

EXAMINING THE IMPACTS OF ROBOT SERVICE ON HOTEL GUEST
EXPERIENCE

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Submitted to the faculty of the University Graduate School
in partial fulfillment of the requirements
for the degree
Master of Science
in the Department of Tourism, Conventions, and Event Management,
Indiana University

May 2021

Accepted by the Graduate Faculty of Indiana University, in partial
fulfillment of the requirements for the degree of Master of Science.

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ACKNOWLEDGEMENT

I would like to express the deepest appreciation to my committee chair Dr. Becky Liu-Lastres, who has constantly motivated and guided me throughout the journey. Without her guidance this thesis would not have been possible.

I would like to thank my committee members, Dr. Yao-Yi Fu and Dr. Mona Mirhie for their feedback and support on my thesis. Their feedback really helped me to enhance my work.

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The aim of the study is to assess the impact of robot service on hotel guest experiences. Application of technology in tourism and hospitality services is growing each day. Using robots in hospitality establishment is becoming more and more popular, mainly because it can help cut down the labor costs, increase efficiency and reduce human contacts. Very few studies, however, have been done on examining customer experience regarding robots used in the hotel. Social media sites such as TripAdvisor are popular platforms where people share their first-hand experiences. Hence, this study focuses on studying the reviews of robotic hotels. Using the software Leximancer, reviews were studied and categorized in different themes to understand if the presence of the robot would create positive or negative experience for customers. The sample of the study included total of 2383 reviews related to robotic hotels from TripAdvisor from January 2011 to October 2020. The findings highlighted the major themes as Room, Robot, Hotel and Staff and their relationship with the ratings. It also provided insights into the contribution of robot service to consumer's hotel experiences.

Becky Liu-Lastres, Ph.D., Chair

TABLE OF CONTENTS

List of Tables	vii
List of Figures	viii
List of Abbreviations	ix
Chapter One	1
Introduction.....	1
Chapter Two.....	4
Literature review	4
2.1 Robots	4
2.2 Value Co-Creation in Tourism and Hospitality	5
2.2.1 The Value Co-Creation Framework.....	6
2.3 Hotel Guests Service Outcomes.....	8
2.3.1 Customer Satisfaction	9
2.3.2 Loyalty	10
2.4 Conceptual Model.....	11
Chapter Three.....	13
Methodology	13
3.1 Research Design.....	13
3.2 Study Site	15
3.3 Data Collection	15
3.4 Data Analysis	16
Chapter Four	19
Results and Discussion	19
4.1 Descriptive Analysis Results	19
4.2 How does customers perceive the experience?.....	20
4.3 How do robotic services influence hotel guest's experience?	22
4.4 Do Robotic services lead to loyalty and satisfaction?	24
Chapter Five	27
Conclusion	27
5.1 Implications	28
5.2 Limitations and Future Research	29
References.....	30
Curriculum Vitae	

LIST OF TABLES

Table 1. Profile of the Hotels in the Sample	19
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LIST OF FIGURES

Figure 1. A Conceptual framework for value co-creation	7
Figure 2. Conceptual Model	12
Figure 3. Major Themes.....	21
Figure 4. Conceptual Map with Review Ratings	25
Figure 5. A summary of findings.....	28

LIST OF ABBREVIATIONS

WOM: Word of Mouth

AI: Artificial Intelligence

eWOM: Electronic Word of Mouth

ACA: Automated Content Analysis

Chapter One

Introduction

The current period is said to be the universe of innovation (Jakhete & Mankar, 2015). Many new technologies have been used to improve customer experience in hospitality such as robots. The Robot Institute of America defines robot as “A reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks” (Bartneck & Forlizzi, 2004). Robotics is now considered one of the most appealing human's achievements. As of late, produced robots are progressively being accessible for people in general (T. Kurfess, 2015). Robots are complex yet valuable systems that have been utilized in industry for decades where the capacity and utility of robots have also drastically been expanded (Proctor et al.,2016).

The idea of the robot isn't especially old, just being instituted in 1920 by Karel Čapek in his play R.U.R—Rossum's Universal Robots (NPR, 2011) and it took quite a few years before the idea was joined completely into mainstream society. The incorporation of robots came moderately late to the hospitality and tourism industry, likely since a significant number of the tasks are needed to respond to the necessities of the customer (Ivanov et al., 2017). At present, robots are utilized in lodgings for errands such as checking visitors in, vacuuming floors, conveying things to visitors, and attendant services. Many hotels around the globe have adopted robotic services. For example, Henn-na Hotel in Japan is one of the pioneers in the field, where the property is completely staffed by robots (Papathanassis, 2017). The utilization of robotic services can also be found in American

hotels in the past five years, such as Aloft Hotels (Tussyadiah & Park, 2017) and Hilton Hotels (Hilton, 2017).

According to Meyer and Schwager (2007, p,118), “customer experience is the internal and subjective response customers have to any direct or indirect contact with a company”. Direct contact by and large happens over the span of purchase, use, and administration and is normally started by the client. Indirect contact regularly includes spontaneous experiences with agents of an organization's products, administration or brands and appears as verbal suggestions or reactions, publicizing, news reports, surveys, etc (Meyer & Schwager, 2007). Customer experience is significantly more perplexing than simply being seated, getting the menu, making the requests, being served, and paying bill (Walter et al., 2010). Marketers in the lodging business endeavor to perform up to customers' expectation and deliver a remarkable experience. Along these lines, they continually try to pick up bits of knowledge on service quality through examination on customers' understanding, for example, on what customers like and what they don't (Crotts et al., 2008).

At the point when a company offers a service or product, it is conceivable that there are numerous comparative products or services available by contenders. Customers for the most part have numerous alternatives. In this manner, it is significant for organizations to improve the benefit of existing shoppers and find a way to pull in their repurchase practices other than drawing in new customers (Hanai et al., 2008). As for revisit intention, it is constantly related with consumer loyalty, and the higher fulfillment a hotel conveys, the higher the likelihood that customers will return to (Oh, 2000; Han et al., 2009).

Consumer satisfaction is a business philosophy which keeps an eye on the creation of significant worth for customers, foreseeing and dealing with their desires, and showing capacity and duty to fulfill their requirements. Quality of service and consumer satisfaction are basic variables for accomplishment of any business (Gronoos, 1990; Parasuraman et al., 1988). Consumer satisfaction is the result of customer's view of the worth got in an exchange or relationship, where worth equivalents saw service quality, contrasted with the worth anticipated from exchanges or associations with contending sellers (Blanchard & Galloway, 1994). The value co-creation behavior corresponds to satisfaction (Yi & Gong (2013). As indicated by Peelen and Beltman (2013), “co-creation is a form of a creative contribution and allows a better active involvement of the customer (p. 208).” To determine if robotic services played a role in value co-creation, online reviews will be analyzed. Online reviews are vital, as they can reflect the potential interest for a product later on, find that both the number of unique guests and the number of site visits, as proportions of web traffic, and give gradual logical intensity of stock cost above net gain and its segments (Trueman et al., 2000).

Regardless of the extraordinary business capability of robots in the travel industry firms' tasks, there is an absence of research examining the business' flow robot selection levels and speculation goals (Ivanov et al., 2019). There is no conversation in the looked into articles on how Artificial Intelligence (AI) or robots impact value co-creation (Kaarremo et. al., 2018). Subsequently, there is a solid need to inquire about the impacts of robots utilized in hotels on customers. Accordingly, the purpose of the study is to assess the impact of robot service on customer's experience in hotels.

Chapter Two Literature Review

2.1 Robots

By the 1950s, Hollywood and mainstream society had extensively scattered the idea of the robot and enlivened robot improvement. By 1956, the primary organization to create a robot, Unimation, was established (International Federation of Robotics, 2012). Today, modern robots are generally utilized in agribusiness (Driessen & Heutinck, 2014), fabricating (Pires, 2007), warehousing and coordination (Min, 2009), transportation (Maurer et al., 2016), and medication (Schommer et al., 2017). Service and social robots (Wirtz et al., 2018), are normally utilized in training (Timms, 2016) and senior care (Glende et al., 2015). Wada and Shibata,(2007), built up a psychological submit robot, named Paro, particularly for robot treatment utilized it at pediatric emergency clinics and a few offices for the older, for example, day service centers and wellbeing offices.

Robots are additionally engaged with numerous different services in the travel industry and related businesses, for example, preparing beverages, engaging visitors, guiding visitors and offering data to visitors (Ivanov et al., 2017). Research in the hospitality area has been at first very unassuming, most likely because of the extremely modest number of service robots in business, yet since 2015 it has progressively pulled in the consideration of the travel industry/hospitality analysts (Ivanov et al.,2019). Studies in this distinct area give different models and cases on how robots can be utilized in different help settings, jobs and activities, e.g.: back-office (for example to control fluid when serving bar drinks) (Komoguchi et al., 2008) and front-office activities such as BellBot (López et al., 2013); and, robots as receptionists, bellboys, exhibition hall guides,

attendants, maids, servers and barkeeps, gear stockpiling staff, conveyance robots, stewards and room service help, chatbots and online customer care staff (Ivanov et al., 2017).

Two examinations portray the utilization of a mechanical robot for cleaning airplanes (Wanner & Herkommer, 1994) likewise recognized the requirement for research to examine the utilization and effect of actually possessed robots in the lodging business, however there is no observational research taking a gander at this either. Robot used in our study carrying various task such as storing baggage, cooking omelets, delivery toiletries, greeting, giving info about nearby attractions, room delivery, riding elevators, playing music, dancing, removing trash and changing linens. Technology-based initiatives are usually used in most companies' marketing strategies (Fullterton et al. 2017). Robots are currently used by marketing to promote services.

2.2 Value Co-Creation in Tourism and Hospitality

As Artificial intelligence (AI) and robots are progressively occurring in practical service arrangements, it is important to comprehend innovation in value co-creation (Kaartemo et al., 2018). As service capacities dependent on AI and robots become progressively normal in business sectors and regular daily existences, they are probably going to change the manner in which worth is co-made and experienced (Kaartemo et al.,2018). While more holistic approach to analysis of value co-creation has been proposed for 10 years (Vargo et al., 2008), the genuine association between a customer and a firm is as yet seen the focal locus in services marketing (Echeverri & Salomonson, 2017). As AI

and robots are progressively occurring in practical service solutions, it is important to comprehend innovation in value co-creation.

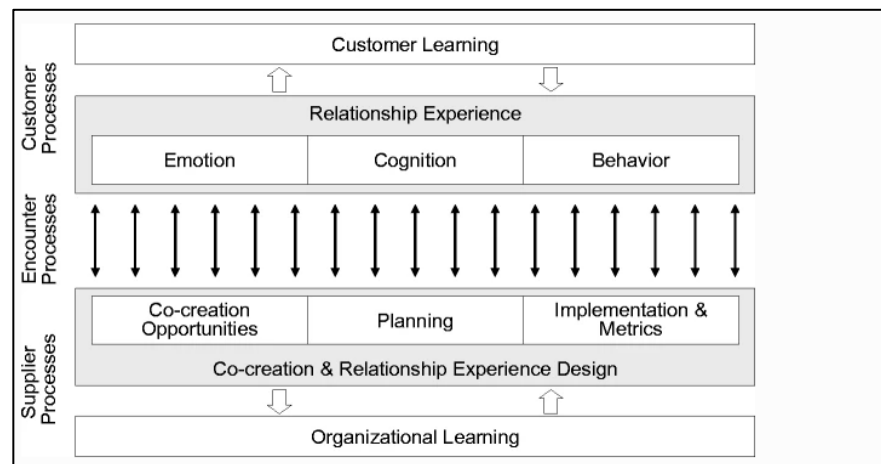
Kaartemo et al. (2018) expected more research on how AI impacts customer commitment or how robots impact the apparent estimation of service experience. This can empower marketing and service researchers to move the concentration towards understanding the jobs of AI and robots in a more extensive setting of significant value co-creation. The jobs of AI and robots in a recipient's value co-creation procedures and prosperity stay an almost immaculate region in service research and marketing (Kaartemo et al., 2018). AI can be utilized to enhance experience past transaction which, thus, impact co-creation of significant worth in a service ecosystem (Jaakkola & Alexander, 2014). Hence, this study will focus on online reviews pertaining to robotic services in hotels to analyze the effect of robotic services on consumers.

2.2.1 The Value Co-Creation Framework

Prahalad and Ramaswamy (2004) were among the spearheading researchers who built up the idea of co-creation as the following degree of significant value. As indicated by Peelen and Beltman (2013), “co-creation is a form of a creative contribution and allows a better active involvement of the customer (p. 208).” With regards to peer-to-peer communication in hospitality, the fundamental thought of a greeting by local inhabitant is an incredible wellspring of fulfillment in tourists' encounters (Frochot & Batat, 2013), prompting conceivable co-creation of value (Chathoth et al., 2013; Cova et al., 2011). This worldview changes in speculation suggested that encounters and worth could never again be essentially conveyed to customers (Ramaswamy, 2011; Vargo, 2011).

To create value, "value propositions" are required, starting with one entertainer then onto the next, who take part in an experience and coordinate their assets for monetary, budgetary or social worth, or a mix of all (Chandler & Lusch, 2015). Purchasers' fundamental intrigue lies in utilizing assets to acquire value, as worth lives "not in the object of utilization, yet in the experience of utilization (Grönroos, 2008; Payne et al., 2008, p. 91). " Subsequently, experience and worth co-creation can happen through the "integration of assets and utilization of capabilities" (Vargo et al., 2008, p. 146), and the joint coordinated effort among associations and customer (Prahalad & Ramaswamy, 2004). Figure 1 presents the value co-creation framework created by (Payne et al., 2008) was incorporated in figure. 2. It describes three fundamental cycles (customer, supplier, encounter) that represent the premises of the system for co-creation.

Figure 1. A Conceptual framework for value co-creation.



Adopted from Payne et al., (2008)

- Customer *value-creating processes*—in a business-to-consumer relationship, the cycles, assets and practices which clients use to deal with their activities.
- Supplier *value-creating processes*—the cycles, assets and practices which the provider uses to deal with its business and its associations with client and other important partners.
- Encounter *processes*—the cycles and practices of communication and trade that happen within customer and provider connections and which should be overseen to create fruitful co-creation opportunities.

This framework is tested by other scholars. Study done by Andreu et al. (2010) in the furniture market used this framework to evaluate the consumers and retailers and mentioned the framework helped them to foster value co-creation to grow benefits. It was indicated by (Payne et al., 2008) that it can be used in mapping the process and finding out opportunities for usage and service of co-creation of value.

2.3 Hotel Guests Service Outcomes

Three outcomes listed by Payne et al. (2008) are cognitive, affective, and behavioral perspectives. The data-processing purchaser research stream sees clients as being engaged with a cognitive cycle of making a judgment based on whether past, present or envisioned future experiences are significant for them (Oliver 1999). As per this cognitive view, the guest is engaged in basically in objective directed practices like looking for information, assessing accessible alternatives, and choosing whether or not to purchase a specific item or service (Payne et al., 2008).

Cognition should be seen from both a data-processing approach that centers around memory-based practices and with respect to measures that are "more sub-conscious and private in nature" (Payne et al., 2008). Feeling and sentiments reach out beyond 'effect' which underscores attitudes and inclinations. Behavior is the activities that come from and result in experiences. Behavior analysis ought to in this way move beyond decision measures that lead to purchase choices and incorporate experiences that clients have because of utilizing an item or service (Payne et al., 2008).

2.3.1 Customer Satisfaction

Achieving high levels of customer satisfaction is a business philosophy which tends to the creation of value for customers, anticipating and managing their expectations, and demonstrating ability and responsibility to satisfy their needs. Quality of service and customer satisfaction are critical factors for success of any business (Gronoos, 1990; Parasuraman et al., 1988). Customer satisfaction is the outcome of customer's perception of the value received in a transaction or relationship, where value equals perceived service quality, compared to the value expected from transactions or relationships with competing vendors (Blanchard & Galloway, 1994).

In order to achieve customer satisfaction, it is important to recognize and to anticipate customers' needs and to be able to satisfy them. Enterprises which are able to rapidly understand and satisfy customers' needs, make greater profits than those which fail to understand and satisfy them (Barsky & Nash, 2003). Nowadays one of the biggest challenges for managers in the hotel industry is to provide and sustain customer satisfaction. Customer requirements for quality products and service in the tourism industry

has become increasingly evident to professionals (Lam & Zhang, 1999). Hotels with good service quality will ultimately improve their profitability (Oh & Parks, 1997).

In a competitive hospitality industry, which offers homogeneous services, individual hoteliers must be able to satisfy customers better than their counterparts (Choi & Chou, 2001). Customer satisfaction is the starting point to build customer loyalty; therefore a long-term relationship will affect their loyalty. Study done by Ogba & Tan (2009) suggests good image ideally has effect on customer loyalty. Where there is repeated purchase it is said to be a behavior of brand loyalty which is due to satisfaction from brand.

2.3.2 Loyalty

Hotel guest loyalty is critical given the competitive nature of the hotel sector. The expanding development of hotels into other hospitality enhances the continuing significance of visitor dedication and the need to ensure repeat business (Jani & Han, 2014). Dick and Basu (1994) expressed that, "customer loyalty is viewed as the strength of the relationship between an individual's relative attitude and their repeat patronage".

Additionally, "loyal customer" refers to a client who repurchases from a similar specialist organization at whatever point conceivable, and who keeps on suggesting or keeps up a positive attitude towards the service provider (Kandampully & Suhartanto, 2000). There are two measurements of customer loyalty: behavioral and attitudinal (Julander et al., 1997). The behavioral measurement alludes to a client's conduct on repeated purchase, showing an inclination for a brand or a service after some time (Bowen & Shoemaker, 1998). Attitudinal measurements refer to a customer's expectation to repurchase and suggest, which are acceptable markers of a loyal customer (Getty &

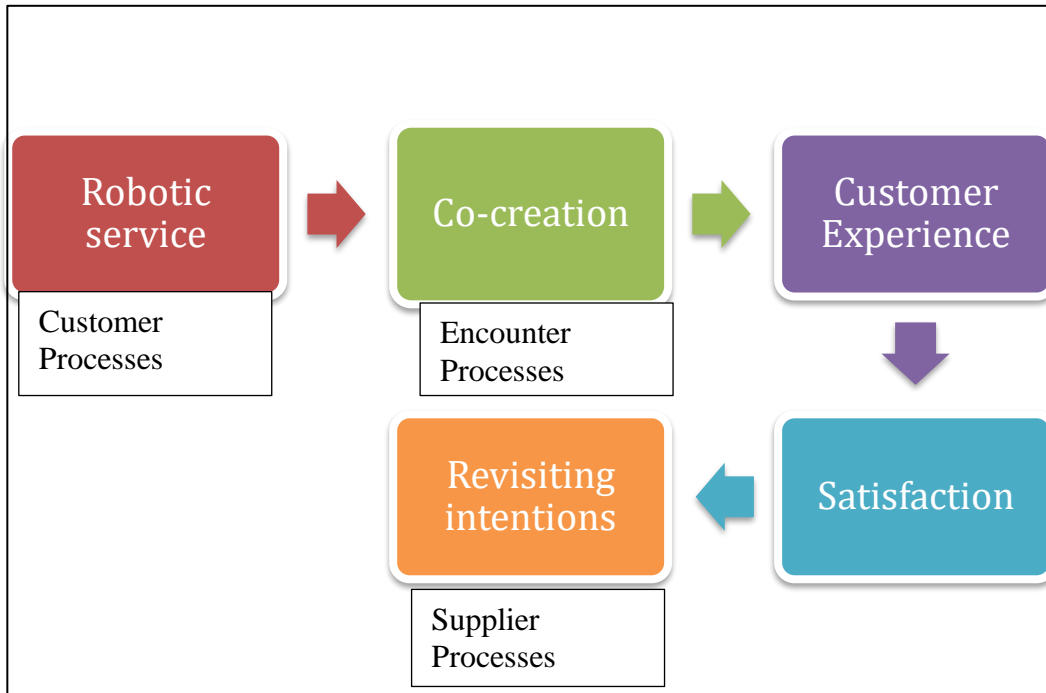
Thompson, 1994). Additionally, a customer who has the aim to repurchase and recommend is probably going to stay with the brand. The affective loyalty alludes to emotional bond of one individual towards something, for this situation, a selling point (McGoldrick & Andre, 1997; Bennett & Rundle-Thiele, 2002).

Numerous scientists (e.g., Ehrenberg, Goodhardt and Barwise, 1990, Kahn, Kalwani and Morrison, 1986) accept that continue buying can capture the loyalty of a customer towards the brand of interest. The conspicuous requirement for fulfilling the company's customer is to grow the business, to increase a higher market share of the overall industry, and to get repeat and referral business, all of which lead to improved productivity (Barsky, 1992).

2.4 Conceptual Model

Based on the literature, a conceptual model was developed in this study (Figure 2). Our conceptual model consists of 5 elements. Starting at customer level with robotic service leading to encounter process of co-creation. After the element of co-creation, there is a customer experience leading to satisfaction and revisiting intention as their behavioral outcome.

Figure 2. Conceptual Model



Chapter Three

Methodology

3.1 Research Design

This exploratory study used a deductive approach and analyzed online reviews on hotels that use robotic services in the United States and Singapore. The following research questions were used to guide the study:

- How does robotic service influence hotel guests' experiences?
- How does robotic service contribute to the value co-creation process?
- How does robotic service influence hotel guests' satisfaction and loyalty?

This study used a qualitative approach and collected reviews from TripAdvisor referencing hotels that use robots in their service. Gebauer et al. (2008) note that deciphering customer review is commonly founded on computerized or non-robotized content analysis. Non-automated content investigation happens when people classify content as per a preset classification framework, though a computer commonly performs automated content analysis. Every strategy has advantages and constraints, and the choice with regards to which type of content analysis to utilize relies upon the objectives of a particular project.

Tourists can likewise share their travelling viewpoints and encounters in web journals, for example, Twitter and TripAdvisor, giving significant data to possible sightseers. These online reviews, websites information and other related information in a textual style establish a unique kind of big data in the travel industry research online textual information, conveying emotions, slants and temperaments of vacationers (Li et al., 2018). From one perspective, the examination centers around various sorts of big data were

profoundly subject to the data qualities (particularly preferences). For instance, online textual information (conveying traveler emotion) was useful in examining vacationer fulfillment about the travel industry destination or products (Li et al., 2018).

Online reviews are vital, as it might mirror the potential interest for a product later on. Trueman et al. (2000) found that both the number of guests and the number of site visits, as proportions of web traffic, give gradual logical intensity of stock cost above net gain and its segments. Alongside the ever-expanding development in the number and nearness of item marks talked about on online conclusion stages, there is a developing rivalry among comparable items to draw the consideration of web surfers (Zhang et al., 2010). Discoveries of earlier examinations show that online surveys altogether impact the popularity and deals of specific items (Chevlier & Mayzlin, 2003; Liu, 2006).

In the Internet period, the impact and conveyance of electronic word of mouth (eWOM) have been additionally upgraded, as people would now be able to make their conclusions effectively available to other Internet customers (Dellarocas, 2003). As indicated by another survey (comScore/Kelsey Group, 2007), with more than 2,000 U.S. adults, somewhere in the range of 79% and 87% of readers of online reviews of eateries, inns, and travel services revealed that the surveys impacted their buy choices. All the more significantly, in view of the quality of the reviews that they read, 41% of eatery survey per users thusly visited a café, and 40% of lodging survey per users in this manner remained at an inn (comScore/Kelsey Group, 2007).

The outsider assessment stages, for example, TravBuddy.com, Travellerspoint, WAYN, and TripAdvisor.com., have assembled an abundance of movement data. For

example, TripAdvisor is covering close to 7 million accommodations, restaurants and attractions (Tripadvisor.com,2020). With 184 million reviews worldwide, Yelp helps millions of consumers see which businesses are available in their area and how each one has performed for their customers. (yelp.com,2020). These movement exhortation sites have set up themselves as significant settings for eWOM by permitting customers to communicate and provide feedback on restaurant, hotels or neighborhood vacation destinations.

3.2 Study Site

For the current study, we gathered information through text mining from TripAdvisor. This travel industry web-based media site gives an enormous number of customers produced online reviews of voyagers' encounters with eateries, facilities, flights, travels, etc. For instance, in excess of 730 million opinions and reviews were produced on TripAdvisor in 2018 (Lock, 2019).

3.3 Data Collection

The first hotel that used robot technology for their services was in 2011. Hence, we collected reviews from January 2011 to October 2020 from TripAdvisor for 12 hotels across United States and Singapore. Hotels such as Vadera hotel, Luma, Residence Inn by Marriott, Homewood suites, Hilton, Fairfield Marriott, Sheraton, Hotel EMC2 Chicago, Yotel Newyork, Yotel Singapore, West Wing Florida and M social Singapore use robots and hence, reviews were collected by using the word search “Robot” on the TripAdvisor websites. Robot in this hotel were performing various task such as storing baggage, cooking omelets, delivery toiletries, greeting, giving info about nearby attractions, room

delivery, riding elevators, playing music, dancing, removing trash and changing linens. Guests posted their review on TripAdvisor which has a rating scale from 1 star to 5 stars where 1 is lowest and 5 being highest. Reviews were scraped using scraping tool and transferred to excel or csv file.

3.4 Data Analysis

Various specialists propose (Automated Content Analysis) ACA – a strategy that includes text mining algorithms from software engineering to perceive patterns and make probabilistic predictions of information (Evans, McIntosh, Lin & Cates, 2007). ACA as an alternative methodology by methods for computer-assisted programs was presented in the most recent decade, although prior renditions can be gone back to 1990s in the utilization of Latent Semantic Indexing, a strategy that recovers data using direct linear math strategies (Deerwester, Dumais, Furnas, Landauer, & Harshman, 1990). A few investigations have affirmed the unwavering quality and legitimacy of ACA. Leximancer, for instance an ACA programming, has gotten broadly acknowledged across different disciplines, with ongoing application in analysing the travel industry scholarly publications (Jin & Wang, 2016), Australian news articles to comprehend the portrayals of homelessness (MacKinnon, 2015) and social media information (Tseng, Wu, Morrison, Zhang, & Chen, 2015).

This is on the grounds that as an ACA tool – Leximancer has been found to produce a more goal and text-driven survey of reports with reproducible and reliable idea extractions and theme grouping (Smith & Humphreys, 2006), even with enormous chunks of text (Angus, Rintel & Wiles, 2013). Leximancer, an information mining programming

bundle, was picked above others since it empowers the researcher to explore the multifaceted nature of content more deftly and is more scientifically thorough than its rivals (Robson et al., 2013).

Leximancer is undeniably fit to a characteristic language handling technique. Warschauer and Healey (1998) define natural language preparing as “The process of a computer extracting meaningful information from natural language input and/or producing natural language output”. Leximancer attempts information mining draws near in any case, combined with natural language preparing through idea advancement, accomplishes understanding and disclosure more promptly than ‘categorization’ learning approaches alone – it (Leximancer) empowers the improvement of meaning (Robson et al., 2013). Once Leximancer recognizes an idea, words that are firmly connected to that idea are created; this procedure produces subjects that encompass specific gatherings of ideas. Therefore, Leximancer permits basic concepts and theme to be extracted and characterized through how they are identified with different words included in the text (Robson et al., 2013).

For output, Leximancer produces an 'concept map' or a 'theme map' that outwardly portrays the fundamental ideas and subjects (and the connections between these)In view of the computation of word frequencies and co-occurrences, Leximancer can create a word-concept-theme framework structure that can indicate the implications of the information just as delineate the connections between key themes/concept (Smith, 2003). Wu et al. (2014) utilized Leximancer to look at international visitor experience at the Silk Market which was based on 149 reviews posted on TripAdvisor.com.

Leximancer is not quite the same as other software used for content analysis. Not at all like NVivo, ATLAS.ti, and CATPAC, Leximancer doesn't have any significant bearing word recurrence, or coding of terms and expressions. Leximancer, uses its own algorithms, is utilized for breaking down the implications inside entries of text by extracting the principle ideas and concepts. It applies a quantitative strategy to lead qualitative analysis by utilizing various algorithms for stages (Indulska, Hovorka & Recker, 2011). It has likewise been applied in the travel industry and hospitality research, for instance to distinguish event pictures in paper reports (Scott and Smith, 2005), to analyze hotel stay manager perception of inability administration provision (Darcy & Pegg, 2011), and to analyze vacationer shopping encounters in Beijing Silk Market (Wu et al., 2014).

In this investigation, Leximancer programming was applied to analyze large qualitative information so as to distinguish the primary concept from textual information. Visual idea maps and statistical output were created that helped with increasing more prominent insights and perception of language (Wu et al., 2014). The network rate percentage from Leximancer (2013) determined the connectedness of concepts along the themes and mirrored the significance of each theme.

Chapter Four Results and Discussion

4.1 Descriptive Analysis Results

Table 1 presents the profile of the hotels included in the sample. All hotels are above 4 rating and are located in either United States of America or Singapore. Reviews collected are mostly from the year 2015 to 2020 except for one which is from the year 2011.

No.	Hotel Name (code)	Location	Star-Rating	Number of Reviews	Years
1	A	Las Vegas	4.5	160	Feb 2018- Feb 2020
2	B	New York	4	521	June 2011 - April 2020
3	C	New York	4.5	96	Nov 2017 - March 2020
4	D	LA	4.5	143	Sep 2015- Aug 2020
5	E	LA	4.5	25	Oct 2017- Sep 2019
6	F	LA	4	22	Jan 2018- Feb 2020
7	G	LA	4.5	64	Oct 2017- May 2020

8	H	San Diego	4	32	May 2017- March 2020
9	I	Chicago	4.5	287	May 2017- August 2020
10	J	Florida	4.5	85	April 2017- March 2020
11	K	Singapore	4	234	Nov 2016- Aug 2020
12	L	Singapore	4.5	714	Oct 2017- Oct 2020
				Total 2383	

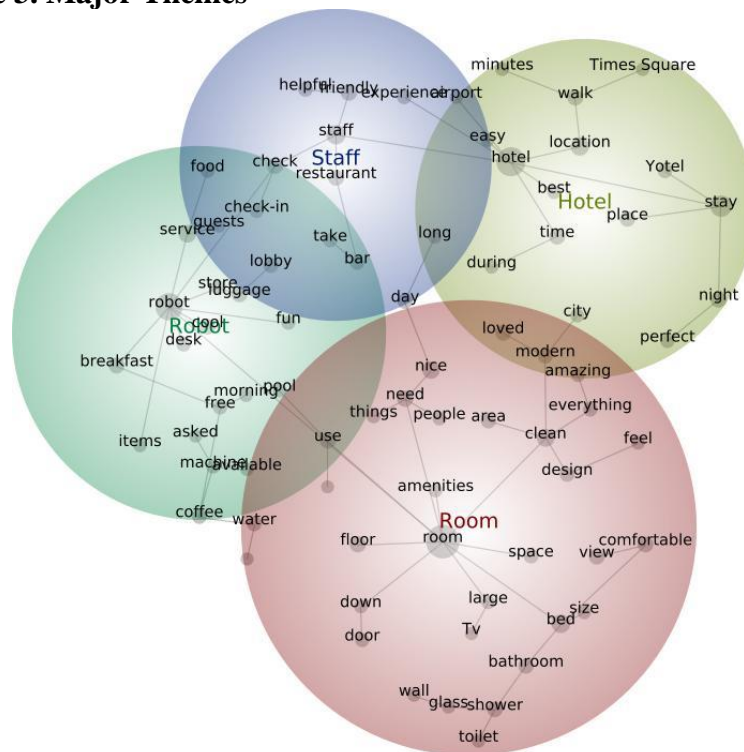
Table 1. Profile of the Hotels in the Sample

4.2 How does customers perceive the experience?

A total of 78 concepts were extracted from the reviews and represent four major themes, including *Room*, *Robot*, *Hotel* and *Staff*. All of them were related to each other (See Figure 3). The primary findings were consistent with the findings of previous studies, where it is found that robotic service improved guests' intellectual, sensory, and behavioral experiences (Xiang et al., 2014). These enhanced experiences also lead to customers posting positive comments online, and positive online reviews are valuable information sources to produce bits of knowledge to supplement conventional methodologies and statistics. A study conducted by Zhang et al. (2019) concludes that

using the online reviews to study challenges faced by Airbnb and hotel helped to analyse the perceived guest experience. As expected, Hotel (Hit= 6956) is one of the most prominent themes considering that these reviews were all centering around different hotels. Room (Hit= 7065) is another major theme, which occupies the central position of hotel products. In our sample, there are several sub-themes related to the concept Room, such as *space, amenities, large, design, clean, everything, amazing, modern, comfortable, bed, size, bathroom, wall, glass, shower, toilet, need, things, area, floor, door*. For instance, one review talked about the room, saying that “*this hotel was a big surprise. The entire experience was perfect. The room service was excellent. The rooms were modern and comfortable.*”

Figure 3. Major Themes



Noticeably, *hotel* is identified as another major theme, mainly because the reviews are regarding the hotels using robot service and were related to concept such as *walk, location, place, stay, time, night, perfect, city, during, easy, minutes, airport*, as stated by a review “*The hotel is very high tech*”. Robot is another expected theme, as this study mainly concerns consumer’s experiences in robotic services in hotels. Most reviews shared their interaction with the robot onsite and underscored the “wow” factor in their experience. For example, one review wrote, “*And the robot egg maker is great fun - I would love to bring my kids here for that alone*”.

Staff (Hit=4007) primarily considers the guests’ interaction with staff, which was related to “friendly”, “helpful”, “experience”. To summarize, the primary findings here suggest that despite the uniqueness of robot, hotel customers’ experience are constituted of a wide variety of elements beyond robots. Robotic-service hotels who fail to perfect their core products would still dissatisfy and disappoint their customers, resulting in an increase in negative reviews.

4.3 How do robotic services influence hotel guest’s experience?

Another focus of this study was to understand how robotic service influence hotel guests’ experience. To achieve this objective, we further analyzed the relationships between the theme *Robot* and other concepts. The results (Figure 3) showed that Robot is associated with the following concepts: Store, luggage, desk, breakfast, items, machine, guests, service, fun, coffee, pool. These concepts can be further divided into two categories, one related to the robots’ tasks (i.e., luggage, store, items) and the other one relates to guests’ feelings (i.e., fun, cool). The concepts luggage and items describe the major

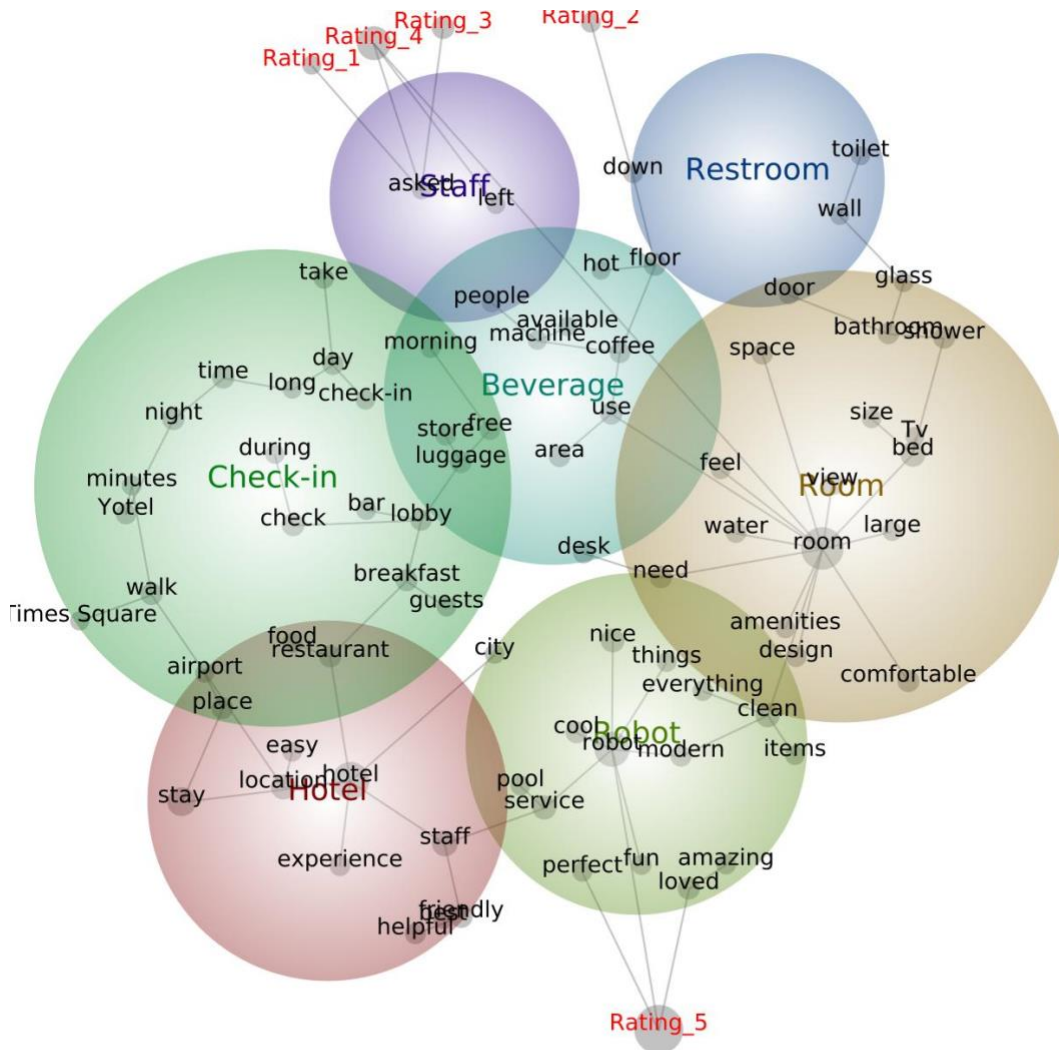
responsibilities of robot. At cognitive level (Payne et al., 2008), hotel guests in this study started showing cognitive outcome by observing the robot while they are performing the tasks. Some customers were fascinated by the task and tech of robot, as stated by one review “*Robot arm to keep your luggage safe was exciting to watch*”. At affective level (Payne et al., 2008), guests were seen reporting their emotions and feelings while they were observing the robot. Guests’ feelings are also reported in these themes, such as fun and cool. They described it was interesting to watch perform various task. As one review depicted “*Wally, the delivery robot was fun to watch*”. Interestingly the concept of “item” suggest that most customers were fascinated and enjoyed toiletries item delivered by robot, one review stated, “*The robot that brings items to your room is just awesome!*”.

One of the most exciting findings were noticed here that interaction of consumers with robot that led to co-creation. As one review depicted, “*I played with a robot! That's cool!*”. As similar observation is noted from a previous study (Chang & Tung, 2019), that robotic service reports increased in level of value co-creation. The findings likewise recommend that consumers and robots can co-create novel encounters, with certain visitors even proactively looking for new occasions to connect and speak with robots to build up a specific degree of "relationship" with them. The themes of staff and robot are strongly correlated. One reviews state this “*She is the staff robot*”. Where consumers were seen mentioning robot has one of the staff members. At behavioral level (Payne et al., 2008), hotel guests in this study were seen mentioning about their revisiting intentions as one review stated, “*The robot, for providing us all we need directly to our room, Thank you for an unforgettable experience! Hope to see you again real soon!*”

4.4 Do Robotic services lead to loyalty and satisfaction?

Lastly, this study tried to investigate if robotic services can lead to higher satisfaction. From previous analyses, it was evident that most customers were happy, joyful and delighted by robotic services. To build a stronger argument, we generated another conceptual map by running sentimental analysis and review ratings. The results are shown in the Figure 4. Results revealed that the theme robot is strongly related with 4 and 5 rating reviews. This indicates that inclusion of robot plays a significant role in customer satisfaction.

Figure 4. Conceptual Map with Review Ratings



A closer examination of 4-star reviews reveals that it is closely related to ‘luggage’ and ‘store’ which was indirectly connected to robot. For example, as stated by one review “*Robot luggage storage had a wow factor*”. These experiences propose a specific degree of "relationship" advancement, and even intentional attempts to "bond" with robots. In reality, relationship improvement and holding are significant perspectives in encouraging critical the travel industry experiences (Tung and Ritchie, 2011). As illustrated in Figure

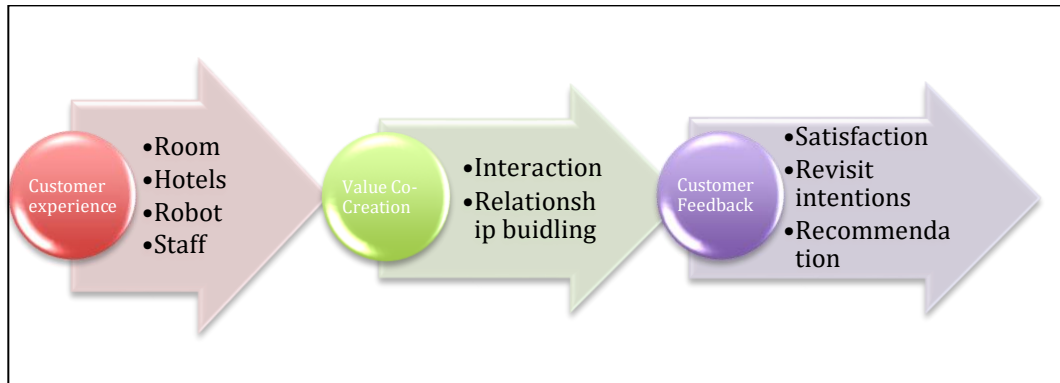
4, the 5-star reviews were more closely linked with amazing, best, robot and room suggesting that customers satisfaction and reference is linked to the overall experience. This finding is consistent with previous research that says numerous visitors who stayed at the hotels referred the property to different sightseers with family. The family travel market is developing and presently accepting a great deal of promoting consideration (Li et al., 2017).

Chapter Five

Conclusion

By analyzing the reviews of hotel referring robotic services, the purpose of this study was to explore the robotic services on hotel's customer experiences. Robot was present in top 4 major themes of the findings. It was strongly co-related with positive elements like cool, fun, experience. Findings on figure 3 & 4 depicts strong relation between robot and satisfaction and its connection to rating 4 and rating 5. Hereby, we can say the experience provided by robotic services alleviated their positive perception and in turn increased satisfaction. Satisfaction also lead to recommendation of the hotel to friends and family which affected their loyalty. Their interaction with robot and building the relationship with them had a long-lasting impression and communicated the willingness to return as seen in Figure 5. Our study also had theoretical and practical implications.

Figure 5. A summary of findings



5.1 Implications

This study fills the knowledge gap that concerns the effect of robot on value co-creation (Kaarremo et. al., 2018). By analyzing huge reviews across the hotels that uses robots, this study has identified major themes that are interested to guests. It also helped to get the detailed picture of connection of robot to different elements of hotel. This study has used online reviews unlike the traditional approach of survey. Advantage of using a software like Leximancer helps to get results without being biased by previous finding or study. Additionally, this study has used online review which gives raw and honest picture along with actionable recommendations for managers of hotels (D'Acunto et al., 2020).

This study has provided three practical implications for hotel owners. Firstly, the core product of hotels are room and compromise in those areas can lead to negative reviews, as seen in figure 4. Hence, hotel managers should strengthen the core product of hotels before adding the robot element. Secondly, robot can help in elevating the experience by means of value co-creation. Hotel managers can therefore use them for

various tasks especially where guests get a chance to interact with robot. Thirdly, it is seen robots are enjoyed by everyone especially families. Hence, managers can focus marketing the hotel targeted to families and kids.

5.2 Limitations and Future Research

This research study surely has limitations. Firstly, all our reviews were in English. That led to exclusion of non-English reviews. Secondly, it's difficult to remove any comments shared by bots or fake id. Future studies can focus on comparing posts and rating from pre and post Covid-19 era. In the post covid-area robots might be more used as a contactless way of delivering and deep cleaning tasks. This additional task might affect the way consumer perceive robots in hotels.

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Curriculum Vitae
Namrata Rajendra Kumar Jain

Education

January 2019- May 2021

Indiana University degree earned at Indiana University-Purdue University Indianapolis

Master of Science in Event Tourism

2018

Fanshawe college, ON, Canada

P.G diploma in Health System and Management

2010 – 2015

Dr D Patil College of Physiotherapy

Bachelor of Physiotherapy

Honors, Awards, Fellowships

January 2019- May 2021-Academic Award- Indianapolis, IN Graduate Assistantship and tuition scholarship

Professional Experience

January 2019- May 2021: Indiana University, Indianapolis- Graduate Assistant

Conducted research needed for the Tourism, Conventions and Event Management

Department. Grade undergraduate coursework in the TCEM Department. Courses

include:

TCEM T 208 Tourism Geography

TCEM G 100 Introduction to Tourism Industry

Planned a conference for CentralCHRIE in Indianapolis in the month of March 2019.

Planned a medical tourism trip from USA to Nigeria for a medical team in the month of August 2019.

Presented my poster in ICHRIE Conference in HongKong on “Medical Tourism” in 2019.

Volunteered at El Blanc Dinner event in 2019.

Volunteered at Medial tourism event in Africa in 2019.

Presented poster in TTRA virtual conference in 2021

01/2018-12/2018: Hats off, London, ON, Canada- Child youth worker

Working to curate the activities for children in foster home

Maintaining data and analyze for solving critical problems

2015 –2017: Wockhardt Hospitals, Mumbai, India -Physiotherapist

Involved in treatment and management in the department of PT