

INCREASING PERCEIVED VALUE IN PHYSICAL ENVIRONMENTS THROUGH  
THE IMPLEMENTATION OF AUGMENTED REALITY

By

Teodor Herman

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# INCREASING PERCEIVED VALUE IN PHYSICAL ENVIRONMENTS THROUGH THE IMPLEMENTATION OF AUGMENTED REALITY

Teodor Herman

Master of Digital Media

Digital Media

Ryerson University, 2019

## **Abstract**

This research project examines the impact of Augmented Reality (AR) technology as a means to increase customer engagement. More specifically, it explores how the inclusion of AR in public spaces has the ability to promote positive customer experiences that lead to higher referrals and increased revenue while reducing acquisition costs. The research identifies that AR is defined as a medium through which pictures and information can be displayed over a screen. By way of this process, new virtual elements are created by overlaying and integrating them into the environment. Through a quantitative deductive analysis, this project sought to test whether the implementation of AR overlaid upon key aspects of a space has the ability to improve the perceived value of a customer's experience in that environment.

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## Introduction

Augmented reality (AR) may be defined as a medium through which pictures can be displayed over a screen. Through this process new virtual elements are created by overlaying and integrating them into the environment (Adascalitei, Baltoi 2018). In contrast, virtual reality (VR) is defined as having the ability to create a simulated environment (Adascalitei, Baltoi 2018). Currently, public spaces such as zoos, museums, and cultural heritage sites around the world are amongst some of the most commonly visited destinations for tourists and local residents (Chung et al. 2015). As these institutions seek to attract and increase repeated visitation (Jung et al. 2015), they are looking to digital media technologies to provide more meaningful connections within their environments in an effort to enhance value for their customers (Gretzel, Werthner, Koo, and Lamsfus, 2015). The universal availability of AR enabled mobile devices and the constant evolution of computing power, connectivity speeds, and other technological hardware advancements has made the utilization of augmented reality in our everyday lives a ubiquitous possibility (Liberati 2016). According to *Goldman Sachs Research*, the augmented reality and virtual reality (AR/VR) market is predicted to exceed USD 80 billion dollars by 2025 (Goldman Sachs 2019). *Medium* makes the distinction that AR is expected to outgrow VR at an approximate ratio of 4:1 (AR:VR) (Gallagher 2018). However, while current research has shown that AR is a technology that can provide better user experiences, there is a lack of research examining the impact of how this medium can be utilized in public spaces and cultural environments as a way to increase a visitor's perception of value (Chung et al. 2018).



## **Section 2: The Problem**

### **2.1 Why is the Problem Worth Exploring and Timeliness of the Study**

Research has identified that AR has the potential to enhance the tourism domain in many different aspects as it provides the ability to improve on-trip experiences in a way that is unmatched by other types of displays and technologies (Yovcheva et al. 2013). Research has also focused on exploring the ways in which Augmented Reality Experiential Marketing (AREM) can lead to the creation of perceived experiential value, and thus contribute to the development of increased customer satisfaction (Bulearca and Tamarjan 2010). As a result, an opportunity exists to measure the impact that AR has on customer loyalty, repeat purchasing intent, positive recommendation, and its potential to increase market share. This is founded on the premise that the customer milieu is based on perceiving satisfaction in the experience economy, as customers do not always focus on products but rather on the experiential consumption. Furthermore, business theory has identified that higher customer engagement leads to a higher rate of referrals, thus driving increased revenue without significantly impacting customer acquisition costs and increasing higher customer long term value (Hudson, et al. 2013, Thorsten, et al. 2010, and Warren 2016). As a result, studies in the field of AR have recognized and attempted to demonstrate that this medium has the ability to improve customer experiences.

### **2.2 The Toronto Zoo**

With over 1.3 million yearly visitors, The Toronto Zoo is a public institution that is one of the top five destination attraction points for the City of Toronto. It was first opened in August of 1974 and is located near the Rouge River at the eastern border of the Scarborough district. The Zoo has four main pavilions (African Rainforest, Americas, Australasia, and Indo Malaya) and

numerous other indoor and outdoor exhibits. As one of the largest zoos in North America, the site consists of approximately 710 acres, with a collection of over 6,000 animals representing more than 495 different animal species (Toronto Zoo, 2019). The Toronto Zoo focuses considerable efforts to conserve endangered species from around the world, including the difficult process of breeding captive animals. Their programs have enjoyed a high success rate enabling the re-introduction of many species back into the wild (Toronto Zoo Master Plan, 2017). This positions The Toronto Zoo as an institution that is focused on being a world-class scientific research organization. Since the majority of visitation to the Zoo occurs during the summer months, it is constantly looking for ways to significantly increase year-round visitation numbers (Toronto Zoo Master Plan, 2017). Through major objective experiences at the Zoo, the organization strives to positively inspire its audience through programs that are both educational and entertaining and that will inform individuals about their research and conservation efforts (Dolf de Jong, communication, 2019). This includes the Zoo's mission to create "compelling guest experiences and inspiring passion to protect wildlife and habitats" (Dolf de Jong, communication, 2019) by connecting individuals to the natural world through the implementation of digital media solutions such as augmented reality.

### **2.3 Theoretical Framework for the Proposed Study**

Changing how sellers and customers connect and interact through social/digital media facilitates a participatory process – strategic choices are made jointly between vendors and consumers and mutually beneficial enhanced value is co-created (Warren, 2013). This provides customers with the potential to contribute to value-adding and marketing decisions. The customer engagement cycle is thereby progressively enhanced.

## 2.4 Statement of the Problem to be Investigated and Hypothesis

This major research project intends to examine the impact of Augmented Reality (AR) technology as a means to increase customer engagement. More specifically, it seeks to explore how the inclusion of AR in public spaces has the ability to promote positive customer experiences that lead to higher referrals and increased revenue while reducing acquisition costs. Through a quantitative deductive analysis, this project intends to test whether the implementation of AR overlaid upon key aspects of a space has the ability to improve the perceived value of a customer's experience in that environment. How does the inclusion of AR in an environment increase the likelihood for visitors to recommend their experience? Studying the impact of AR within an environment will demonstrate how the inclusion of this technology can serve as an effective value-adding marketing strategy.



*Figure 2.1 Hypothesis Diagram, AR leads to better customer experiences.*

## 2.5 Delimitations and Limitations of the Study

This study has several limitations, as it does not test for the quality of AR and the role of aesthetics in influencing participant response. The research is limited to one small-scale exhibit inside a pavilion at the Zoo, recognizing that results could be influenced when a device is employed outdoors. Other additional variables such as screen visibility, available space, and weather may further influence customer engagement and impact the results. The study does not address specific groups of people or influential factors as a result of group demographic. Since participants were provided with a mobile device with functional AR software, the study does not

provide insight into the ability of AR to effect engagement when participants have the opportunity to use their own personal handheld devices.

## **2.6 Summary**

AR is a technology that offers the potential to overlay the environment with additional information thus enhancing visitor experiences within a public space. Public institutions such as The Toronto Zoo are looking to enhance visitor engagement to promote visitor attendance. There is current research identifying that AR has the ability to improve consumer engagement. However, this research has not measured how the inclusion of AR can lead to increasing the probability that a visitor will recommend the experience. This research seeks to examine how higher engagement leads to more positive experiences and produces greater referral rates, thereby increasing the vitality and the social selling benefits of the environment in which AR is implemented.

## **Section 3: Literature Review**

### **3.1 Overview of the Theory and Research Literature**

This literature review offers insight into current research that attempts to demonstrate the potential of AR as a technology that can lead to improved customer engagement. The review seeks to identify how AR has the potential to enhance the tourism domain in many different ways as it provides the ability to improve on-trip visitor experiences unlike any other display or technology. Additionally, this review investigates current research that demonstrates the potential of new media and social media to enhance customer satisfaction in a way that results in more referrals. Business theory further identifies the correlation between higher customer engagement and a subsequent increase in the rate of referrals, increasing social vitality and thus driving revenue without significantly impacting customer acquisition costs.

### **3.2 Theory and Research Literature**

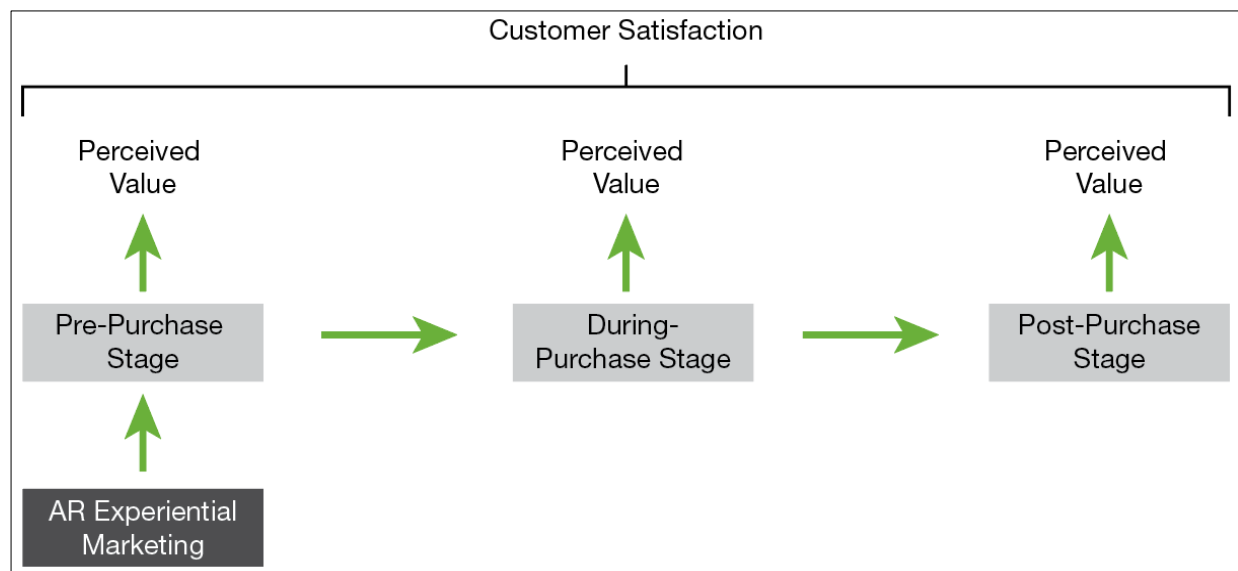
#### **3.2.1 Who Says AR Leads to Better Engagement**

A major theme in the study of AR examines the medium's ability to create enhanced experiences through the employment of this technology. There is evidence that Augmented Reality Experiential Marketing (AREM) can be a beneficial technology for companies and brands that extends beyond the short-term “shiny object” syndrome (Bulearca and Tamarjan, 2010). Qualitative studies include information that aims to shed light on the long-term benefits of using AR. They provide insight into the technology’s ability to raise customer satisfaction experiences as a means of increasing customer loyalty, intention of repetitive purchasing, positive word of mouth (WOM) and greater market share (Bulearca and Tamarjan, 2010).

Research has focused on exploring the ways in which AREM leads to an increase in perceived experiential value, and thus contributes to the development of customer satisfaction (Bulearca and Tamarjan, 2010). This informs how AR marketing can serve as a beneficial tool that extends beyond a short-term strategy, instead contributing to long term customer satisfaction – similar to other forms of experiential marketing (Bulearca and Tamarjan, 2010). AR has been defined as a technology with the ability to play an important role in improving customer loyalty, intention of repetitive purchasing, positive word of mouth, and greater market share (Bulearca and Tamarjan, 2010). Additionally, it has been identified that the current milieu of customer satisfaction finds itself in the experience economy, indicating that customers do not solely focus on products but on the experiential consumption (Bulearca and Tamarjan, 2010). Experiential marketing acknowledges that consumption drives both emotional and rational purchase considerations. The overall importance of experiential marketing is recognized for its ability to create value for the end user in addition to offering a competitive edge that will motivate consumers to make faster and more positive purchasing decisions (Bulearca and Tamarjan, 2010). Experiential value therefore delivers an emotional and functional value alongside positive customer satisfaction that can be recognized in transaction specific and cumulative aspects of a customer cycle (Bulearca and Tamarjan, 2010).

There is research focused on functional and emotional experiential values that provide the opportunity to explore the ways in which AR experiential marketing can enhance convenience. This ability proves to be a key driver in increasing purchase consideration; it can also determine the movement of a consumer from the pre-purchase to the during-purchase stage (see figure 3.1). Thus enhanced convenience is a contributing factor to the cumulative aspect of customer satisfaction (Bulearca and Tamarjan, 2010). Research additionally explores the ways in which

AR experiential marketing influences enjoyment levels, and this is considered by many academics to be one of the most important emotional values when customers engage in a consumption experience (Bulearca and Tamarjan, 2010). Lastly, studies explore the ways in which AR experiential marketing affects brand attitude. This is due to the customer viewpoint being addressed as an emotional value that serves as a communication objective in marketing. The conclusion can be drawn that when there is little positive attitude amongst a target audience, purchase likelihood decreases (Bulearca and Tamarjan, 2010). Research into AR as a means of increasing engagement aims at providing information to extend marketer's understanding of the medium's effect on experiential value. The study uses the company Glasses Direct AR application as an example in the focus group research to investigate how a brand can use AR as an ongoing marketing process (Bulearca and Tamarjan, 2010).



*Figure 3.1* Customer Satisfaction and Purchasing Stages (Adapted from Burlearca and Tamarjan, 2010).

The study concludes that the perceived benefits of AREM and the initial impression of the AR application are very positive. The research identifies how the implementation of AR can

offer time-saving abilities, practicality, and convenience (Bulearca and Tamarjan, 2010). AR positively impacts brand attitude creation, and proves to be a reliable and trustworthy application as participants can use AR to try on the glasses (Bulearca and Tamarjan, 2010). However, drawbacks emerge from a consumer standpoint when comparing a real shopping experience and the AR shopping experience. The main negative drawback of the application arises in regard to the lack of tangibility – the absence of fit and feel of an object (Bulearca and Tamarjan, 2010). However, overall the technology is well received as an experiential marketing initiative that creates a more intimate link between consumers and products.

### **3.2.2 The Ability of AR to Enhance On-Trip Experiences**

AR provides the potential to enhance the tourism domain in many different ways, as it has the ability to enhance on-trip experiences in a way that is unmatched by other types of displays and technologies (Yovcheva et al. 2013). AR receives significant attention for the role it plays in being capable of fulfilling a societal and individualistic niche demand for memorable experiences (Yovcheva et al. 2013). The technology demonstrates the ability to enhance on-trip experiences by making information about objects immediately visible and this results in better situational awareness. Unlike VR (that is a completely computer-generated environment), AR supplements the real world with information. This ability receives significant attention in the tourism as it posits the notion of enhanced tourist experiences that are technology-based (Yovcheva et al. 2013). Augmented tourism theory identifies the ideas of augmented spaces by having virtual layers of information overlaying a physical environment. This provides a visualization paradigm that is significantly different from that of VR (Yovcheva et al. 2013). Therefore, AR tourism enables real-time virtual information in tourism-related surroundings.



One of the main advantages of augmented tourism experiences are that they form a complex construct that involves the emotions, feelings, knowledge, and skills that result from the perception and processing of digital and virtual information that is not conducted in an isolated manner, but instead the technology is fused with the real world (Yovcheva et al. 2013). This transforms experience into captivating, motivating, engaging, and novelty rich events that can be seen individually and shared in groups. It is noted that the commercial success of AR will be dependant on the availability of content to support this technology (Yovcheva et al. 2013). The delivery of information occurs in many different ways such as text, pictures, images, animations, 3D models, animated 3D models or combinations of these elements. This means that AR technology is dependent on the ability to fuse the informational content with the real world. Similarly, the way in which the technology triggers the conveyance of information in the environment to deliver content has an impact on the adoption and implementation of this technology. Therefore, quality and the way in which the information is delivered can greatly impact the success and adaptation of AR technology (Yovcheva et al. 2013).

In conclusion, investigating the ability of AR to enhance on-trip experiences provides designers and developers of AR experiences with an outline to help grow the adoption of this promising technology. AR is suitable to accommodate multi-user collaborative experiences that are especially suitable for museums, indoor events, exhibitions, and other locations and institutions such as hotels and airports where on-trip experiences can benefit from additional information.

### **3.2.3 Previous Attempts to Study the Impact of AR**

In the role of augmented reality for experience-influenced environments, the impact of AR on consumer's attitudes and behavioural intentions in public spaces – more specifically cultural heritage sites – has received considerable research attention (Chung et al. 2018). Investigations have explored the causal mechanism that establishes AR as a perceived advantage, offering greater enjoyment and satisfaction within public spaces (Chung et al. 2018). Research is focused on cultural heritage sites as being among some of the most popular tourist destinations around the world (Chung et al. 2018). This is due to cultural sites typically containing many architectural elements and other components that attract a vast number of visitors yearly. AR provides visitors with additional relevant information so they can fully appreciate the significance and heritage importance of the location (Chung et al. 2018). Additionally, as a result of not having a physical impact, AR does not degrade the natural footprint of a site. AR provides access to sites with limited ingress or areas that are in preservation, maintenance, or restoration that can decline perceived visitor experience (Chung et al. 2018).

AR research has been conducted at the royal palace of Deoksugung Palace in Korea by launching a specific application created for the site called “Deoksugung in My Hands” (Chung et al. 2018). The purpose is to provide domestic and foreign visitors with high quality historical and point-of-interest information. The AR application contains 1,634 photos and videos, as well as 3D images related to the Deoksugung Palace serving as a virtual AR tour that lasts approximately 30 minutes. Offering a series of questionnaires, the study gathered information about the AR application (Chung et al. 2018). The study received a total of 145 respondents, with 94 (64.8 %) female and 51 (35.2%) male. Additionally, approximately half of the respondents were between 20 and 29 years old (46.2%) or students (60.0%). While the

respondents of their survey were young and highly educated, only 48 (33.1%) of them had previously used AR (Chung et al. 2018).

The procedures for measuring the constructs in the Deoksugung Palace study are focused on expectation confirmation, perceived advantage, aesthetic experience, perceived enjoyment, satisfaction, attitude towards the location through AR, and intention to revisit the destination (Chung et al. 2018). The survey questionnaire was first developed in English and then translated into Korean by language proficient individuals (Chung et al. 2018). The validity of the survey content was examined using existing literature and the measurement instruments were developed through the adoption of constructs previously validated by other researchers (Chung et al. 2018). Research discriminant validity is assessed by comparing the average variances that are extracted and associated with each construct, and with the correlations amongst constructs (Chung et al. 2018 and Fornell and Larcker 1981). Convergent validity is assessed by composite reliability and Cronbach's  $\alpha$  (Chung et al. 2018). The research found that reliability measures exceeded the recommended 0.70 threshold (Fornell and Larcker 1981), resulting in the strong evidence for discriminant and convergent validity that the measurement models appeared acceptable (Chung et al. 2018).

The results of the study identify a positive relationship between expectation confirmation and perceived advantage, aesthetics, and perceived enjoyment, respectively when using AR. Supporting that expectation confirmation is found to have a positive effect on perceived advantage ( $\beta = 0.273$ ,  $t = 3.794$ ), aesthetics ( $\beta = 0.520$ ,  $t = 8.817$ ), and perceived enjoyment ( $\beta = 0.240$ ,  $t = 3.583$ ) (Chung et al. 2018). In addition, the tests conducted support that aesthetics have the ability to significantly influence the perceived advantage by ( $\beta = 0.442$ ,  $t = 5.036$ ) and the perceived enjoyment by ( $\beta = 0.533$ ,  $t = 6.415$ ) (Chung et al. 2018). Proposing that a positive

relationship can be found between perceived advantage, aesthetics, perceived enjoyment, and satisfaction, these findings reveal that satisfaction is found to be significantly influenced by perceived advantage ( $\beta = 0.505$ ,  $t = 6.888$ ) and aesthetics ( $\beta = 0.178$ ,  $t = 2.083$ ) (Chung et al. 2018). However, the path from perceived enjoyment to satisfaction is not material at only ( $\beta = 0.133$ ,  $t = 1.517$ ) (Chung et al. 2018). The study finds that AR satisfaction has a significant impact on attitudes toward a destination recording ( $\beta = 0.688$ ,  $t = 11.951$ ) (Chung et al. 2018). The research does not find a significant relationship between AR satisfaction and behavioural intentions toward the cultural heritage site ( $\beta = 0.086$ ,  $t = 0.764$ ) (Chung et al. 2018). Lastly, the results conclude that attitudes toward a destination that implements AR have an impact on visitor's intentions to revisit ( $\beta = 0.372$ ,  $t = 3.415$ ).

### **3.3 Research in Cognate Areas Relevant to the Topic**

#### **3.3.1 Role of Engagement Resulting in Better Experiences which Lead to Customer Referrals**

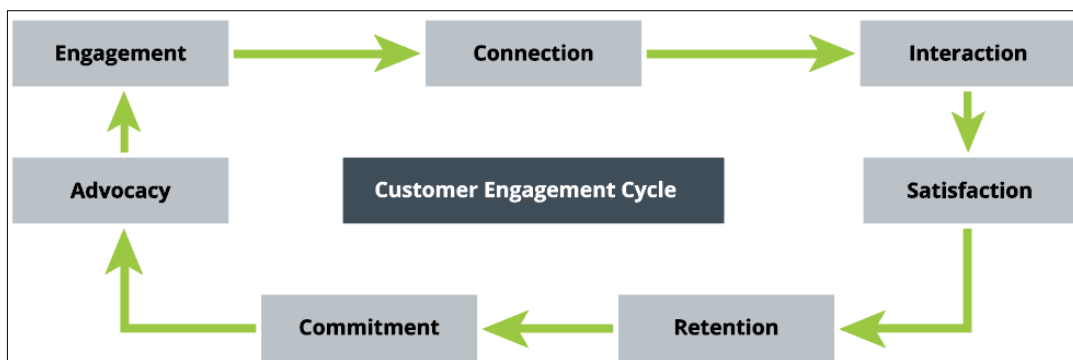
Understanding the concepts that lead to better customer engagement are essential. Therefore, a thorough understanding of the different stages and cycles of engagement help to define how digital AR can be employed to advance consumers through the different steps and lead to more referrals (Sashi, 2012). Therefore, identifying how to model the customer engagement cycle through the different stages of connection, interaction, satisfaction, retention, loyalty, and advocacy, provides understanding how AR has the ability to enhance customer relationships (Sashi, 2012).

Examining different practitioner views of customer engagement is an initial step in developing a theoretical framework. This offers a better understanding of the different aspects of

the relationship between customer engagement, buyer-seller relationships, and digital technologies such as social media (Sashi, 2012). The evolution of the internet, digital technology capabilities, and social media provide an enhanced ability to facilitate interaction between buyers and sellers (Sashi, 2012). This captures the interest of managers that seek to better understand and serve their buyers when using digital technologies. The creation of a customer experience that allows companies to build deeper, more meaningful and sustainable interactions between an organization and its customers, demonstrates that customer engagement derives from a process developed through the establishment of relationships (Sashi, 2012). Examining the impact of customer engagement on performance in the casual dining industry reveals that even an improved ratio of 2.2 customer percent in customer engagement helps to grow overall sales by 30 percent and per unit sales by 13 percent (Sashi, 2012). Similarly, this highlights that the repeated interactions between customer and brand helps to strengthen the psychological, emotional, and physical investment that a customer has with a brand (Sashi, 2012). Thus a customer's emotional attachment to an organization's brand or services will help to increase the time and attention a consumer or prospect gives to a company's brand through different channels (Sashi, 2012). To achieve metric goals such as profitability, market share, revenue, and sales volumes that reflect a seller's needs, the needs of the customer must first be met (Sashi, 2012). It is worthwhile to note that customer engagement does not mean sole purchase or transaction between seller and buyer (Sashi, 2012). The outcome of engaging customers is that they are most likely to recommend products to others through word of mouth, blogs, commenting on-line, and social networking, as consumers add value through user-generated content (Sashi, 2012). This transforms and expands the traditional role of a customer, by including them as part of the value-adding process that helps sellers understand consumer needs

(Sashi, 2012). The participatory role of an engaged customer involves taking part in the product development process, providing feedback on products and strategies, while consumers become advocates for services or products (Sashi, 2012).

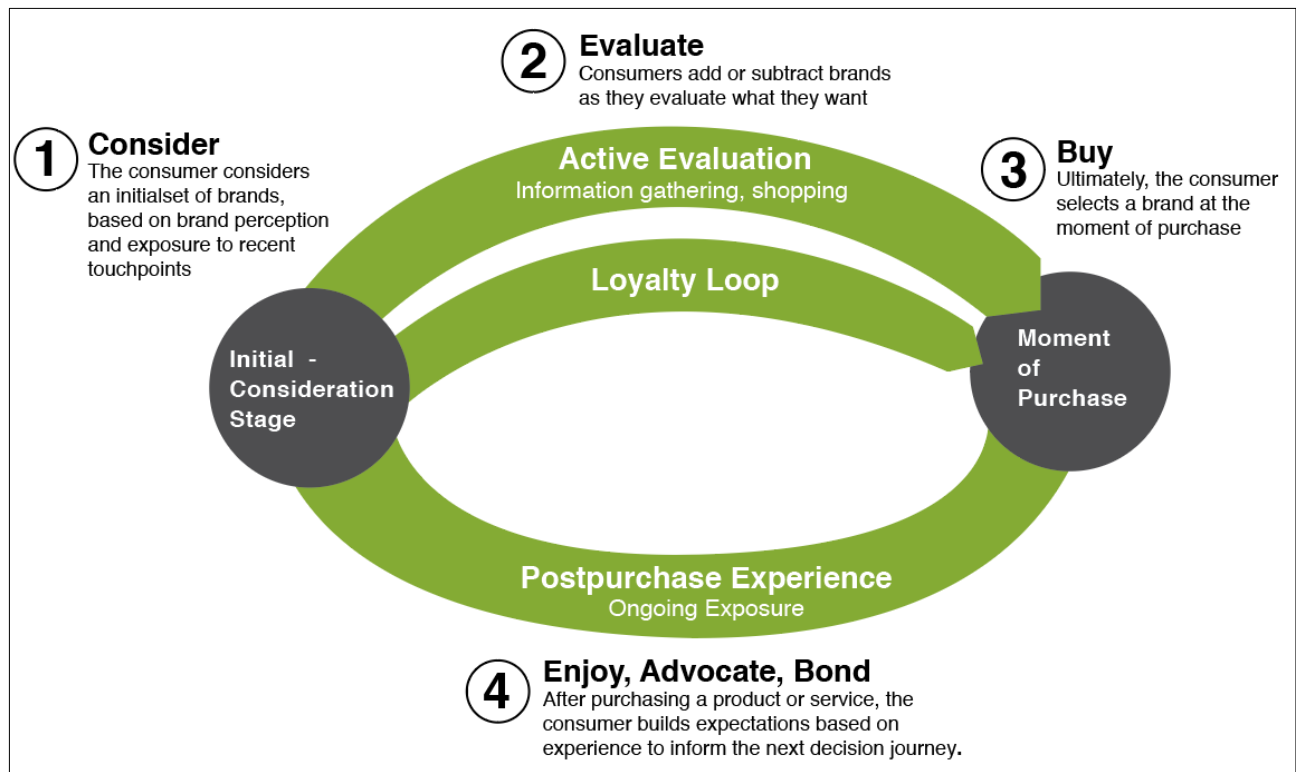
Having the ability to turn consumers into fans, provides the opportunity to reach to non-customers, thus turning existing customers into transactional customers that can help launch a new cycle of customer engagement (Sashi, 2012). The conceptual model of customer engagement provides a basis for developing customer engagement strategies that can be used both online and offline (Sashi, 2012). Engagement is achieved by facilitating customer's through several stages of the customer engagement cycle such as connection, interaction, satisfaction, retention, commitment, advocacy, and engagement (see figure 3.2). As sellers and customer interact through digital mediums such as social media, customers gain the ability to participate in making strategic choices jointly with sellers and therefore value is co-created. Lastly, digital technologies such as social media helps to connect sellers with other customers and non-customers.



*Figure 3.2 Customer Engagement Cycle (Adapted from Sashi, 2012).*

### **3.3.2 The Importance of Customer Referrals in the Consumer Decision Process**

Social media has fundamentally changed the consumer decision process, evolving a more sophisticated view of customer engagement with brands (Hudson and Thal, 2013). Utilizing social media after the purchase stage can allow customers to establish relationships with the brand (Hudson and Thal, 2013). In the consumer decision journey the customer identifies several stages: (a) consider, (b) evaluate, (c) buy, and (d) enjoy, (e) advocate and bond (Hudson and Thal, 2013). Digital and social media increase the relevance and potential for a customer to engage in the process of evaluation and advocating (Hudson and Thal, 2013). In the first stage “consider”, social media campaigns are used to drive traffic. In the second “evaluation” stage, consumers take part in outreaching to sources of information that will most likely influence, shape, and ensure their choices (Hudson and Thal, 2013). Online reviews play an important role during the evaluation stage, providing an opportunity for the company to demonstrate how it addresses and mitigates negative comments and also gaining cost free advertising from positive consumer reviews [See Figure 1.1. Customer Evaluation Process] (Hudson and Thal, 2013). Samples from the travel industry identify how blogging sites and online communities can influence the evaluation stage (Hudson and Thal, 2013). As the emergence of brand communication coincides with the growth in consumer empowerment, it should be noted that a passive role to marketing is best suited when facilitating to a brand’s community (Hudson and Thal, 2013). However, in the after purchase, a deeper brand connection begins as the consumer interacts with the product and with online touch points (Hudson and Thal, 2013).



*Figure 3.3 Customer Evaluation Process (Adapted from Hudson and Thal, 2013).*

Research demonstrates that in the travel industry, resorts leverage the enjoy, advocacy, and bonding experiences shared by customers as part of their social media strategy to gain new clients (Hudson and Thal, 2013). For example, ski resorts provide internal rewards such as vertical miles skied within their resorts, providing on the hill information and using this data to provide special accomplishments for their guests (Hudson and Thal, 2013). These achievements are recognized as digital collective pins that can be instantly flaunted on Facebook after downloading the resorts app (Hudson and Thal, 2013). Additionally, highlights into customer check-ins used in exchange for discounts or coupons by Foursquare, Gowalla, and Loopt are used to invoke interactions from customers. This provides the opportunity to create conversations, exchange information, share stories, demonstrate experience, and share advice



that provides a new level of customer participation and ultimately serves as a way to generate more sales (Hudson and Thal, 2013).

Companies who engage with their customers on an ongoing and consistent basis while utilizing social media are able to create better engagement thus reinforcing, strengthening, and increasing the durability of a brand (Hudson and Thal, 2013). As a result this leads to stronger return on investment (ROI) for companies that employ social media as part of their customer engagement strategy.

### **3.3.3 Impact of New Media on Customer Relationships**

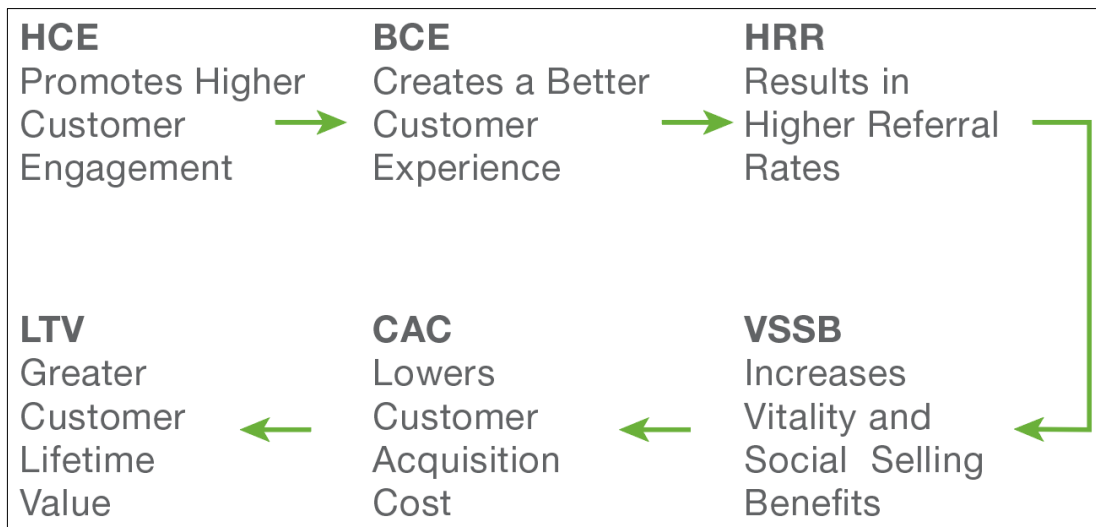
New media encompasses digital communication channels in which active customers engage in behaviours that can be consumed by other users in real time and long after, regardless of their location (Thorsten, et al. 2010). The way in which customers gather and exchange information about products has changed, as well as the way in which they obtain and consume them (Thorsten, et al. 2010). This is the result of new media channels that more actively encourage customer engagement by providing businesses with an opportunity for growth through adaptive strategies (Thorsten, et al. 2010). Due to the evolution of digital technologies, companies are taking further steps to understand the impact of how new media impacts customer relationships (Thorsten, et al. 2010). A business' failure to notice the advantages provided by digital and social media would lead to a lost opportunity at better understanding customer behaviour, squandering the chance to successfully manage customer interactions and effectively measure a customer's activities and the outcomes of sales and services (Thorsten, et al. 2010).

Through smartphones the exchange of real-time information has become an integral element of consumer behaviour anytime and anywhere (Thorsten, et al. 2010). The digital aspect

of new media allows consumers the ability to produce content without having to pass through a gatekeeper such as a publisher, thus allowing anyone to create content (Thorsten, et al. 2010). This system provides the opportunity for consumers to be proactive, contributing to all aspects of the value chain relevant to a service or product (Thorsten, et al. 2010). This leads to the co-creation of products through feedback as seen in technological companies such as Firefox browser (Thorsten, et al. 2010). Through digital consumer articulation, consumers are able to share their comments and reviews about services and products as well as the companies that produce them (Thorsten, et al. 2010). Electronic-word-of-mouth (EWOM) provides the ability for sellers and potential customers to gain insight and helping to hinder the diffusion of a poor product sooner, while accelerating the delivery of a good product to new clients (Thorsten, et al. 2010). This suggests that customer engagement through online communities has the ability to shape consumers' brand perception through EWOM (Thorsten, et al. 2010). Additionally, it can be noted how powerfully mobile technologies can facilitate market reach, increasing the number of consumers through their personal communication devices for maximum outreach (Thorsten, et al. 2010). This offers customers the opportunity to receive immediate permission and location-based services, thus offering the potential for data collection and bringing forward capabilities and benefits for businesses and marketers to connect with their customers while receiving immediate feedback (Thorsten, et al. 2010).

As a result, understanding consumers offers the opportunity to predict user preferences, providing a deeper understanding in regard to customer's acceptance of recommenders (Thorsten, et al. 2010). Therefore, the availability of customer reviews in addition to recommendations increase the trust and social value of an organization's online presence (Thorsten, et al. 2010). Overall, the way in which customer relationships are managed is essential

to consumers as they have become active partners that help producers co-create content. This is achieved by developing a strong connection with other consumers.



*Figure 3.4 Higher Customer Engagements Leads to Greater LTV Process Chart*

Thus, higher customer engagement, higher engagement leads to more positive experiences, positive experiences lead to higher referral rates, higher referral rates increase vitality and social selling benefits, this lowers customer acquisition cost and results in greater customer lifetime value.

### 3.3.4 Social Media and Outbound Ticket Sales:

Examining the current implementation of social media strategies by ticket sales organizations across collegiate and minor sports, the study provides insight into measuring social media usage rates across various platforms. Further it investigates how social media is used throughout the sales process and how it affects sales performance (Warren, 2016). The growing recognition of the power of social media as a communication medium for commerce has led organizations to look at ways to effectively incorporate social media into their customer relationship-building activities (Warren, 2016). Research in this field identifies that social media serves as an integral support dimension and key facilitator of purchasing decisions. Most

organizations have some sort of social media presence due to the technology's ability to serve as a strategy that facilitates fan engagement (Warren, 2016). Social media provides the opportunity for organizations to have ongoing dynamic engagement with their customers (Warren, 2016). By facilitating an open and dynamic communication with its customer base, many organizations provide assistance in case of product or service failure, and develop new engagement strategies using customer input (Warren, 2016). Utilizing social media platforms provides salespeople with an enhanced trackable reach that permits them to be even more present within their own networks (Warren, 2016). This defines the building blocks of social media as the core concept of engagement and collaboration, meaning that social selling is a key component for recruiting prospects by salespeople (Warren, 2016). Studies that investigate the implementation of social media in a ticket sales context compare the effects of traditional phone sales with social media selling (Warren, 2016). As a result, these studies provide a series of recommendations as to how an organization can strategically integrate social selling at each step of the sales process (Warren, 2016). Businesses should fully articulate their goals when using social media communication, as this would help to match customer preferences and expectations (Warren, 2016). Articulating social media goals can assist in providing a series of recommendations as to how an organization could strategically integrate social selling at each step of the sales process (Warren, 2016). Research shows that businesses that join social media groups such as LinkedIn and Twitter are better positioned to serve customers (Warren, 2016). It is suggested that approaching customers with activities such as posting news stories on Facebook and tweeting about innovative ideas can generate more sales (Warren, 2016). This provides a variety of ways to present product information through the various platforms (Warren, 2016). In the first season of Sacramento

King sales, the implementation of a social media sales strategy saw a 42% increase on the average ticket sales, surpassing their own ticket sales goal by 50% (Warren, 2016).

To analyze social media engagement through the sales process, studies utilizing a survey in accordance with the theoretical frameworks of sales engagement are employed (Warren, 2016. Andzulis et al. 2012. Kaplan and Haenlein 2010). Utilizing twelve (12) resulting measurement constructs, the study's dependent variable seeks to measure a self-report of sales performance (Warren, 2016). The survey employs the likeable scale rating items that are anchored on "*strongly agree*" and "*strongly disagree*" with additional responses that address basic demographic and social media usage questions (Warren, 2016). The analyzed data examines social selling in a sport context measuring basic frequency statistics that investigate and assess the state of social media usage among ticket salespeople and analyzes the variance (Warren, 2016). Comparing top-performing reps to baseline reps demonstrates the difference in usage of social media platforms in selling situations by salespeople (Warren, 2016).

With a total of 126 usable responses the study consists of 64.3% males (n = 81) and 22.2% females (n = 28) with 13.5% (n = 17) preferring not to respond (Warren, 2016). Most respondents were between 21 and 29 years of age 82.5% (n = 104). The results indicate that 30.2% (n = 38) work for a major professional team of, 65.9% (n = 83) in college athletics, and 4.0% (n = 5) in minor league sport (Warren, 2016). Furthermore, 41.3% of respondents are categorized as top performers, while the remaining 58.7% were considered baseline salespeople (Warren, 2016).

The study results demonstrate that Facebook is found to be an incredibly popular platform with 88.9% of active salespeople (Warren, 2016). Additionally, the study highlights that the most popular platform amongst salespeople is the LinkedIn platform with an active

participation rate of 95.2% (Warren, 2016). This reveals that top performing ticket sellers are active on a variety of ticket sales platforms (Warren, 2016), demonstrating that top sales performers integrate social media into their selling efforts more regularly than the baseline non top performers.

Evidence from research leads to the conclusion that there is a need to incorporate social media as part of customer engagement strategy as a viable selling initiative. Top performing reps integrate social media as part of their sales strategy more significantly than the baseline salespeople (Warren, 2016). This provides evidence that using social media platforms as a strategy for customer engagement results in increased sales (Warren, 2016). This reveals that in the six step business to business perspective: 1) understanding the customer, 2) approaching the customer, 3) discovering customer needs, 4) presenting, 5) closing sales, and 6) following up/providing service (Warren, 2016), social media proves to be the differentiating factor when approaching the customer and determining customer's needs (Warren, 2016). This validates that social media is an effective mode of communication that enhances the ability of the salesperson to engage the customer.

### **3.4 Critique of the Validity of Appropriate Theory and Research Literature**

As noted, current research demonstrates the potential of AR as a technology that can lead to better customer engagement. This is due to the potential of AR to enhance on-trip experiences in a way that is unparalleled by other displays and technologies. Research demonstrates that new media has the potential to provide an opportunity to enhance customer satisfaction and lead to better referrals. This identifies that higher customer engagement as a result of digital participation leads to a higher rate of referrals, thus improving social vitality, while driving

increased revenue without significantly impacting customer acquisition costs. Research focus is based on exploring the ways in which Augmented Reality Experiential Marketing (AREM) provides insight into the creation of perceived experiential value that contributes to the development of increased customer satisfaction (Bulearca and Tamarjan 2010).

The review of literature identifies several limitations extant in the current research. Research demonstrates that visitors intend to revisit a public space when an additional layer of information is provided by AR. The study does not measure the likelihood of visitors to recommend a visit to someone else. Additionally, the study demonstrates that there are positive links between expectation confirmation and perceived advantage, aesthetic experience and perceived enjoyment attributed to AR application and experience satisfaction. However, the data informing the research is based on a very small sample, targeting a very limited type of participant such as college students between 20 to 29 years of age who have previously used AR. Unfortunately, this causes limitations and does not provide information that relates to how a wider demographic would respond to using the AR application in a public place. Research into the role of customer engagement provides a limited viewpoint on the part that social media plays in enhancing customer interaction. Future studies can examine the role of emerging technologies (such as AR) in providing better customer engagement that result in better experiences, translating into increased customer lead referrals. From a critical viewpoint, the research into the importance of customer referrals does not address the relationship that a customer establishes when engaging with media that connects the consumer with their environment such as an AR application in a public institution.

### **3.5 The Contribution this Study Will Make to the Literature**

This study intends to contribute to AR and business literature by providing quantifiable figures that demonstrate the ability of AR to impact an environment. As the literature review illustrates, while current studies have shown that AR is a technology that can provide better user experiences, there is a lack of research that examines the impact of how this medium can be utilized in public spaces and cultural environments as a means to increase a visitor's perception of value (Chung et al. 2018). Research has identified that AR has the potential to enhance the tourism domain in many different ways, as it provides the ability to improve on-trip experiences that is unmatched by other types of displays and technologies (Yovcheva et al. 2013). Additionally, The findings of this study are important to the AR and business fields as they demonstrate how the inclusion of AR can lead to higher customer engagement. Higher engagement leads to more positive experiences and produces greater referral rates, thus increasing the vitality and the social selling benefits of the environment in which AR is implemented.



## **Section 4: Research Procedures**

This section provides the methodological approach that forms the basis for this study. Firstly, an introduction into the paradigm and general approach for conducting the research will be outlined. Secondly, the type of study and specific research question that comprise the groundwork for the research will be addressed. Thirdly, an examination of the data collection will provide a detailed description of the sample and size, the instruments involved in the study, and the details associated with the A/B test that was performed onsite will be analyzed. Fourthly, a chronological breakdown will be provided so future research may replicate or expand this study. This section provides the details that help to maintain the validity and reliability of the information collected and overall research that was obtained. Included are the details for the data analysis that was conducted as well as insight into the role of the researcher in regards to the study. Lastly, this section outlines the procedures involved in the study to ensure that the research was ethical.

### **4.1 Research Methodology**

The objective for this project is to utilize three key metrics in the experiment to help understand which group communicates its content most clearly to users, and which category results in providing visitors with better experiences (Young, 2014). User participation serves as a way to measure the initial ability to attract users (Young 2014). Visitor drop-off rate gauges the percentage of users who choose not to participate based on challenges they may experience with the technology and equipment (Young 2014). The likelihood to recommend the experience serves as a measure to calculate the ability to meet user expectations (Young 2014). The implementation of the A/B test provides the opportunity to gather quantitative user data by

testing the variations through direct user feedback in order to test the proposed hypotheses (Young 2014). The highest-performing variation validates an improvement to the visitor's experience that meets their expectations to a higher degree (Young 2014). Thus the study explores the impact of a digital AR layer over the environment by performing an A/B test that provides the optimal ability to communicate the relevant information that tests the improvement in visitor engagement and event attendance (Young 2014).

This deductive study attempts to provide quantitative evidence that AR can be used as an actionable marketing tactic within an environment, thus improving overall customer satisfaction. Since the study must compare the mean scores between two different groups, the implementation of an A/B test serves as the appropriate method to capture the information and provide the ability to capture statistics and significant levels of data (Fisher, 215 and Bryman, 211). Furthermore, collection of quantitative data proves useful as it furnishes the opportunity to examine the relationships, patterns, and the ability to express these patterns with numbers as specific statistical results of behaviour (Kjell, 26).

## **4.2 Specific Procedures**

To measure whether the use of augmented reality has the ability to improve the perceived value of a visitor's experience in the environment, both sets of participants answer the same survey question. Additionally, a hashtag was made available to participants for the duration of the test allowing participants to post on social media. The hashtag serves as a way to track and measure the overall social media impact of each test, providing the opportunity to cross-reference and analyze the data to quantifiably measure the differences between the two tests. By

providing the hashtag it is expected that a relationship between the social media posts and the proposed hypothesis can be made.

#### **4.2.1 Onsite Research Approach and Chronological Breakdown**

Day 1 serves as the pilot run to allow for any adjustments prior to collecting data. Day 2 serves to establish the baseline/benchmark for the test. The Happy or Not™ rating survey kiosks were placed next to both entrances to the corridor of the pavilion. Terminal #1 was located inside the corridor beside the north entrance door, while terminal's #2 and #3 are located at the south entrance.

**Non-AR survey portion of test:** On days 1 and 2 the survey was conducted from 10:00 am to 4:00 pm, with a one-hour break between 12:00 pm and 1:00 pm. Participants were notified that they were able to use the hashtag #TorontoZooExperience to share their experience on social media with their own devices.

**AR implementation & survey:** On days 3 and 4 the AR experience was introduced into the environment. Data was collected from 10:00 am to 4:00 pm, with a one-hour lunch break between 12:00 pm and 1:00 pm. Five volunteer research assistants were available to help the participants, handle the devices, conduct surveys, and record the number of people who declined to participate in the experience. The participants were given a quick demonstration of how the AR application worked and were then permitted to explore the exhibit on their own using the provided handheld device. For larger groups of children such as summer camps, one device was given to a participant and they would take turns looking at the AR on the enabled device. For the AR portion of the test, participants were informed that the hashtag #TorontoZooAR was available for them to share their experience on social media with their own devices.

**AR application and experience details:** The signage that served as a launch point for the AR was identified to the participants. The AR application showcased six (6) animals including 3D models of a cheetah, giraffe, zebra, gorilla, and two augmented videos projected on the signage posters of the rhinoceros and river hippopotamus. The software offered participants with the opportunity to control the 3D models to make the animals, walk, run, or trot by manipulating a simple UI. Additionally, the user interface included a point for participants to learn more information about the actual animals, their habitat, behavioural traits, etc. The hashtag #TorontoZooAR was printed and posted in various visible places informing participants on how to post to social media relating their experience.



*Figure 4.1 AR application and Image Target Poster.*

#### **4.3 Research Population or Sample**

The research was conducted at The Toronto Zoo in a confined area near the main entrance of the African Rainforest Pavilion. There were live animals and birds on exhibit, printed informational graphics about the animals, and other displays about the African Rainforest in this location. This corridor offers the opportunity to greet people, inform them about the study, and allow individuals to participate in the experiment and complete the survey before exiting the

exhibit. With approximately 2,500 people visiting the African Rainforest pavilion during a peak season weekday (D. James, personal communication, May 07, 2019), the research estimated a total potential sample size of 600 participants, or 300 people per sample group. This study employed a purposive sampling method as a means to gather participants, with over 7,000 daily visitors it was determined that the sample size would encompass a wide range of participants. The critical reader may note that this method of participant collection may lead to a lack of randomness in the sample means. For this specific quantitative study, it was believed that the wide range of visitor demographic that attends The Toronto Zoo on a regular day would provide a varied range of participants to confidently represent a sufficiently diverse portion of the population.

#### **4.4 Instrumentation**

A rating scale style survey was used as it best suited to ask respondents to rate/evaluate a service or experience by indicating the nature of their opinion by choosing the appropriate place on the scale (Fisher, 194). The implementation of a rating scale would demonstrate the varying spread across the results providing insight and evidence demonstrating the differences between the degrees of satisfaction (Fisher, 194). The A/B test was able to delineate the fine differences between people in terms of the characteristics in question, while also detecting variations in levels of experience satisfaction (Fisher, 194). Utilizing three (3) Happy or Not™ terminals provided the opportunity to capture the data, measure the research, and to produce precise results ensuring overall research consistency. Four (4) mobile Android Pixel 3 phones were utilized to present the augmented reality experience. After participants viewed the exhibit they were asked to answer the survey question.

#### **4.5 Pilot Study**

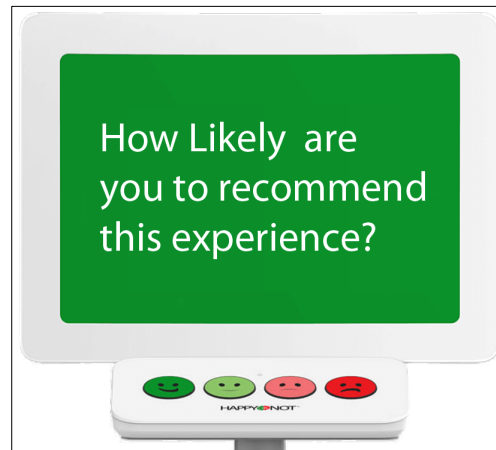
The first day of the study served as the pilot run, as it offered the opportunity to identify how individuals responded to the approach, location, and position of the machines. The pilot run informed the best way to approach participants so they understood that the survey question applied specifically to the exhibit, and not to the entirety of their experience at the Zoo. It also informed how research volunteers proximity to the survey terminals could potentially impact the participants answer. For these reasons, the pilot study was essential to understand how to proceed forward with the rest of the data collection days, helping to ensure the validity and consistency of the gathered data.

#### **4.6 Data Collection**

Participants were recruited onsite as they entered the African Rainforest Pavilion where the experiment was taking place. The individuals comprised a wide range of diverse backgrounds including adults, tourists, children, school programs (summer camps), and individuals with accessibility needs. Participants were approached on a first come first serve basis and the study did not exclude participants based on racial, ethnic, or any other discriminatory basis. To maintain consistency with the existing site, new signage had a similar look and feel with pictures of the animals to be exhibited with AR. The new signage with images of the animals were installed in the environment on Day 1 prior to the commencement of the test.

To measure whether the use of augmented reality when overlaid upon key aspects of a space has the ability to improve the perceived value of a visitor's experience in that environment, both sets of participants answered the same survey question. The survey was collected

electronically after participants viewed the exhibit using a Happy or Not™ rating survey terminal. The survey asked the participants to rate their experience based on a Behavioural Anchored Rating Scale (BARS), using a smiley face to represent the positive end of the scale and a series of increasingly scowling faces for the negative end of the scale (Fisher, 194). The survey posed the following question: How likely are you to recommend this experience?



*Figure 4.2 BARS Rating Survey Kiosk with Survey Question.*

Due to the large number of people visiting the test site in a day, having a one question survey helped to reduce friction for the participants. Additionally, The rating satisfaction survey was introduced through the BARS survey as it would help to attribute a numerical value to positions on the verbal scales (Fisher, 2007). This provided the opportunity for respondents to rate and evaluate their experience on a graduated scale based on how they felt. The survey collection was accomplished by utilizing the Happy or Not™ rating survey terminal as they have the ability to collect the research data with access to software that provides immediate analytics after each collection day. This yielded information in regards to experience, overall distribution, a percentage breakout of feedback responses per rating selection, trendlines including percentage change in participant feedback, total distribution of satisfaction segments, top and bottom performing areas of the survey, and reporting through an overall distribution. The

Happy or Not™ software also included a built-in filter setting that canceled excessively repeated button presses to help ensure data accuracy. As participants returned the AR enabled devices, they were asked to answer the one question survey on the terminal. One of the research volunteers recorded how many people did not take part in the survey as participants left the exhibit. When all the AR handheld devices were in use, individuals were informed of the short wait until a handset would become available.

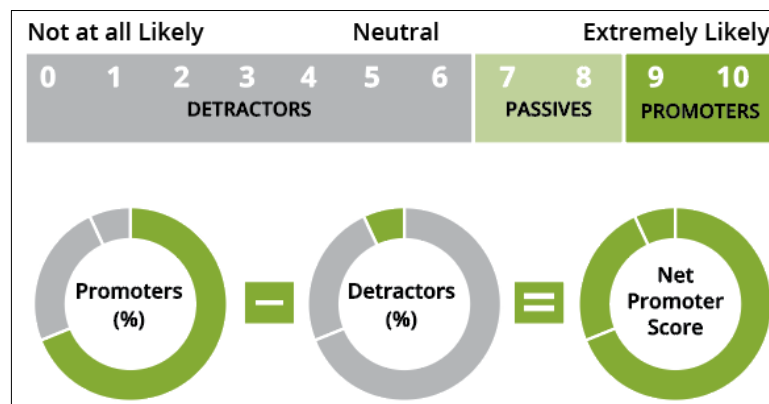
#### **4.7 Treatment of data**

To avoid data contamination only the researcher had access to the data, and all findings were shared with the thesis supervisor. The survey information was recorded digitally, and these records were acquired daily to ensure that no information was lost, providing the ability to monitor for extreme abnormalities. To ensure measurement stability, the test was conducted over two consecutive days for both portions of the A/B test to confirm confident results (Bryman, 162). All information captured at the kiosks was available for analysis. Due to the large volume of people that passed through the exhibit, to ensure test validity the study cross-referenced the survey information with the counted number of people that participated in the survey. Using a hand-counter, research volunteers recorded the number of people that participated and did not participate in the survey.

To analyze the results of the data, Net Promoter Score®, or NPS® was used as it measures customer experience and predicts business growth. This proven metric transformed the business world and now provides the core measurement for customer experience management programs the world round (NetPromoter, 2019). In the Net Promoter Score® detractors (score 0-6) are unhappy customers who can damage your brand and impede growth through negative



word-of-mouth; passives (score 7-8) are satisfied but unenthusiastic customers who are vulnerable to competitive offerings; promoters (score 9-10) are loyal enthusiasts who will keep buying and refer others, fueling growth (NetPromoter, 2019). Net Promoter Score was utilized as it highlights the tendency of loyal customers to bring in new customers – at no charge to the company – this is particularly beneficial as a company grows, especially if it operates in a mature industry (Harvard Business Review. Reichheld, 2003) such as the Zoo. In such a case, the tremendous marketing costs of acquiring each new customer through advertising and other promotions make it hard to grow profitably (Harvard Business Review. Reichheld, 2003). In fact, the only path to profitable growth may lie in a company’s ability to get its loyal customers to become, in effect, its marketing department (Harvard Business Review. Reichheld, 2003). Therefore, by utilizing the Net Promoter Score® within the study would provide the ability to measure the overall impact of AR.



*Figure 4.3 Net Promoter Score® Chart.*

#### 4.8 Research Ethics

Consent was obtained pursuant to methods dictated by Ryerson University Research Ethics Board (REB 2019-269).

## **4.9 Summary**

This section provides the methodological approach that informs the basis for this study, delivering insight into the details that help to maintain validity and reliability of the information collected and overall research. The instruments used included the details for the data analysis that was conducted. Details were provided about the AR application implementation. Lastly, this section outlines the procedures involved while conducting the research.

## **Section 5: Findings**

### **5.1 The Plan of the Study and Hypothesis**

This major research project examined the impact of Augmented Reality (AR) technology as a means to increase customer engagement. More specifically, it explored how the inclusion of AR in public spaces has the ability to promote positive customer experiences that lead to higher referrals and increased revenue while reducing acquisition costs. This deductive quantitative analysis intended to test whether the implementation of AR when overlaid upon key aspects of a space has the ability to improve the perceived value of a customer's experience in that environment. Furthermore, the analysis explored how the inclusion of AR in an environment would increase the likelihood for visitors to recommend their experience. This research analyzes the impact of AR within an environment to demonstrate how the inclusion of this technology can serve as an effective value-adding marketing strategy.

### **5.2 Procedures**

The study sought to measure the impact of AR on the environment through an A/B test that was performed onsite in a high traffic corridor of the African Rainforest Pavilion.

The study consisted of the following elements:

- 1) Establishing a baseline to measure the impact of AR.
- 2) Experiencing the installation with a handheld device equipped with an AR application.
- 3) Recruiting visitor feedback by utilizing a Behaviourally Anchored Rating Scale (BARS) that posed the survey question: "How likely are you to recommend this experience?".
- 4) Utilize the Net Promoter Score® (NPS®) as a method to measure visitor engagement following the implementation of AR.



*Figure 5.1* Images of the study conducted at The Toronto Zoo including exhibit area, survey kiosk, and AR animal displays

### 5.3 Supporting Evidence to Support Hypothesis

**Day 1:** Of the 710 responses collected: (80%,  $n = 569$ ) answered highly likely to recommend the experience, (14%,  $n = 102$ ) were likely to recommend the experience, (3%,  $n = 21$ ) were not likely to recommend the experience, and (3%,  $n = 18$ ) were highly unlikely to recommend the experience. It was recorded that 115 individuals decided not to take part in the survey. This resulted in an overall NPS® score of 75. However, It was realized that by approaching individuals and asking them to leave their feedback had an influence on how they answered the survey. This was a result of 1) how close the research assistants were standing to the survey terminal and 2) the participant's predilection to associate the study with the Zoo as a whole and not exclusively to the intentioned exhibit. After looking at the data collected from the first day, it was realized that approaching individuals while standing close to the machines was actually influencing their ability to provide honest feedback. Therefore, the data collection for

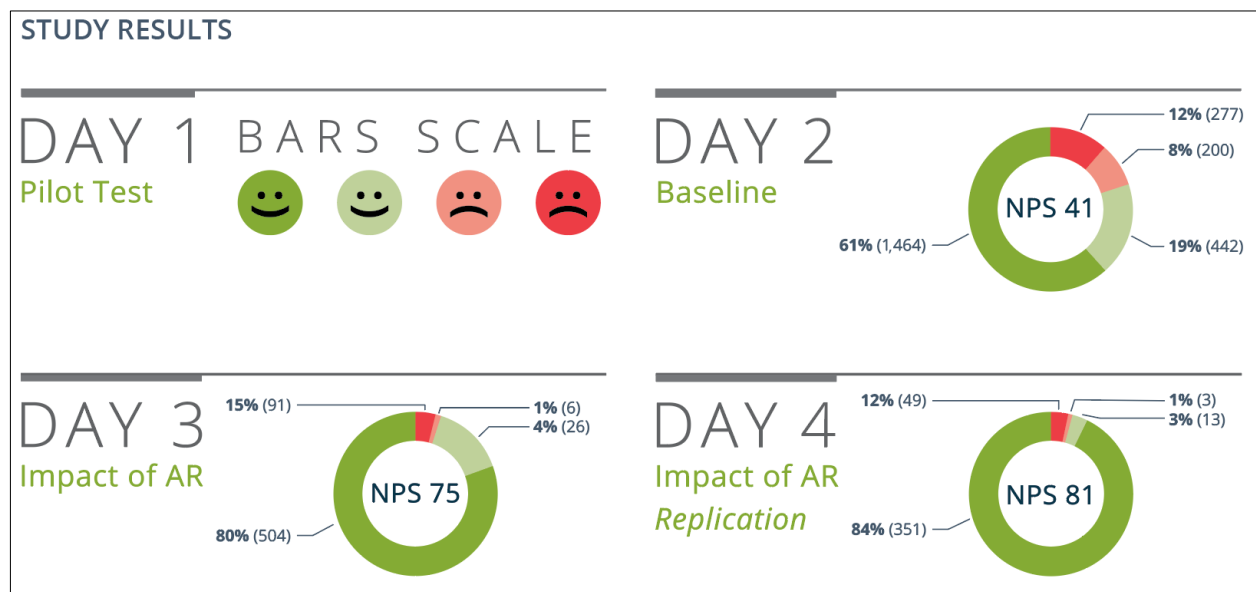
Day 1 was dropped, and the day served instead as a pilot run to fine-tune the strategic approach for the following days.

**Day 2:** Of the 2,383 responses, (61%, n = 1464) answered highly likely to recommend the experience, (19%, n = 442) were likely to recommend the experience, (8%, n = 200) were not likely to recommend the experience, and (12%, n = 277) were highly unlikely to recommend the experience. It was recorded that there were 635 individuals who did not take part in the survey. This resulted in an overall NPS® score of 41.

**Day 3:** On Day 3 AR was introduced into the exhibit. After the participants experienced the AR, they were asked to take the survey. Of the 627 responses, (80%, n = 504) answered highly likely to recommend the experience, (15%, n = 91) were likely to recommend the experience, (1%, n = 6) were not likely to recommend the experience, and (4%, n = 26) were highly unlikely to recommend the experience. It was recorded that 86 individuals declined to take part in the survey. This resulted in an overall NPS® score of 75.

**Day 4:** AR was again implemented in the exhibit. After the participants experienced the AR they were asked to take the survey. Of the 416 responses, (84%, n = 351) answered highly likely to recommend the experience, (12%, n = 41) were likely to recommend the experience, (1%, n = 3) were not likely to recommend the experience, and (3%, n = 13) were highly unlikely to recommend the experience. It was recorded that 94 individuals decided not to take part in the survey. This resulted in an overall NPS® score of 81.

**Effectiveness and Utilization of Social Media Hashtags:** Through the duration of the study no posts were made to social media using either one of the hashtags provided to participants. Upon reflection, not including the ability to post directly from a handheld device proved to be a deterrent for participants to utilize social media. Additionally, with the large number of participants it was difficult to ask everyone to engage with social media.



*Figure 5.2 Study Daily Results Survey Feedback*

## 5.4 Summary of Findings

A total of 3,426 visitors participated in the study, 1,043 or 30.4% of which experienced the augmented reality application on the handheld device. All participants were asked to rate: “How likely are they to recommend the experience?”. The baseline demonstrated that with an NPS® score of 41 only 41% of the visitors (without augmented reality) would recommend the exhibit. After the inclusion of AR in the exhibit a total score of NPS® 77.8 was recorded, indicating that 77.8% of the visitors who used the AR application would highly recommend their experience.

Thus, the intervention of AR in the exhibit resulted in a 36.8 NPS point or +90.24% increase in customer engagement and the higher likelihood that visitors would recommend their experience at the Zoo. This confirms the hypothesis that adding augmented reality increases the virality potential in public spaces as a result of higher customer engagement.

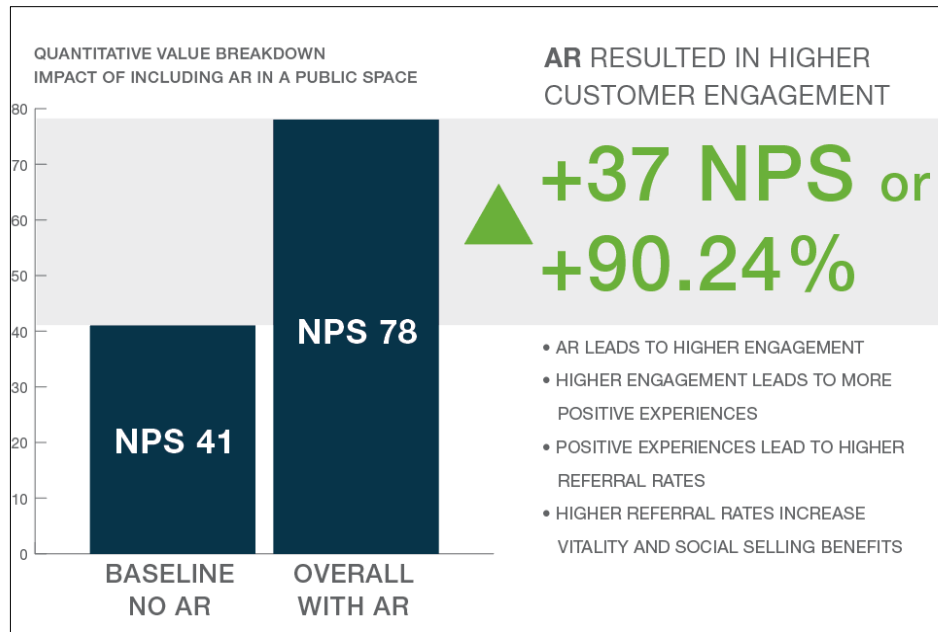


Figure 5.3 Impact of AR on Customer Engagement

## **Section 6: Conclusion and Discussion**

It can be concluded that AR in public spaces can enhance consumer experiential value. AR can be leveraged as a key technology to help increase purchase consideration, encouraging positive customer engagement and increasing both emotional and functional value. This establishes that the implementation of AR in a public space can improve customer satisfaction. This deductive and quantitative study demonstrates how the inclusion of AR can provide businesses with a valuable advantage that should encourage the application of this technology. It is hoped that the increased adaptation of this technology will promote further research and advancements in the AR field.

The findings of this study are important to the AR and business fields as they demonstrate that the inclusion of AR leads to higher customer engagement. Higher engagement leads to more positive experiences and produces higher referral rates, thus increasing the vitality and the social selling benefits of an environment in which AR is implemented. The findings determined that the inclusion of AR in public spaces can significantly increase the likelihood of a visitor to recommend the experience. This research provides quantifiable factual evidence that AR has the ability to increase customer engagement.

The outcome of this study may be subject to certain limitations. Quantitative methods such as surveys and observations may not be able to completely assess the influences and perceptions of the users who participated in the study (Fisher, 2007). The survey and observational tactics employed may not fully capture the emotional responses of the users, and may minimize the distortions imposed by time on the recall of feelings (Fisher, 2007). Testing user experience through convenience sampling within a particular site may result in subject bias, thereby favouring a technologically novel effect (Young et al., 2018). Further research would



seek to extend the amount of time during which the A/B test would be conducted, also looking to ensure that the sample size between the baseline and AR participants are within the same range. Future studies could look at ways to encourage users to employ social media, resulting in more posts and increasing virality by including AR in the environment. A next step for this study would be to compare the cost of intervention with the impact on ticket sales and promotion at the host institution.

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