communication skills (Stanley, 2010). The same idea applies for their views and their ease of use of technology. First came the switchboard operators, then came the landline telephone, next were the mobile phones and today we have the smartphones (Stanley, 2010). Based on

Maslow's Hierarchy of Needs, a study of the relationship between technology and generations was conducted to investigate if certain technologies have become human needs (Dunmore, 2013). For instance, 67% of Baby Boomers, 74% of Generation X and 48% of Generation Y ranked the cell phone and other technologies as a primary need (Dunmore, 2013). Therefore, we can expect each generation to have different preferences for their guestroom technologies.

The research from Lodging Technology 2013 identified guestroom technology as the number one information technology (hereinafter IT) investment in the hotel industry (Erdem, Schrier, Nusair, & Cobanoglu, 2013). To have a successful business, hoteliers need to understand how consumers perceive the product or service attributes (Chu & Choi, 2000), in this case the guestroom technologies. Through the study of strengths and weaknesses of the guestroom technology and precisely defining their importance and performance, the hotel can gain competitive advantage in the zealous hotel industry. This paper attempts to identify both the importance and performance of guestroom technology through four generational cohorts using the Importance-Performance Analysis (hereinafter IPA). This study will explore the generational differences with the goal to identify the top preferred guestroom technologies for each generation.

Purpose of the Study

The purpose of this paper is to identify and evaluate guestroom technologies across each unique generational cohort. The findings of this study will provide valuable insights for hotel managers in terms of strategic decision making when upgrading or purchasing guestroom technologies. Consequently, the investment of guestroom technology will be cost saving, efficient and practical as the hoteliers would know which technologies to invest in. The frequency use of the specific technologies will also be examined as it will provide information on how often certain technologies are used by each generation.

Statement of the Problem

Technology is an important part of the hotel industry and hoteliers should know which guestroom technologies should be strategically positioned in the guestrooms based on customer profile. Each generation has its own identity and its own preferences, but hoteliers do not have information on which technologies are the most important to their guest across different generations.

Research Questions

After a thorough review of related literature the following research questions were formulated.

1. Which guestroom technologies are important for guests across generations?
2. How did guestroom technologies perform across generations?
3. How often were guestroom technologies used across generations?
4. Would guests pay more for state of the art technology?
5. What is the acceptable price point for newer technology?

Significance of the Study

Academic Significance: Previous studies have researched guestroom technology, but did not look further into the generational preferences for in-room technology. This study gives an update to similar studies by including newer technology and investigates all the generational cohorts since Baby Boomers and up to Generation Z, which has not been previously considered.

Practical Significance: Hoteliers gain the ability to determine which and where guestroom technologies should be strategically placed into the hotel rooms depending on the guest generational profile. Baby Boomers, Generation X, Generation Y, and Generation Z may prefer different technologies and this study attempts to lay out which guestroom technology should be placed in the guestroom. It is critical for the hoteliers to understand guest technology preferences. Access to this information may give the managers the advantage of being one step ahead while providing the hotel guests with access to their preferred technologies.

Definition of Terms

Prior to any detailed discussion of technology and generations, the following terms have been defined in order to gain a better understanding of this study.

Generational Cohorts: “Encompasses all individual cohorts and organize them by peer personality into basic building blocks of social change” (Strauss & Howe, 1991, p .57).

- Baby Boomers: Group of individuals born between 1943 and 1960 (Strauss & Howe, 1991).
- Generation X: Group of individuals born between 1961 and 1981 (Strauss & Howe, 1991).
- Generation Y (Millennial): Group of individuals born in 1982 and 2002 (Strauss & Howe, 1991).
- Generation Z: Group of individuals born in 1995 and 2010 (Singh, 2013)

Guestroom Technology: Technologies that are found within a hotel room in order to replicate home based technologies (Beldona & Cobanoglu 2007). Guestroom technology is also synonymous with in-room technology.

Importance-Performance Analysis (IPA): A managerial/tactical tool that is used for analysis and evaluation of marketing strategies (Martilla & James, 1977).

PART TWO: LITERATURE REVIEW

Introduction

Identifying the accurate market segmentation for the hotel can present a comprehensive understanding of the demand base (Bisema, 2009). If the hoteliers know who their customers are then they can produce profit by avoiding costly errors such as providing services for which there is no demand (Bisema, 2009). The basic markets that all hotels try to segment are business and leisure markets (Bisema, 2009; Chu & Choi, 2000). Nonetheless the purpose of travel is not the only method to differentiate the market. The literature (Dumore, 2013) tells us that technology preferences vary across generational cohorts. As expected, hotel guests differ in their preference for the hotel type service, needs, desires and expectations. Therefore, it is possible that technology preferences for hotel guests could differ based on other demographics.

The Lodging Technology Study 2013 reports that the top five reasons why hotels invest in technology are: revenue growth, guest service enhancement, operational efficiency improvements and competitive advantage. These findings represent the benefits for investing in technology (Erdem et al., 2013). The same report showed that 19.7% of the IT dollar spending was invested in guestroom technology, which ranked number one technology investment across the U.S. (Erdem et al., 2013). The scheduled list of guestroom technology upgrades include increasing bandwidth, wireless Internet access, HDTV, Flat screen TV, Energy management, Voice over Internet Protocol Phone, Room Control Device, Electronic Locking System, iPad/Tablet, and 3D TV (Erdem et al., 2013). Despite that, there is no information available to which generations of consumers are more likely to use these technologies. The 2014 edition of the Lodging

Technology study used IPA and found that guestroom technology was a the most important technology area for guests but it did not perform that well to the satisfaction level of the guest (Erdem, 2014).

Given the above findings, guestroom technologies are priorities that hoteliers should focus on. However, it is still a challenge to determine if the planned guestroom technology upgrades match the needs of the generational cohorts. It is to the hotelier's advantage to have strategic understanding of the differences in hotel guestroom technologies across the generational cohorts.

The remainder of Part 2 will focus on previous studies and provide comprehensive literature review relevant to the current study. The two primary themes of this chapter shall be guestroom technologies studies and generational needs in technology studies. Lists of current and emerging technologies shall be provided to inform the reader of specific technologies in the hotel industry. In addition, significant findings of previous studies on in-room technology will be included. Finally, IPA will be discussed in relations to guestroom technology.

Guestroom Technology Literature Themes

There are reoccurring themes in terms in the literature when it comes to guestroom technologies. The common labels/terms the authors use include guestroom technology, GET, and technology-influenced guest satisfaction.

Guestroom Technologies

There are mainly two types of hotel technology: The managerial & operational technology that creates efficiency and cost-saving functionalities and the in-room guest service technology which improves the experience of the guest. Guestroom technologies' purpose is to replicate existing home based technologies into the hotel guestroom (Beldona & Cobanoglu 2007). The primary purpose is for the guests to feel as comfortable as they would if they were at their own house without forgetting the safety and entertainment elements that come with it. Even though guestroom technologies can provide efficiency, customer satisfaction and increase in revenues, some hoteliers choose not invest in them (Vining 2012). The first issue before investing is often exploring the costs of the investment (Singh & Anjana, 2012) and most hoteliers are not experts in technology-innovation as they do not want to spend their resources in research and experimentation of new technologies. To address that issue a special exhibition booth was designed during the annual hospitality technology conference HITEC in 2006. That exhibit was formerly known as "Guestroom 2010" which replicated a hotel room that had leading edge and futuristic guestroom technologies (GuestLINK™ Rebrands to G-LINK™ with Sleek Style and Powerful Connections, 2012). The 2012 edition of this exhibit was named Guestroom 20X and it featured not only futuristic technologies such as in room artwork that changes according to the guest's mood but also realistic

technologies such as upgraded versions of desktop lamp that is also a mobile device charger (G2X Guestroom 20X, 2012). By introducing this tangible environment where attendees of the conference can see and interact with such technology, would as result drive discussion on the possibility and feasibility of each technology presented (G2X Guestroom 20X, 2012).

According to Nasoz (2011) having new in-room technologies can impact the consumer behavior because it affects their decision of hotel choice. In the same study it was found that different generation set a different importance to different technologies (Nasoz, 2011). Therefore having the right technologies ready for the right generations would possibly drive their choice towards the specific hotel.

Guest Empowerment Technologies (GET)

Business organizations' bottom line is to make profits and two ways to achieve that goal is to increase productivity and lower operational costs (Green & Skinner, 2005). For that reason, these businesses invest in self-service technologies that can achieve those goals. Guest Empowerment Technologies (GET) are technologies that have replaced mundane services that were once performed by employees (Schrier, Erdem, & Brewer, 2010). These services were unnecessary, inefficient and could be easily replaced with technology in order to increase productivity and customer experience (Doyle, 2007). GETs are classified under self-service technologies (Schrier et al., 2010) as they can allow hotel guests to have personal experience with certain technologies that provide some form of convenient service without the interference of a hotel employee (Meuter, Bitner, Ostrom, & Brown, 2005). Examples of self-service technologies include

convention touch screen displays, hotel self-check-in and/or check-out kiosks and grocery self-check-out counters. Technologies specific to GETs include in-room entertainment systems, in-room check-out systems and also on-demand business services (Schrier et al., 2010). The presence of self-service technologies has empowered the guests with choices that have made them active participants to the product delivery process.

Schrier et al. (2010) used structural equation modeling to determine the most popular entertainment GETs through the methodologies of task-technology fit and technology acceptance model (Schrier et al., 2010). The task-technology fit model measures the level of certain technology that can assist the individual in performing certain tasks (Goodhue & Thompson 1995). The technology acceptance model can determine the perceived usefulness and ease of use of a certain technology (Davis, 1986). By utilizing a hybrid model of both methodologies this study was able to better indicate the acceptance level for these technologies. Their study concluded that in-room movies and on-demand services were the top entertainment GET and should be necessary amenities in the hotel room (Schrier et al., 2010). Nonetheless, this study did not differentiate which generations would most likely use these entertainment GETs. It is inconclusive if in-room movies and on-demand services were the technologies that every generation would need to have in their guestrooms.

Technology-Influenced Guest Satisfaction

According to Lodging Technology 2014 study, the most critical challenge that technology departments face is that guests expect greater technology advancements than hotel IT managers can reasonably keep up with (Erdem, 2014). Technological advancements such as in-room technology has been found to drive overall guest satisfaction (Cobanoglu, Berezina, Kasavana, & Erdem, 2011). Hoteliers promote hotel technologies to guests as added value amenities that can give a competitive advantage, increase customer satisfaction, and increase customer loyalty thus sustaining repeat business (Cobanoglu, Ryan, & Beck, 1999). Satisfaction is the post-purchase evaluation of good or service quality when the consumer had pre-purchase expectations about that good or service (Kotler, Bowen, & Makens, 2003). Business could achieve customer satisfaction if the post-purchase evaluations indicate higher service quality than the guests expected service quality (Kotler et al., 2003). Satisfied guests will have positive experiences which can lead to them coming back and use word of mouth to promote the services to their acquaintance who might in turn seek the same positive experiences.

A study investigating technology amenities and hotel guest overall satisfaction found that Internet access, business essentials (business center services, express check-in check-out etc.) and in-room technologies (game systems, universal battery chargers, etc.) had a significant positive relationship with overall guest satisfaction (Cobanoglu et al., 2011). The results showed that in-room technology amenities can significantly impact overall guest satisfaction which in turn affect guest retention (Cobanoglu et al., 2011).

On the other hand there have been studies that showed certain technologies do not always lead to satisfaction but in fact those technologies increase guest dissatisfaction

(Cobanoglu, 2009). Those technologies were not easy to use and might be too complicated for certain guests. In a study of Korean hotel technology, call accounting, electronic locks, energy management, in-room entertainment, in-room vending and information services were found to have no relationship with overall satisfaction (Ham, Kim, Jeong, 2005). Cobanoglu (2009) mentioned that green technology such lower water pressure in the shower dissatisfied certain guests because having lower pressure would make them take longer showers to thoroughly clean themselves. In another study, comfort technologies such as in-room electronic safe, guest control panel etc., were not likely to impact guest satisfaction (Cobanoglu et al., 2011). Technologies have strengths and weaknesses and it might satisfy one group of guests while dissatisfying another. It is important to understand which guestroom technologies increase satisfaction and which decrease satisfaction so the managers can strategically place the appropriate technology for the appropriate guest in order to provide a positive guest experience.

Generational Disparities

Introduction

Raymond (2012) mentions that similar aged groups are defined through their actions and traits by two factors. The first factor is their social and historical events that they experienced in a period of time (Raymond, 2012). Those global events could be wars, international sporting events, economic cycles, acts of god, and events that affect people on a large scale. The second factor mention by Raymond (2012) is their stage of life as people personality matures and changes from childhood to adulthood. During the change of stage of life their needs, wants, desires and ambition also changes. A child might love and play with certain toys but those items would not interest the child when it reached adulthood. Each generation has different ideas, needs, wants, values, and communication skills (Stanley, 2010). With that said, each generation must also have different needs of technology. This difference in technology needs is called the digital divide and it is prevalent among different age groups, income and educational levels (Zickuhr& Smith 2012). Since the digital divide exists among different age groups this paper will look into which guestroom technologies are preferred by Baby Boomers, Generation X, Generation Y and Generation Z. The generational cohorts were originally created so marketers could understand consumers better in order to meet their needs and sell the right products to their desired target markets. The literature on generations is based on the United States population thus it cannot be generalized to other countries.

As shown in Table 1, there has been no consensus on the universal interpretation and birth range for each generation. Each of the research articles below shows few years of overlap between each generational cohort. By investigating previous literature, it can be safely said that the gap between each generation encompasses approximately 15 to 20 years. When the following articles were written, Generation Z was not included because it was relatively news and un-researched topic thus Table 1 does not include this generation.

Table 1. Interpretation of Generations

	Baby Boomer	Generation X	Millennial
Howe and Strauss (2000)	Born 1943-1960	Born 1961-1981	Born 1982-2002
	Baby Boomer	Generation Xers	Generation Nexters
Zemke, Raines, and Filipczak (2000)	Born 1943-1960	Born 1960-1980	Born 1980-2000
	Baby Boomer	Generation X	Nexters
Crampton and Hodge (2007)	Born 1947-1967	Born 1970-1980	Born 1980-1999
	Baby Boomer	Generation X	Generation Y
Tulgan and Martin (2001)	Born 1946-1962	Born 1963-1977	Born 1978-1984
	Baby Boomers	Generation Xers	Millennials
Lancaster and Stillman (2002)	Born 1846-1964	Born 1965-1980	Born 1981-1999

Note: This table was copied from Dunmore, D. (2013). *Has technology become a need?*

A qualitative study exploring three generational cohorts' perception of technology in regards to Maslow's hierarchy of needs. (Ph.D., Capella University). Retrieved from ProQuest Dissertations and Theses.

Table 2 discusses identified sociological and psychological characteristics of the generational cohorts from the literature. Currently, the most populated generation is the Baby Boomer who reaches 79 million in the United States. The order from the most populated to the least populated generation is Baby Boomers, Generation Y, Generation Z and Generation X respectively. Synonyms for each generation come from similar experiences that they have encountered during the lifetime. For example, Generation Y is most commonly known as Millennial as they were born close the turn of new millennial year 2000 (Strauss & Howe, 1991). The birth range used is taken from the researchers in the noted section. The observed traits from each generation show their sociological and psychological attitudes. Influencers are people or events that had a significant impact on each generation and thus their values are derived from those influencers. Technology plays a major role because for each generation it has a different effect.

Table 2. Characteristics of each Generation

	Baby Boomers	Generation X	Generation Y	Generation Z
Cohort size	79 million	46 million	76 million	66 million
Other Names	Shadow Boomers, Cold War Generation	Gen Xers, MTV generation	Millennials, Baby Busters, Nexters	iGeneration, GenTech, Digital Natives, Gen Next,
Birth range	1943-1960	1961-1981	1982-2002	1995-2010
Traits	Competitive, workaholics	Skeptic, individualistic, risk-takers	Realistic, socially aware, educated	Optimistic, socially responsible,
Influencers	Dr. Martin Luther King Jr., Richard Nixon, John F. Kennedy	Michael Jordan, September 11th, Bill Clinton	Technology, Barney, globalization	Social media, technology, Steve Jobs, smartphones
Values	Opportunity, equality	Work/life balance, independence	Teamwork, diversity, social change	Green, Online, Connected
Technology	Adapting	Skilled	Savvy	Tech Dependent

Note: Adapted from Dunmore, D. (2013). *Has technology become a need? A qualitative study exploring three generational cohorts' perception of technology in regards to Maslow's hierarchy of needs.* (Ph.D., Capella University). Retrieved from ProQuest Dissertations and Theses. Raymond, A. (2012). Here comes generation Z. *CabinetMaker+FMD*, 26(4), 20-21. Singh, S. (2013) Generation Z: Rules to reach the multinational consumer. *Sapient*.

Baby Boomers

Currently, Baby Boomers have the highest population in the U.S. reaching approximately 79 million (Strauss & Howe, 1991). The name was derived from the many babies born after World War II even though experts predicted low birth rates (O'Bannon, 2001). The birth range for the Baby Boomers according to Strauss and Howe's (1991) interpretation is between 1943 and 1960. It is important to note that television was first commercialized in that period of time and in 1950 as it became the main media for public opinion (Diggs-Brown, 2012). Other events include the landing of the first man on to the moon, experiencing the cold war and the civil rights movement. This generation valued hard work and worked with others but because of technological advancements the tasks they did became obsolete thus becoming unemployed (Wieck, 2007).

It was reported that older generations such as Baby Boomers would most likely be dissatisfied with technology because of the older age (Cobanoglu, 2009). It was found that older generations just wanted simple and essential technologies while younger generations were three times more likely to use newer technologies (Cobanoglu, 2009). The younger generation was also more satisfied with these technologies in comparison to the older (Cobanoglu, 2009). On the other hand more recent studies have shown that Baby Boomers use of Internet and online presence has increased over the years (Zickuhr, 2010). More than 40% of this generation has social network profiles according in Zickuhr (2010).

Generation X

The birth range defined by Strauss and Howe (1991) for the Generation X is between 1961 and 1981. This generation has approximately 46 million people who are much fewer in comparison to the previous generation. The “X” in Generation X shows the rebellious nature of this generation by showing anonymity and defiance to a given name (Beutell & Wittig-Berman, 2008). Baby Boomer valued teamwork but Generation X was opposite in the sense that they liked to do things by themselves (Lancaster & Stillman, 2002). Leadership and individual success can be seen in people from this generational cohort such as Michael Jordan. Technological advancements in this time period include cell phones, personal computers, fax machines, and microwaves (Lancaster & Stillman, 2002).

In terms of technology Generation X are considered tech savvy (Zickuhr, 2010). For 2010 statistics, Zickuhr (2010) identified that more than 60% of this generation uses social media, 66% have watched online videos, and 58% listen to music online. This generation is independent and they do not require help with technology. Their nature tells them to learn by themselves thus becoming tech savvy in the process and be able to use most of the technologies.

Generation Y

More commonly known as Millennial, the Generation Y has approximately 76 million individuals (Strauss & Howe, 1991). Naming Generation Y as Millennial comes from the fact that they were born before the beginning of the new millennium year 2000. Crampton and Hodge (2007) consider them as the most educated generation to enter the work force as their parents taught them the value education. Wieck (2007) has mentioned that generation is not afraid to show their emotions and very comfortable with their decisions. Open minded, diverse, inclusive and patient are how they are described in the literature (Wilson, 2008; Smith & Clark, 2010). Depending on the interpretation for the birth range of the Millennials, they could either surpass or be slightly less than Baby Boomers meaning that as a generation they have significant impact in decisions that affect the world.

Generation Y is also tech savvy as this group of individuals grew up with technologies such as computers and cell phones (Lancaster & Stillman, 2002). Zickuhr (2010) has mentioned that Generation Y is more engaging with technology than the previous generations as 80% of the millennial has viewed online videos. The technologies that surround them the most are Internet, cell phone, computers, and video games. Consequently, having access to those technologies it means they also have access to social media, which is a common form of communication for this generation. Technology is essential for Millennial as that how they have learned how to interact with others within the society.

Generation Z

According to Singh (2013) 20.1% of the U.S. population is considered as Generation Z, which amounts to approximately 66 million individuals. They are also called “digital natives” according to Grail Research (2011) because they were born and raised in a society of ever-present technologies. One of Singh’s (2013) observations included that this generation was heavily depended on mobile technology. For example at a children birthday party, all the kids spent more time with iPads (electronic tablets) than with playing physical games. This cohort is socially responsible due to their ability to instantaneously gather information online on global topics (Grail Research, 2011). Generation Z is relatively new and there is no specific birth range thus causing the overlap of years with the previous generation. There is literature that shows Generation Z’s birth range to start as early as in the mid 90s (Grail Research, 2011; Singh, 2013) but for the purpose of this paper their birth range will be between 1995 and 2010. It is important to note the overlap of birth range in the literature between Millennial and Generation Z because it causes both generations to share similar characteristics such as being technology savvy. The only agreement in the literature to the definition of Generation Z is that they are the generation that came after Generation Y.

For them, technology is their source of information and knowledge. It has become so essential that there are articles suggesting the implementation of technologies in the classrooms including video conferencing with guest speakers, using cell phones as clickers to use as polling and using social media to create groups for students to interact on class topics (Miller, 2012). Technological advancements have also increased pace as newer technologies are developed faster and adoption of technologies is higher (Grail

Research, 2011). This cohort is constantly connected and their way to communicate comes through technology. In conclusion, it is important to say that technology should also be present in the guestrooms for this Generation in order for them to stay connected.

Each generation is different from each other. Their ideas, needs, want, values, communication skills are all different (Stanley, 2010). Thus, their technology preference could also be different. The next section of the literature review will focus on showcasing and defining guestroom technology.

Existing and Emerging Guestroom Technologies

Introduction

Within literature there is an abundant variety of in-room technology. This section contains comprehensive list of in-room technologies gathered from qualitative and quantitative research. It will discuss and define each guestroom technology and elaborate on similarities and key findings from the literature. The contents in the Tables 3 and 4 are alphabetically sorted by the first column and include thirty eight (38) technology items.

Table 3 exemplifies a comprehensive list of items included in previous research studies that focused on in-room technologies. The first column identifies the listed guestroom technology, the second column gives a basic description of the guestroom technology and the third column provides the author/source of where the technology was derived from.

Table 3. Description of Existing In-room Technology Items

Guestroom Technologies	Descriptions	Authors
3D Television	TV that conveys depth perception	Nasoz, 2011
Additional Data Line Accessible To Desk	Wired line that connects to the laptop to the Internet network	Beldona, & Cobanoglu, 2007
Alarm Clock	Timing device that is designed to wake a person at a specific time	Beldona, & Cobanoglu, 2007; Cobanoglu, Berezina, Kasavana, & Erdem, 2011
Central 800 Reservation Number	Toll-free telephone number that is billed for all arriving calls	Beldona, & Cobanoglu, 2007
Connectivity Panels	Ability to plug in games, laptop, etc. into HDTV	Nasoz, 2011

Electronic Key Cards	Plastic card that can be used as door key	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011
Electronic Locking System	Use electronic media to access or lock the room	Nasoz, 2011
Express Check-In	Fast check in by using electronic device to enter the room	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011
Express Check-Out	Fast check out by enabling guest folio review, charge settle and check out through electronic panel	Beldona, & Cobanoglu, 2007; Nasoz, 2011; Cobanoglu et al., 2011
Guest Device Connectivity (Docking Systems)	Device used to allow guests to connect their devices to charge battery or enhance functionality	Bilgihan, 2009
High Definition Television	TV with higher resolutions and detailed pictures	Bilgihan, 2009; Nasoz, 2011; Cobanoglu et al., 2011
High-Speed Internet Access (HSIA)	Internet connectivity that reaches speed of at least 100 Mbps (Megabits per second)	Beldona, & Cobanoglu, 2007; Bilgihan, 2009; Nasoz, 2011; Cobanoglu et al., 2011
Increased Bandwidth	Ability to download more data	Nasoz, 2011
In-Room Accessible Outlets	Easily accessible power outlets	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011
In-Room Control Panel	Panel to control in-room amenities (e.g. temperature, lights, curtains)	Nasoz, 2011; Cobanoglu et al., 2011
In-Room Electronic Safety Boxes	Electronic safes that can be accessed through Personal Identification Number (PIN) or magnetic strip cards	Beldona, & Cobanoglu, 2007; Nasoz, 2011; Cobanoglu et al., 2011
In-Room Fax Machine	Device to process an image of a document and send it to another similar device	Beldona, & Cobanoglu, 2007
In-Room Fitness System	Physical exercise units (e.g. treadmill)	Bilgihan, 2009; Cobanoglu et al., 2011

In-Room Game System/Video Gaming	Electronic entertainment consoles that connect to the TV (e.g. Playstation, XBOX)	Bilgihan, 2009; Nasoz, 2011; Cobanoglu et al., 2011
In-Room Guest Empowerment Technologies	Self-service technologies	Nasoz, 2011
In-Room Personal Computer	Electronic device for storing and processing data	Beldona, & Cobanoglu, 2007; Bilgihan, 2009; Nasoz, 2011; Cobanoglu et al., 2011
In-Room Printer	Process of reproducing text and images	Beldona, & Cobanoglu, 2007; Nasoz, 2011
In-Room Temperature Control	Ability to control the room temperature	Beldona, & Cobanoglu, 2007; Nasoz, 2011
In-Room Video Viewing Of Guest Portfolio	Ability to view guest folio from a video screen	Nasoz, 2011
Internet TV	Access to Internet through the TV	Beldona, & Cobanoglu, 2007; Bilgihan, 2009; Nasoz, 2011
Music	Ability to listen to music	Bilgihan, 2009
Online Reservation Capability	Ability to reserve hotel room online	Beldona, & Cobanoglu, 2007
Pay Per View/Video On Demand	Digital media available to the guest on demand for a price through the TV (e.g. Music, TV Shows, Movies)	Beldona, & Cobanoglu, 2007; Bilgihan, 2009; Nasoz, 2011; Cobanoglu et al., 2011
Plasma Screen TV	TV that utilizes small cells that contain electrically charged ionized gases	Beldona, & Cobanoglu, 2007
Portable Or Speaker Phone	Telecommunications device that permits two or more users to conduct a conversation from distance	Beldona, & Cobanoglu, 2007; Nasoz, 2011
Promotional Video	Video of promotional opportunities from the hotel (e.g. discounts to restaurants)	Bilgihan, 2009
Remote Control TV	Electronic controller to manipulate TV	Beldona, & Cobanoglu, 2007

Telephone/Free-Long Distance Telephone Calls/Voice over Internet Protocol (VoIP)	Transfer of voice data through Internet protocol	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011
Universal Battery Charger	Flexible battery charger that accepts different types of ports.	Bilgihan, 2009; Cobanoglu et al., 2011
Video-conferencing Capabilities	Basic business center amenities in the room (e.g. computer, fax, copier)	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011
Voice Mail	Ability to leave message to the guest through a landline phone	Beldona, & Cobanoglu, 2007; Nasoz, 2011; Cobanoglu et al., 2011
Wireless Access To Hotel (Website)	Having available website address of the hotel	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011
Wireless Internet Access In Hotel	Access to the Internet through a Wi-Fi signal	Beldona, & Cobanoglu, 2007; Cobanoglu et al., 2011

Note: This table was developed by reviewing previous research articles including Beldona, S., & Cobanoglu, C. (2007). Importance-performance analysis of guest technologies in the lodging industry. *Cornell Hotel and Restaurant Administration Quarterly*, 48(3), 299-312. Bilgihan, F. A. (2009). *An analysis of in-room entertainment technologies in hotels*. Retrieved from ProQuest Dissertations and Theses. Nasoz, P. (2011). *What is mission critical in the hotel guest room: Examining in-room guest empowerment technologies*. Retrieved from ProQuest Dissertations and Theses. Cobanoglu, C., Berezina, K., Kasavana, M. L., & Erdem, M. (2011). The impact of technology amenities on hotel guest overall satisfaction. *Journal of Quality Assurance in Hospitality & Tourism*, 12(4), 272-288.

Existing In-room Technology

In order to document which technologies were covered by previous studies Table 4 was created. Table 4 offers a summary of technology items included in surveys of the four major studies that focused on guestroom technologies. Another purpose of the table is to identify technology items covered by all four studies. It should be noted that publication date of the four studies range from 2007 to 2011. Although a four year time span may not seem long in terms of technology advancements it represents a considerable amount of time. With that said, High-Speed Internet Access, In-Room Personal Computer, and Pay Per View are the only three guestroom technologies that have been studied in all four research articles. This is not surprising considering the increase in the variety of guest technology items due to advancements during this period. High speed Internet is essential because it keeps the guest connected, Pay Per View keeps them entertained and In-Room Personal Computer does both. The guestroom technologies that have been present in three research articles are Express Check-Out, High Definition Television, In-Room Electronic Safety Boxes, In-Room Game System/Video Gaming, Internet TV, and Voice Mail. The in-room technologies that have been studied in two articles are Electronic Key Cards, Express Check-In, In-Room Accessible Outlets, In-Room Control Panel, In-Room Fitness System, Telephone; Free-Long Distance Telephone Calls/Voice over Internet Protocol (VoIP), Universal Battery Charger, Videoconferencing Capabilities (Computer, Fax, Copier), Wireless Access To Hotel (Website), Wireless Internet Access In Hotel, In-Room Printer, In-Room, Temperature Control, Portable Or Speaker Phone. The rest of the technologies are only listed once.

Given the above pattern of technology items included in previous studies it is obvious that a new study focusing on this issue must include technology items vetted by subject-matter experts to ensure that the list of items studied are inclusive of existing technologies and not redundantly listing items that are no longer perceived as technology. For example, having a TV remote control or alarm clock is no longer considered a technology amenity but a must-have item no different than having a switch to turn on the lights in the guestroom. This proposed study wants to ensure that not only such redundant items are eliminated from such surveys but the latest technologies available for guests are also included. Having subject-matter experts review and finalize the list of items will help ensure capturing a better picture of guestroom technology usage in current times.

Table 4. Existing In-room Technology Items.

Guestroom Technologies	Beldona, & Cobanoglu, 2007	Bilgihan, 2009	Nasoz, 2011	Cobanoglu, Berezina, Kasavana, & Erdem, 2011
3D Television			✓	
Additional Data Line Accessible To Desk	✓			
Alarm Clock	✓			✓
Central 800 Reservation Number	✓			
Connectivity Panels			✓	
Electronic Key Cards	✓			✓
Electronic Locking System			✓	
Express Check-In	✓			✓
Express Check-Out	✓		✓	✓
Guest Device Connectivity (Docking Systems)		✓		

High Definition Television		✓	✓	✓
High-Speed Internet Access (HSIA)	✓	✓	✓	✓
Increased Bandwidth			✓	
In-Room Accessible Outlets	✓			✓
In-Room Control Panel			✓	✓
In-Room Electronic Safety Boxes	✓		✓	✓
In-Room Fax Machine	✓			
In-Room Fitness System		✓		✓
In-Room Game System/Video Gaming		✓	✓	✓
In-Room Guest Empowerment Technologies			✓	
In-Room Personal Computer	✓	✓	✓	✓
In-Room Printer	✓		✓	
In-Room Temperature Control	✓		✓	
In-Room Video Viewing Of Guest Portfolio			✓	
Internet TV	✓	✓	✓	
Music		✓		
Online Reservation Capability	✓			
Pay Per View/Video On Demand	✓	✓	✓	✓
Plasma Screen TV	✓			
Portable Or Speaker Phone	✓		✓	
Promotional Video		✓		
Remote Control TV	✓			

Telephone/Free-Long Distance Telephone Calls/Voice over Internet Protocol (VoIP)	✓			✓
Universal Battery Charger		✓		✓
Videoconferencing Capabilities (Computer, Fax, Copier)	✓			✓
Voice Mail	✓		✓	✓
Wireless Access To Hotel (Website)	✓			✓
Wireless Internet Access In Hotel	✓			✓

Note: This table was developed by reviewing previous research articles including Beldona, S., & Cobanoglu, C. (2007). Importance-performance analysis of guest technologies in the lodging industry. *Cornell Hotel and Restaurant Administration Quarterly*, 48(3), 299-312. Bilgihan, F. A. (2009). *An analysis of in-room entertainment technologies in hotels*. Retrieved from ProQuest Dissertations and Theses. Nasoz, P. (2011). *What is mission critical in the hotel guest room: Examining in-room guest empowerment technologies*. Retrieved from ProQuest Dissertations and Theses. Cobanoglu, C., Berezina, K., Kasavana, M. L., & Erdem, M. (2011). The impact of technology amenities on hotel guest overall satisfaction. *Journal of Quality Assurance in Hospitality & Tourism*, 12(4), 272-288.

Key Findings from Previous Literature

This section will discuss what previous related studies have found on guestroom technologies. The findings are discussed in an ascending chronological order based on when the study was published. The first article is written by Beldona and Cobanoglu (2007) which explore guest technologies in a generic scope. The second paper is a Ph.D. dissertation focusing on in-room entertainment technologies (Bilgihan, 2009). The third study is a master thesis researching in-room self-service technologies (Nasoz, 2011). Finally, the last paper is research study on hotel technology amenities and their impact on guest satisfaction (Cobanoglu et al., 2011)

Beldona and Cobanoglu (2007) used IPA to investigate guest technologies in the lodging industry. Their study had two stages, where as in the first stage they conducted a focus group with community members to help identify key guest amenities and in the second stage they used an online survey to conduct the IPA (Beldona & Cobanoglu, 2007). They compared respondent's view on guest technology through basic demographics such as income, education etc. In addition, they also compared respondent's view by age and by splitting into the group of ages thirty five and younger and the other group thirty six and older. When comparing these two groups by age their finding was that there were no significant differences between each other thus implying that age does not matter. They did mention that older consumers consider toll-free number for reservations, in-room temperature control and easily accessible electrical outlets were important to them. Eventually, they found that from their overall sample that satisfaction of most technologies was significantly greater than their importance. Another key finding is that more important technologies produce less satisfaction because these

were essential and common necessities. Also less important technologies were also relatively new.

In Bilgihan's (2009) study, the purpose was to ascertain differences in in-room technology amenities between leisure and business travelers. This study also used IPA to measure the importance and performance of certain in-room entertainment technologies. It was also found that most technologies investigated in this study were low priority to the guests meaning that the hoteliers should not focus on those technologies (Bilgihan, 2009). Findings discuss that there is no difference between leisure and business travelers when it comes to in-room entertainment technology amenities. The reason could be that technology is becoming essential in everyday life thus knowing how to use it is given (Bilgihan, 2009). Another finding suggests that travelers carry their personal laptops thus the hotel room should include connectivity option such as connecting the laptop to the TV in order for the guest to use his own entertainment. Key findings were that Free-to-Guest TV, Guest Device Connectivity and HSIA where what is important and satisfactory for the guests to have in their rooms (Bilgihan, 2009).

Nasoz (2011), who completed a study of 18 in-room empowerment technologies, also used the IPA for her research methods. This study identified in-room wireless high speed Internet service, HDTV, Video on Demand, temperature control, electronic safe and connectivity panels as technologies that the hoteliers should pay attention to. These technologies offer satisfaction and are important to the guest (Nasoz, 2011). On the other hand, some technologies that were less important and did not perform up to the guest's satisfaction are 3D TV, Internet TV and electronic locking systems (Nasoz, 2011). The sample in this study was broken down by leisure and business travel and it was found that

both groups assign equal importance to in-room technologies. The key finding indicates that wireless Internet was the most important technology for the guest as it was able to let the guest stay connected and gather information. Lastly, it was suggested when hoteliers charge for wireless Internet they should do so by charging a single fee for a specific Internet speed (Nasoz, 2011).

The next research study is on technology-based amenities and how they impact customer satisfaction (Cobanoglu et al., 2011). Some technologies such as in-room electronic safe, electric lock, guest control panel did not seem to impact guest satisfaction. Technologies that seemed to affect guest satisfaction were in-room telephone, game systems, and express check-in/check-out did affect the guest satisfaction. Key findings discuss that technology does affect guest satisfaction when the appropriate technologies are chosen and promoted in marketing strategies (Cobanoglu et al., 2011).

Emerging In-room Technology

Hotel technology industry professionals have always been eager to know what new guestroom technologies work and what not (G2X Guestroom 20X, 2012). As a result, the leaders of the annual hospitality technology conference HITEC in 2006 decided to compile and showcase emerging technologies in an exhibit booth modeled after a guest hotel room. The exhibit was named Guestroom 2X and has since then established itself to be present at HITEC for many years after (G2X Guestroom 20X, 2012). Being able to interact with new technologies could spur discussion on the opportunities for certain technologies to identify the needs of the guest. Table 5 was adapted from guestroom technologies and includes twenty one (21) guestroom technologies that were exhibited in the G2X Guestroom 20X (2012). Trends derived from that exhibit indicated that developers had a tendency to combine technologies together such as Universal USB Wall Plug where there is a power outlet and USB port in the same place. Another trend was the technology that was friendly towards technologies that guest would bring with them such as Smart Station where the guest could charge its mobile devices.

Table 5. Description of Emerging In-room Technology Items

Guestroom Technology	Description
Smart TV	Multifunction function TV with advanced features (Voice navigation, gesture control, Internet access)
IP Video Intercom	Video phone mounted to guestroom door. Ability to connect with phone.
Near Field Communication (NFC) Mobile Key Solution	Using radio-frequency identification through mobile device to access the room
Flipping TV Mount	TV Mount that can rotate the TV horizontally 180 degrees to display a picture.
Smart Station	Landline phone with iPhone docking station. Provides hands free calls with better quality speakers while charging iPhone.
Wireless Power Grommet	Wirelessly charging devices without charging cables
Mobility Service Engine	Mobile app that provides Indoor map to navigate within the hotel
Charging Valet Desk Lamp	Lamp with docking stations to charge mobile devices
Automatic Minibar	Guestroom minibar for food and beverage
Zero Gravity Massage Chair	Using infrared technology to identify the body of the guest to provide personalized massage service
Smoke Alarm Aid	Smoke Alarm that uses sound recognition technology to alert guests of fire through low frequency sound, flashing light and bed shaking
Smart Docking Station	Docking station that transmits entertainment from the guest's mobile device to the HDTV
Smart Bed	Bed that allows the guests to customize the firmness and shape of the bed
Moving Murals	Wall mounted electronic murals that provide visual and sound, and scent sensory
Wireless Light bulb Speaker	Light bulbs with speakers
Green Panel	Panel that controls the room temperature using motion sensors and CO2 sensors to detect the if the guest is present
Sensor LED Lights	Lights that turn on when they sense motion
Water Power Alarm Clock	Alarm clock that extracts the electrons from water to charge itself
LCD Weather Station	Colorful LCD display to show indoor and outdoor weather conditions
Smart Toilet	Toilet with heated seats, warm air dryer, automatic deodorizer, self-cleaning nozzles
Universal USB Wall Plug	Wall outlet with USB port that accepts universal plugs

Note: This table was adapted from the guestroom technologies of the exhibit G2X Guestroom 20X at the HITEC 2012. G2X Guestroom 20X. (2012). *Hospitality Financial and Technology Professionals*.

Using the aforementioned lists of current and emerging in-room technologies the proposed study will attempt to determine the importance and performance of each of those technologies across generation.

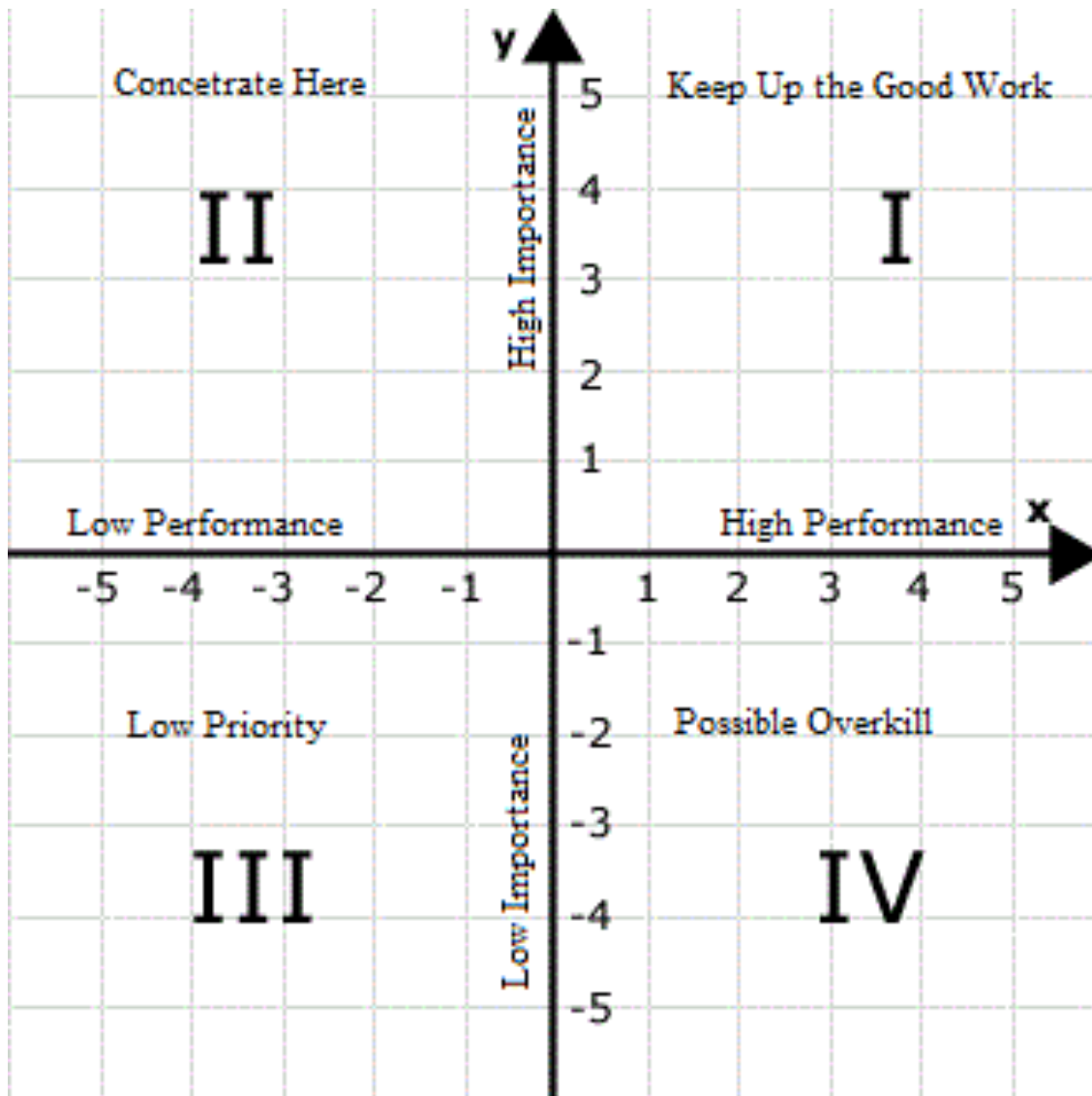
IPA studies of Guestroom Technology Studies

Importance-performance analysis is an effective analytical tool that is used to develop better understanding of certain attributes (Martilla & James, 1977). As the name implies with this tool it is possible to evaluate the importance and performance of certain items. The original purpose of IPA was to evaluate the elements of marketing programs because it was difficult for management to comprehend academic research terms and for researchers to study two separate attributes with one question (Martilla & James, 1977).

When applying IPA, a grid of two-by-two matrix is created with the performance attribute lying on the x-axis and Importance lying on the y-axis. Table 6 presents a replication of the original table created by Martilla and James (1997). The items that are investigated are lying on that grid in terms of relevance. If an item is of high importance it would lie on the right side of the grid, for items of low importance it would lie on the left side of the grid, next for items of high importance it would lie on the upper side of the grid and items of low importance it would lie on the lower side of the grid. The upper right corner is labeled as “Keep Up the Good Work”. This quadrant defines the items that are important and perform well for the guests thus items in here should not be changed as they provide customer satisfaction. The upper left quadrant is interpreted as “Concentrate Here”. That means items that fall in that quadrant are considered important to the guests but did not provide the appropriate performance thus the management needs to improve their performance for those items. Next quadrant, which is located on the lower left corner, is described as “Low Priority” because items in this quadrant are low importance and low performance for the guest. Therefore management should either stop providing or show little to no attention for those items. Lastly, the quadrant “Possible Overkill”

which is located on the lower right of the grid has items that have low importance but high performance. This means that the items are performing well and satisfactory but are low importance to the guest. In this case an item performs well but the hotelier should not focus on it as it is important to the guest.

Table 6. Importance-Performance Matrix



Note: This table was replicated after the original grid from Martilla, J. A., & James, J. C. (1977). Importance-performance analysis. *Journal of Marketing (Pre-1986)*, 41(1), 77.

IPA is flexible because it can be applied to a wide spectrum or research areas (Beldona & Cobanoglu, 2007). One of the first studies to apply IPA to research guest technologies was conducted by Beldona & Cobanoglu (2007). Other authors who utilized IPA include Nasoz (2011) who researched GET in relation to leisure and business traveler and Bilgihan (2009) who did an analysis of in-room entertainment technologies. IPA can identify the attributes of importance and performance of the guestroom technologies; therefore it provides a comprehensive guideline to hoteliers to understand which technologies they should pay attention to, which they should keep, which they should remove and which items to pay less attention. This paper will also take advantage of IPA as it can evaluate guestroom technologies accordingly. Using IPA can yield important information, present data in an easily readable form, and understand researched subjects (Martilla & James, 1977).

PART THREE: METHODOLOGY

Introduction

This study will measure guestroom technologies and how important and satisfactory are certain technology items across the four generations. The actual research study will break into two sections. The first section will be conducted on subject-matter experts through focus group interviews and the second section will sample different generational cohorts through an online survey. Focus group interview is a qualitative research that allows the researcher to discover true inner meaning and valuable insights through elaborate interpretation of the data collected. Online survey will conduct quantitative research because it will collect data that provide empirical assessments through numerical information. All the data collected will be primary data.

Development of assessment instruments

Hospitality Technology Expert Focus Group Interview

There are thirty eight existing in-room technology items and twenty one emerging in-room technology items. When combining these two numbers the items comes up to fifty nine in-room technologies. To begin this study, firstly, the fifty nine items needs to be consolidated into a comprehensive list in order to concentrate only on significant technology items. As Martilla and James (1977) suggested, a focus group should be contacted. Focus group interviews are unconstructed interviews with a small group of people that is lead by a moderator who encourages dialogue and discussion on a specific to topic. This method can eliminate obsolete technologies and point out potentially

important technologies that might have been previously missed. General advantages of conducting a focus group interview is that they are fast, easy to execute, provide multiple perspectives, detailed descriptions and most importantly true feelings and thought on the topic presented.

A small meeting will be reserved at the UNLV Campus. The total numbers of subject-matter experts that will be invited to the interview shall not exceed ten people. Attendees are considered subject-matter experts if they are either industry professionals who work in IT departments or academics who research IT related subjects. During the interview the moderator shall promote discussion among the attendees and will start with open ended discussion topics such as “What do you know about Guestroom Technologies?” When the open discussion questions are completed the moderator shall ask the interviewees to list guestroom technologies that they can think of. The next step is to provide the list of existing and emerging technologies and have them rank the technologies who they think are more important and mention if any of the presented technologies shall be removed from the list. When the interview is concluded the researcher shall will collect the all the lists and create one guestroom technology list with the most important items.

Pilot Study

When the questionnaire is completed a pilot study will be conducted with a small group of people. Using a pilot study the researcher can refine the survey and test it before administrating the actual survey. Questions in the survey that are hard to understand can be reworded and grammar errors can be avoided after administrating the pilot study.

Guestroom Technology Survey

Sampling

It is impossible to measure the entire population of all the generations thus sampling will be used to question a representative group from each generation. A sample is part of a population and the population is the entire group. Trying to census the entire population will take time, money and often is impossible to do so as there are million people out there. If the sample is properly collected then it can represent the population with relatively high accuracy. The target population shall be U.S. citizens as the literature review was based on American people. There are four primary sample groups and each shall represent Baby Boomers, Generation X, Generation Y, and Generation Y. In order to create four groups that are representative of the population the researcher shall aim to reduce random sampling error. Using random sampling the sample collected could be used to generalize the entire population. Random sampling error is the difference between the random sampling results and the census results when using same procedures.

Quota Sampling

In order to keep sample size proportionate to the population the researcher shall conduct quota sampling. The sample size for each generation shall be the entire population divided by a million and multiplied by two. Thus the sample size would be 158 Baby Boomers, 92 Generation X, 152 Generation Y, and 132 Generation Z. This method ensures that each generation is included proportionately in the sample. Aggregating various quotas can yield samples that are representative of the desired proportion for each group. However, using quota sampling is also non-probability

sampling meaning that each person who was asked to answer the survey does not have non-zero equal probability to be picked. Therefore, this method could introduce bias because being convenient sample, the researcher might choose respondents who easy to reach. There are certain problems using quota sampling but carefully supervised data collection may provide representative generational cohorts within the population. In order to counter non-respondent bias the researcher shall collect more samples from groups who have higher refusal rate.

Self Administered Questionnaires

Survey Design

The survey will be online and it will include three sections. Before the survey begins a screening question shall be asked in order to remove respondents that the questionnaire does not apply to. The question will ask if the respondent has stayed in a hotel room the past 12 months thus somebody who has been recently been exposed to guestroom technologies, The first section will contain basic demographic questions. The second section will include primary research questions: How often were guestroom technologies used across generations? Would guests pay more for state of the art technology? What is the acceptable price point for newer technology? And the final section will comprise the final list of existing and emerging guestroom technologies. This section will duplicate the technology items so the first part will ask how important they were and the second part will ask who they performed. After collecting the data IPA will be used to produce four grids of guestroom technologies that are differentiated by generations.

Online Survey

Once the pilot study is conducted and corrections are made, the survey can go online instantaneously. When online surveys are deployed the researcher is not present thus the respondent takes the responsibility to read and understand the questions. Online surveys are posted on websites thus reaching a large audience. In order to meet the quota sampling the online survey will be distributed to the aforementioned total numbers of generational cohorts. The respondents will need a digital device that can access the internet to answer the questionnaire. Advantages of the online survey include speed and cost effectiveness as the questionnaire can be instantly be posted on the world wide web and the financial costs are nearly zero. Online surveys also provide anonymity thus encouraging higher unbiased response rates. Online survey quick, efficient and inexpensive and most importantly it can accurately assess information from a population. However, there are errors that could occur when conducting a survey. Examples include random sampling error, systematic error, and respondent error. Biases could also be hurdles such as response bias, extremity bias and social desirability bias. In order to counter those effects this study should be replicated and become a longitudinal study.

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