Understanding Virtual Reality in Marketing:

Nature, Implications and Potential

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Abstract

A new wave of virtual reality (VR) development promises to make the technology mainstream, and with it to provide an exciting new platform for consumer marketing. The impacts of VR on marketing are currently not well understood. This paper provides a framework for understanding the impact of virtual reality on consumers, integrating individual, technology and social levels, and focusing upon the central role of presence, consumer VR experiences and socialness in driving changes in consumer engagement. The paper illustrates the value of VR in marketing through a number of current examples of the use of virtual reality in marketing functions, and examines the nature of the experiences offered. It further provides a framework for positioning the level of VR consumer engagement based on location and interactivity. The paper rounds off with a discussion of the future of VR and a number of problems that need to be solved.

Keywords: virtual reality; VR; presence; framework; experience; examples; consumers.

1. Introduction

Virtual reality (VR) is not a new technology. Early computerized VR began in the late-1960s (VRS 2016), but it was not until the 1980s that the name was coined, alongside the commercial release of head mounted displays and haptic gloves attached to a computer that simulated 3D environments in surround stereoscopic vision (Brey 2008). VR began to appear in computer games in the early 1990s, while Ford began using VR for design and production of its vehicles in 1999 (Gaudiosi 2015). However, VR never became a mainstream consumer product. Now, like

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tablet computers and wearable computer watches, the hope is that VR will come of age. The impact of VR on gaming, entertainment, marketing, education, product design, communications and other aspects of business is likely to be considerable. The development of VR now is being compared to that of social media in 2008, prior to becoming mainstream (Morris 2016).

According to the Oxford English Dictionary, virtual reality refers to "The computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors." NASA (2016) provide an even more technical definition of VR as "the use of computer technology to create the effect of an interactive three-dimensional world in which the objects have a sense of spatial presence". For a more pragmatic definition, eMarketer (2016) suggests "VR completely immerses a user inside a virtual world or experience, typically through the use of a head-mounted display (HMD) that is often connected to headphones, controllers and other peripherals that let users navigate through that experience. A key characteristic of a great VR experience is the feeling of 'presence'—users feel like they are truly in the synthetic environment being presented." A related technology, augmented reality (AR), involves overlaying digital objects and/or information in the real world through digital devices (such as Google Glass or smartphones). A recent example is the popular mobile phone game Pokémon Go. Similarly, mixed reality (MR), merges real-time 3D world software content with the real world, a notable example being Microsoft's HoloLens MR platform.

Business investment in VR in recent years has been vehement. Facebook spent $2 billion on Oculus Rift in March 2014. Google spent $542 million on Magic Leap in October 2014. From Q1 2014 to Q2 2015, more than $1 billion was invested in 91 deals in VR and AR (eMarketer 2016). More than the technology, content is key to the success of VR. According to Goldman Sachs, the VR branded content market could be worth $80 billion by 2025 (Bellini 2016). If

predictions are correct, VR is headed to be consumer mainstream within five years.

This paper examines the impact of the recent wave of advanced virtual reality applications on marketing. Virtual reality affords marketers the opportunity to provide potential consumers with the most realistic experience of a product, service or place yet without necessary physical co-location. This provides an advanced, rich and immersive medium that is able to deliver distinctive, high-impact and memorable messages, and engage audiences and potential consumers (Schmitt 1999; Pine and Gilmore 1998, 1999). The immersive value of the medium surpasses that of traditional 2D screens and some evidence suggests that experienced presence might even surpass reality for some situations, depending on social co-construction and physical and cultural artefacts (Villani et al. 2012). The potential applications in marketing are many and varied and include promotion, market research, online sales, customer service, brand management, and public relations.

In the next section, we provide a framework to help to understand the impact of VR on consumer engagement. This is followed by some examples of VR in marketing and further frameworks that position the value of VR to the marketing effort based on the nature of the experience, the characteristics of the VR platform, and location of customer interactions. The paper concludes with a discussion of the future of VR and some limitations that need to be addressed.

2. A Framework for Understanding the Consumer VR Experience

To aid in the understanding of the impact of VR on the consumer, consider Figure 1, within which there are three main groups of factors driving the consumer VR experience. At the technological level, we consider the VR delivery system, which has associated artefacts, hardware, software, communications and data infrastructure required for VR. The VR delivery

system is an enabler for developing the consumer VR experience – and thereby VR consumer engagement – particularly through gamification, hyperpersonal content and environment cues. At the individual-level, we consider the complex psychological drivers influencing the consumer VR experience. These factors examine consumer predilections in VR environments and social VR situations. At the social level, we move beyond the individual to connected others: 3D virtual worlds are often shared with groups of other avatars and likely to be linked into social networks, assisting in the development of social presence, social capital and social interactions. These social influences contribute greatly to the consumer VR experience. The ultimate outcomes of the VR marketing experience are affective, cognitive and behavioral (conative) change at the individual level. This may include, for example, an emotional connection with a brand, knowledge to solve a customer service support problem, or the purchase of a product.

*** INSERT FIGURE 1 ABOUT HERE ***

2.1. VR Consumer Experience

At the center of Figure 1 is the *Consumer VR Experience* (CVRE) construct. The construct is composed of three key aspects: presence, socialness and nature of experience. Each of these concepts is founded on rich, but typically separate, streams of literature: presence from human-computer interaction; experience from services marketing; and socialness from social psychology, HCI and other sources.

A key element of CVRE is *presence*, the definition of which is complex, multifaceted, and rich in literature on the nature of its development. Early definitions of virtual reality focused narrowly on hardware. For example, Coates (1992), cited in Steuer (1992, p. 74), defines virtual reality as "electronic simulations of environments experienced via head mounted eye goggles and wired clothing enabling the end user to interact in realistic three-dimensional situations." Steuer

(1992) was the first to define virtual reality according to the concept of telepresence as experienced through a rich, simulated media environment. While presence is defined as the sense of being in an environment (typically a physical environment mediated by the senses), telepresence is the "experience of presence in an environment by means of a communication medium" (Steuer 1992: p. 76). According to Steuer (1992), two key dimensions of technology contribute to the feelings of telepresence experienced by humans: vividness and interactivity. Vividness is the "ability of a technology to produce a sensorially-rich mediated environment," whilst interactivity is the "degree to which users of a medium can influence the form and content of the mediated environment" (Steuer 1992, p. 80). Put simply, vividness is how real a VR environment appears to a user, which will vary according to the number of a body's five sensory systems (and sensory modalities) that are used (breadth), and the quality of sensory feedback (depth) in those senses, e.g. quality of visual, auditory feedback, or touch feedback. Interactivity can be understood as the extent and realism of actions performed in the virtual world, which will vary according to the number of possible actions (range), whether actions are real-time (speed), and the natural/predictive nature of controls (mapping of controls to virtual world).

Sherman and Craig (2013) provide a further helpful summary of four elements that are essential to virtual reality experiences: 1. the virtual world environment inhabited by the user (including 3D digital objects, space and rules); 2. the feeling of immersion in the virtual world or actually "being there"; 3. interactivity – the degree to which the user can interact with the virtual world, its objects, characters and places, and how it responds; and 4. the selective provision of sensory feedback to the user based on user input, such as navigation.

Steuer's (1992) definition relies on the use of communication media. However, if VR is delivered through a PC or an app with no remote connection, we may need to reconsider the question of how the definition of telepresence is reinterpreted. The seminal paper of Lombard and

Ditton (1997) provides an important clue to a more suitable vision of telepresence, suggesting that it is related to the disappearance of the technological experience during VR interaction, as it becomes "invisible." Zahorik and Jenison (1998) go further and use metaphysical arguments from philosophy to argue that presence relates to successful interaction with an environment, whether real or virtual. Riva and Mantovani (2014) offer support for this view and argue that "presence is a core neuropsychological phenomenon whose goal is to produce a sense of agency and control: I am present in a real or virtual space if I manage to put my intentions into action (enacting them)" (p. 10). In synthesis, this suggests that telepresence can be defined as the successful enactment of consumer intentions in a VR environment where technology is invisible.

Virtual reality provides an effective platform for experience marketing (Schmitt 1999; Pine and Gilmore 1998, 1999). In experience marketing, businesses focus on developing and providing memorable events for customers, which in themselves become products (the "experience"), with monetary value in the transformational benefits offered by the experiences. From the experiential marketing perspective, consumers are both rational and emotional and seek pleasurable experiences. Marketers can provide such experiences through technology, such as VR, as a medium for experience provision, aiming to create holistic experiences that integrate personal experiences into an organized whole. The types of experiences that marketers should seek to provide include those that are sensory (engaging all the senses), affective, creative and cognitive, physical, and related to social identity. Branding in the experiential marketing should provide "products, communications, and marketing campaigns that dazzle their senses, touch their hearts, and stimulate their minds" (Schmitt 1999: p. 57). Pine and Gilmore (1998) recommend that consumer experiences should be designed around themes and include memorabilia in order to create memorable experiences (e.g. Disney characters in Disney themed worlds), accentuating positive cues whilst removing negative cues. Section 4 examines a number

of VR experiences through the lens of Pine and Gilmore's (1998, 1999) Realms of Experience Framework.

One key component that is missing from traditional definitions of virtual reality is the social dimension, the feeling of *socialness* stemming from the perception of and interaction with 'others'. Socialness can be defined as the extent to which users perceive social cues within a virtual environment considered as a social entity (Barnes and Vidgen 2014). Various contributory factors from the VR delivery system, social influences and psychological drivers will influence the feeling of socialness in a virtual environment. Players encounter social cues within the virtual reality environment that contribute to the feeling of socialness, determined by the design of the gaming environment (e.g. environmental cues – see section 2.2), social influences (e.g. social presence and interactions – see section 2.4), and the psychological tendencies of each individual (e.g. self-construal and ethopoeia – see section 2.3).

2.2 VR Delivery System

Let us begin by examining the technological level. Technology provides a critical enabler for VR telepresence experiences. Indeed, it is the advancement of technology that is providing an impetus to the current wave of development and applications. The most obvious requirements for VR are the special hardware interfaces, including the headsets and other controlling devices. Juniper Research (2015) predict the number of VR headset shipments will reach 30 million by 2020, driven by video and gaming. The VR headset market could be worth $62 billion by 2025 (Munster et al. 2015). Headsets vary considerably in their cost and capability, ranging from free giveaway Google Cardboards to advanced Oculus Rift headsets. Effectively headsets are based around three main platforms: desktop computers, e.g. the head mounted Oculus Rift (Facebook); computer consoles, e.g. Sony's Playstation VR; and headsets into which mobile phones are

inserted, including the Samsung Gear VR and Google's Daydream platform (which will launch in November 2016) at one end of the market and the basic Google cardboard (foldable cardboard headset) at the other. VR technologies provide video and audio, but vary in the degree of immersion offered, for example, through the graphical field of view (i.e. extent of observable virtual environment) and the quality of audio, e.g. using 3D spatial audio.

Haptic devices used for interacting with the virtual world range from some of the mass-market controllers for the Oculus Rift and HTC Vive, which tend to have pistol grips, to more natural haptic devices aimed at detecting body and muscle movements from hands and forearms and giving sensory feedback. Several of these technologies are more futuristic or niche, including the Teslasuit, which enables a user to actually feel objects in the virtual world and for VR users to interact physically, and the Virtusphere, a rolling ball that delivers the possibility of seemingly limitless movement in VR while actually staying in the same place. These technologies provide the means for very advanced interactivity and sensory feedback.

Alongside the VR hardware, software, data and content provide an essential enabler of the VR experience. Central to the experience is the virtual world, which has been argued to be a fertile bed for marketing and studies of consumer behavior (Barnes 2010, 2011; Barnes et al. 2015; Barnes and Mattsson 2011a, 2011b; Barnes and Pressey 2011, 2012; Guo and Barnes 2009, 2011; Hemp 2006; Lui et al. 2007; Pressey et al. 2013; Tikkanen et al. 2009). A 'virtual world' may be defined as "an electronic environment that visually mimics complex physical spaces, where people can interact with each other and with virtual objects, and where people are represented by animated characters" (Bainbridge 2007, p. 472). According to Novak (2012), virtual worlds, such as Second Life, exhibit five core characteristics experienced by the user: a graphical 2D or 3D interface; a social context experienced by many individuals; interactivity and vividness of the virtual environment; a shared space for interaction; and persistence of the

environment.

Virtual worlds, by virtue of their digital nature, enable the tracking of activity of the consumer within, what they are touching, looking at or doing, or even potentially the emotions they are experiencing using physiological interfaces (Levine 2016). Thus, it is possible to collect data on consumer behavior in the virtual world. Combined with additional data on the particular consumer and other available relevant data sources, advanced data analytics could be applied, potentially combining tools from artificial intelligence and gamification techniques to *hyperpersonalize content* for future experiences. Such hyperpersonalized content is likely to be more subtle and persuasive in delivering marketing messages for the modern consumer, requiring less mental processing resources and focusing on the peripheral processing route in the elaboration likelihood model, including such issues as emotional motivation, production quality, credibility and attractiveness (Cacioppo and Petty 1979; Petty and Cacoppo 1986; Petty and Krosnick 1995). Hyperpersonalization enables an authentic, engaging focus for VR marketing content, which can then be amplified through a variety to techniques, such as social media (McLaren 2016).

Native advertising refers to methods for presenting consumers with commercial persuasive messages similar to non-third-party content from the same source (Wojdynski 2016). As a method, it is growing considerably in terms of practitioner interest and expectation, particularly due to its potential value on social media platforms. Traditional native advertising includes sponsored content that could feasibly include VR in the future. Native advertising has raised ethical concerns, as consumers typically are unaware of the persuasive nature of the message contained within seemingly innocuous content (Wojdynski and Evans 2016). Such issues can however be overcome by appropriately priming consumers about the persuasive intent of messages (Wu et al. 2016). The practical value of matching channel to corporate sponsor is

also notable, since unprimed consumers were found to perceive strong persuasive intent on low credibility media channels for high credibility sponsoring companies; when primed, however, consumers perceived persuasive intent only for low credibility sponsored content on high credibility channels (Wu et al. 2016).

Early research into hyperpersonal content systems has found mixed results. Warshaw et al. (2015) found that consumers trusted "expert" algorithms associated with hyperpersonal content delivery and considered them "creepily" accurate. However, Warshaw et al. (2015) also found that people felt pressurized to use such systems and felt unqualified to modify content. The future design of hyperpersonalization systems must pay adequate attention to informed sharing of hyperpersonal data in social networks and user control over content editing.

Gamification relates to the application of game design principles to non-game goods and services in order to increase perceived customer value and influence value-creating behaviors, for instance increased loyalty, consumption, engagement and brand or product advocacy (Blohm and Leimeister 2013; Hofacker et al. 2016). Hofacker et al. (2016) use Schell's (2008) Tetrad Model to explain how such gamification can be achieved in the mobile marketing context, emphasizing that story, mechanics, aesthetics and technology will play key roles, and will be moderated by the type of product/service and the nature of the consumer, particularly goals and characteristics. Clearly, a number of VR platforms have been designed principally as conduits for gaming, such as the Sony Playstation VR. The visual representations (vividness) are also notable elements in developing a game-like environment. Notwithstanding, it is clear that the VR platform presents a number of other features which render it a fertile bed for developing consumer value and subsequent value-based outcomes. For example, the VR medium offers the opportunity for narrative transportation, as the consumer becomes immersed in the particular storyline presented in the marketing content offered (van Laer et al. 2014). This may be more effective where there is

a congruence between the game and marketing goals through regulatory fit (Hofacker et al. 2016), which can increase motivation to process information, consumer engagement, time spent in-world, and intensify positive and negative reactions (Lee et al. 2010). Further, the reward structure presented in VR and its interaction with the goals of consumers, such as extrinsic or intrinsic, will be important determinants of reactions to marketing content (Hofacker et al. 2016).

A key element that marketers must focus on in order to deliver high quality consumer experiences is the provision of *environmental cues* (Pine and Gilmore 1998, 1999). The development of such cues in the delivery of VR content must attempt to accentuate positive experiences through positive cues and reduce the prevalence of possible negative cues. Positive environmental cues act to affirm a positive experience, creating a stronger, more memorable impression on consumers. For example, visual and aural cues may provide information about what the VR consumer will experience next, and act as a priming tool, such as "your adventure is about to begin" (Pine and Gilmore 1998). Such cues may also act to encourage certain types of in-world behavior, such as arrows or other signage to encourage a consumer to press a button to activate a module of experience content. The consistency of design of environment cues is paramount; if they are not properly designed or utilized this can create an unpleasant experience for consumers who follow the "wrong" path. Similarly, negative cues in VR content should be removed or reformulated into neutral or positive cues. For example, an item on a shelf in a VR supermarket application should not be marked as "not available" but rather as "available soon" or removed altogether, while in-world avatars that provide service information to all consumers should be "pull" rather than "push" activated.

2.3 Psychological Drivers

Research has suggested a number of psychological influences that are likely to impact consumer

engagement in VR environments.

The effect of social factors on the consumer is likely to vary due to psychological factors. One such factor is *self-construal*, which examines "an individual's nature or relationship with other people" (Keng et al. 2016, p. 432). Self-construal can be either independent or interdependent; independent self-construal refers to an individual's behavior that is constructed with reference to his or her own personal thoughts, feelings or actions, whereas interdependent self-construal refers to behavior composed with reference to the thoughts, feelings or actions of others (Keng et al. 2016), typically as part of a group (Singelis 1994). Self-construal has been found to be significantly related to social media use and word of mouth (Hoffman et al. 2012), and to influence impulsive consumption behavior (Zhang and Shrum 2009). Keng et al. (2016) found that self-construal moderated the relationship between mere virtual presence with product experience and both brand attitudes and purchase intention.

Presence in VR environments can be influenced by the tendency of the respondent towards *absorption*, "episodes of total attention that fully engages one's representational resources" (Kober and Neuper 2013, after Tellegen and Atkinson 1974), since evidence suggests that an absorbed individual centers their attention on the virtual environment rather than the real world (Wirth et al. 2007). Mental *imagination* is the general ability to imagine an assortment of sensory modalities without actual sensory presentation (Sheehan 1967). A number of studies have shown that the ability of an individual to create mental images of people, objects or events influences their experience of telepresence in VR (Sas and O'Hare 2003; Wallach et al. 2010). Further, the responsivity of an individual to others' experiences and the ability to adopt and see their perspective, *empathy*, is also considered an influence on presence. As Nicovich et al. (2005) point out, empathy and telepresence effectively use the same projective "tool set" to become part of the experience of a virtual world or another person. Various studies have found support for the

role of empathy in developing telepresence experiences (Kober and Neuper 2013; Nicovich et al. 2005; Sas and O'Hare 2003; Wallach et al. 2010). Finally, the tendency of individuals to experience flow, increased involvement or immersion while conducting certain activities has been shown to be a driver of telepresence – referred to as *immersive tendencies*. Numerous studies have shown that those that are more inclined to immersion are more likely to experience a richer sense of telepresence (Kober and Neuper 2013; Laarni et al. 2004; Wallach et al. 2010; Witmer and Singer 1998).

Numerous other factors have been found to contribute to VR telepresence experiences, although sometimes with very mixed results. For example, *impulsive tendencies*, whereby an individual acts without thinking and planning is posited to use the same part of the brain as telepresence (Beeli et al. 2008), and Larni et al. (2004) found support for its influence on telepresence in VR. However, Kober and Neuper (2013) found no such support. Similarly, people who feel a lack of control over the events that unfold in their lives, referred to as an external (i.e. outside of the person) *locus of control*, have been hypothesized to experience a heightened degree of telepresence (Murray et al. 2007; Wallach et al. 2010). However, again, Kober and Neuper (2013) could not find empirical support for this supposition.

Media equation theory asserts that humans treat computers and media as other humans, even when they know that they are not (Moon 2000). The theory is founded on the principal that individuals mindlessly apply social rules and expectations to computers and exhibit the same responses to computers as they would to human actors (Nass and Moon 2000). Such behavior occurs regardless of whether the communication is via text, voice or anthropomorphic virtual agents, and the theory has recently been applied to studies of user behavior in virtual worlds (Zhao et al. 2010). VR may include avatars, either human or computer controlled. Research has found that human or autonomous avatars will evoke a social response from consumers (von der

Pütten et al. 2010). Responses to autonomous agents are automatically triggered by social cues from social situations – the *ethopoeia* concept (Nass and Moon 2000).

2.4 Social Factors

While Facebook has a massive user base (estimated at 1.65 billion in Q1 of 2016; Statista 2016), its platform for communication lacks the degree of socialness offered through richer channels such as virtual worlds. Facebook's purchase of the Oculus Rift is most likely aimed at bringing a greater degree of social interaction into its social network platform in the longer term. Indeed, the company is developing social VR that creates strong social presence through detailed avatars, facial expressions (eyes and mouth), body language, hand and head motion and positional tracking (Carbotte 2016). Connecting to friends, family, and other consumers by linking existing social networks to virtual worlds will provide the much-needed dimension of socialness to VR.

Social capital and social interaction have been found to be key elements in encouraging consumer engagement (Chu and Kim 2011). From a marketing perspective, social networking provides an important medium for enabling word-of-mouth communications (Yadav and Pavlou 2014). Word of mouth (WOM) –which describes person-to-person communication such as personal recommendations – has for many years been recognized as an important element in distributing product and market information (Gilly et al. 1998). Such communication tends to be more trusted and to have more credibility and believability for consumers than formal marketing (Feick and Price 1987), and WOM recommendations via social media can have more commercial value than traditional marketing vehicles (Trusov et al. 2009), affecting purchase behavior through embedded information and persuasion (Goh et al. 2013). Moreover, the valence elasticity of WOM in social media appears higher for privately consumed, low trialability products that would appear suitable for VR experiences (You et al. 2015). The value of engagement and WOM

in social networks is strongly linked to their social capital, including tie strength, trust, shared frame of reference, normative and informational influence (Chi 2011; Chu and Kim 2011; Ellison et al. 2007; Hung and Li 2007; Utz and Muscanell 2015). Ashley and Tuten (2015) find that experiential message appeals are significantly related to social capital via Klout scores and engagement measures through Engagementdb. They also find that other aspects of social media engagement are related to social capital features such as numbers of followers/fans, Klout score and engagement score.

Social presence is an established concept that refers to the extent to which a medium facilitates a user to connect personally with other users of the medium (Short et al. 1976) and to experience other users as being psychologically present (Fulk et al. 1987). Originally, research into social presence theory focused on media characteristics and the extent to which a medium could convey social cues (Short et al. 1976), particularly given the requirements of particular tasks (Karahanna and Straub 1999). Here, social presence is encapsulated by the richness, interactivity and feelings of warmth, human contact, sociability and sensitivity afforded by a medium (Gefen and Straub 2003).

More recently social presence theory has been applied to various computer-generated environments, including virtual worlds (Mennecke et al. 2011; Sivunen and Nordbäck 2015) and virtual reality (Poeschl and Doering 2015) and have extended the concept of social presence to fit these new media. Biocca et al. (2001) argue that social presence is multidimensional and consists of co-presence (the feeling of being together with other people in the virtual environment), psychological involvement (the impact of perceived psychological factors from the respondent and other individuals, such as their mood), and behavioral engagement (the impact of the actions of the respondent and other individuals). This is further confirmed in a study by Sivunen and Nordbäck (2015), using qualitative and quantitative data collected in the virtual world of Second

Life, which has more recently been enabled for use with the Oculus Rift. Sivunen and Nordbäck (2015) found that social presence varied constantly in strength within groups and subgroups (e.g. between just a few members of a group). Perceptions of social presence in a virtual world can lead to physiological and psychological effects (Mennecke et al. 2011), including affective, cognitive and behavioral effects. More broadly, Lim et al. (2015) found that in the context of social TV (backchannel communication on social media during a live TV broadcast), social presence influenced brand loyalty (in the form of recommendation and continued use), mediated by brand commitment, characterized by attachment and belonging to a brand. Ashley and Tuten (2015) find that social presence has a strong link to consumer engagement in their examination of brands using social media. Lu et al. (2016) find that social presence influences trusting beliefs, which in turn impacts purchase intentions.

In the consumer context, the concept of mere virtual presence (MVP) has been used to describe the presence of other consumers in a virtual environment. The concept is similar to that of co-presence. Naylor et al. (2012) found that social influence can impact presence in a virtual brand community context, subsequently impacting brand evaluation and purchase intention. Keng et al. (2016) further extend the MVP concept to encapsulate other consumers with product experience: "Upon seeing that someone similar to oneself likes a certain product, a member of a virtual brand community might involuntarily think that he/she also likes the product, and we defined this as mere virtual presence with product experience (MVPE)" (p. 432). Keng et al. (2016) find that MVPE has a greater impact on purchase intention than MVP and that the impact of MVPE on brand attitude varies according to the relationship with other consumers, being greater for in- rather than out-groups.

Social interaction with those present in a virtual reality environment or with those in the extended social network channels that are accessible will also be important in creating a high

quality VR consumer experience that manifests in positive consumer outcomes. Customers may influence one another directly or indirectly (Bitner 1992). Verhoef et al. (2009) explore how social environment, including social interaction between consumers, is an important determinant of customer experience. Numerous studies have examined the positive and negative aspects of social interactions between consumers (e.g. Wu 2007 examines the tourism industry). Lim et al. (2015) find that communal engagement (a form of behavioral engagement) in the form of interaction and sharing content within the social TV brand community encouraged consumer loyalty. Hudson et al. (2016) conducted three studies and found that social media interaction impacted on brand relationship quality and word-of-mouth, particularly when consumers anthropomorphize a brand and avoid uncertainty.

2.5 VR Consumer Engagement Outcomes

The use of VR for marketing will typically be targeted on one or more of three key types of consumer engagement outcome: cognitive, affective and conative change. Cognitive change occurs through increasing awareness and knowledge regarding the product, service, and/or brand through memorable VR content, increasing the likelihood of attention and absorption. Affective change occurs by attempting to strike a bond with consumers and providing pleasurable experiences, increasing their liking and preference for the product, service and/or brand by highlighting key features or benefits. Finally, conative change involves allows VR consumers to experience aspects of the product, service and or brand, attempting to increase the desire to make actual purchases, which may be facilitated through the virtual world, and other positive social outcomes such as sharing VR experiences or endorsement of brands from VR. It is also possible that different types of consumer outcome are targeted through the same VR marketing initiative, creating a combined hierarchy of effects (Lavidge and Steiner 1961).

Dassart et al. (2016) provide a comprehensive scale for measuring consumer engagement based on affective, cognitive and behavioral dimensions in the context of online brand communities. The affective dimension is composed of enthusiasm and enjoyment, whilst the behavioral construct includes sharing, learning and endorsing. Cognitive dimensions include attention and absorption. Such a scale would also seem suitable in the context of the consumption of VR experiences.

A number of features of VR marketing suggest that it could have a successful impact on the above consumer outcomes. Villani et al. (2012) provide evidence that experienced presence in VR might even surpass reality for some situations, depending upon social context. The novelty of the technology is associated with greater levels of media and public interest (assisting cognitive change). Unlike using a mobile phone, for example, VR requires donning a headset, removing distractions and providing full immersion in marketing content and messages. The nature of the VR experience is also more direct and powerfully emotional than traditional media, creating messages with more impact (thereby aiding in affective change). The results of a study by Riva et al. (2007) confirmed the value of VR as affective channel, demonstrating that interaction with virtual environments specifically designed to invoke certain emotions produced the corresponding affective reaction (anxiety and relaxation in this case). Moreover, Riva et al. (2007) found an interaction between emotion and presence, with presence being higher in emotional VR environments, while the level of presence also impacted upon emotional state. Certain features of VR experiences, particularly those with active elements or with events linked to locations are likely to be more memorable, having a longer impact on the consumer (including prolonged conative change).

There is little data available on consumer demand for modern VR applications. However, one recent study by Ericsson ConsumerLab (2015) surveyed 6,649 consumers in the 15-69 age

group about their perceptions of virtual reality services. Respondents came from across major international cities, including Johannesburg, London, Mexico City, Moscow, New York, Paris, San Francisco, São Paulo, Shanghai, Singapore, Sydney, Tokyo and Istanbul. Around 80% of respondents thought that at least one of the virtual reality services examined was a good idea. Some of the top applications were marketing oriented, with VR retail being most popular at 64% ("see items in real size and form when I shop online") and customer support rated third at 57% ("Internet tech support with all angle view"). The other most popular applications tended to relate to an improved viewer for media content, including VR maps (62%), VR movies (57%), sports (55%), computer games (54%), and smartphone games (52%). Around half of respondents would prefer to view VR through a Google Cardboard-type viewer (49%).

2.6 Using the Model to Explain the Pokémon Go Phenomenon

As a test of the research model, consider its explanatory power over the global success of Pokémon Go – which holds the record for the fastest grossing mobile game ever, earning US$600 million in 90 days, and accounting for 45% of all time spent on Android mobile games in October 2016 (Batchelor 2016). Pokémon Go is a game for smartphones that includes augmented reality and features linked to a user's location. The gamification element occurs as individuals attempt to catch creatures (tagline: "Gotta catch 'em all") and use them to fight other creatures in order to earn points and level-up their character. In order to catch creatures, users must be in the right location and throw balls to hit them using an augmented reality interface. Certain creatures spawn in certain locations and some are rarer than others are. Environmental cues occur through indications (rustling leaves) of the appearance of creatures in certain real world locations using geolocation mapping, and the use of lures at Pokestops (real-world locations such as historic monuments) to encourage creatures to appear, and where free items can also be collected

periodically. Gyms are geolocated in places such as schools, where users can battle in teams to gain points and coins to buy premium items. Of course, coins can also be purchased through real money and used to buy premium items. The game includes strong personalization elements through creating unique 3D avatars, personalizing creatures, and the very personal aspect of gaming in one's own environment, including in one's home and local community.

Social influences also play an important part in Pokémon Go. Users often play in groups and congregate at locations to set lures and to collect creatures (Pokestops) and to battle together in teams (Gyms). There is thus a high degree of social interaction and social presence through the combination of the real world and virtual world. Social capital is built through teamwork, familiarity and trust with other team members, and the use of rare, powerful, or sought after creatures. Strong teams of players can level-up gyms and gain prestige.

The tendency of users to engage with Pokémon Go depends on psychological drivers. Involvement in group activities in the game will likely be influenced by self-construal. Those that play the most are likely to be more absorbed in play and have a greater level of imagination and immersive tendencies, leading to more time spent in the game. An external locus of control may also contribute to the desire to play the game. Impulsive tendencies can encourage greater game-play, as well as the purchase of coins to buy premium items in the game.

Together these three groups of factors contribute towards creating the consumer's Pokémon Go experience. The consumer's experience is immersive and active – or Escapist (Pine and Gilmore 1998). It further follows guidelines for strong experiences in that it is themed, includes memorabilia (many individuals have nostalgic connections with Pokémon) and engages a number of senses through audiovisual content and vibration feedback on the phone (and more recently a wristband that is available to purchase). The AR and geolocation interfaces, in combination with the real world, contribute to creating a strong feeling of presence. Further,

players encounter many social cues within the Pokémon Go social game world that contribute to the feeling of socialness, determined by the design of the gaming environment, social influences (mentioned above, including social presence and interactions), and the psychological tendencies of each individual (particularly self-construal, empathy and ethopoeia).

The outcomes of the Pokémon Go experience are affective, cognitive and conative. Playing the game stirs emotions and generates enthusiasm, fun and enjoyment for users. The game also attracts cognitive attention and absorption, particularly among those with the right predilections. Consumer are encouraged to spend more time in the game to reaching further goals, often spending money in the process. Consumers also learn and share their experiences with each other in the real world and via social media (and there are numerous blogs, websites and social media pages on Pokémon Go).

3. Examples of Virtual Reality Applications in Marketing

The applications of virtual reality to marketing and marketing-related functions are diverse. Table 1 provides some examples of applications in functional areas. A key area of application is brand management. VR can provide a means of brand engagement, educating the consumer about a brand, reinforcing brand values and building affinity and customer loyalty (such as the Patron Spirits example). More broadly, VR can be used for creating brand awareness and relationship building. One example where VR has been used for relationship building is that of Boursin Cheese's 'Sensorium', which allows customers in shopping centers to see inside the contents of a fridge (McLaren 2016). There appear to be many examples of car brands that have VR offerings. Nissan used Oculus VR at the Tokyo motor show to enable consumers to design their own Nissan car. Volvo have the XC90 app to explore a futuristic vehicle on a Google Cardboard. Honda have an app to experience driving the ultra-fast Honda-powered, Dallara car, set to coincide with the

100th running of the Indianapolis 500 on May 29, 2016. Going forward, relationship building is likely to occur via the creation of content that is valued by consumers and the delivery of content to apps on a smartphone. Such content may be free, or possibly even paid for (if considered of sufficient value), with pushed content updates.

*** INSERT TABLE 1 ABOUT HERE ***

Virtual reality provides a valuable new platform for market research, enabling low cost solutions to examining consumer decision-making in a realistic but controllable, and flexible environment, such as that of Tesco Pélé. This is particularly important since consumers make 70% of brand decisions in-store (Rutgers Online 2014). The cost of virtual reality store simulations for market research starts at approximately $30,000 rising to more than $1 million. VR is used by companies such as Nestle, Unilever and Cadbury, and has enabled better shelf layout, pricing, and increased sales (Rutgers Online 2014). In-world interactions can be captured through such features as viewing time, store navigation, and product interaction to obtain customer feedback on store layouts or products. VR can provide more realistic, accurate, holistic feedback on navigation, layout, color, and product range. Other potential applications of VR in market research include new product concept testing, customer experience model testing and menu optimization pricing (Brooks 2015).

Within research and development, 3D modeling is already commonplace. Virtual reality is also increasing in its industrial application, particularly in the manufacturing industry, as the example in Table 1 shows. However, in the consumer segment VR also enables customers and representatives to design their own customized products. For example, the Lowe in-store Holoroom application allows consumers to design a kitchen or bathroom, explore it in VR, and share it on YouTube (Morris 2016) to create a more social experience.

VR has the potential to provide a richer, more engaging and entertaining retail environment. IT can more fully emulate a retail experience, such as a visit to London's Bond Street, from the comfort of a consumer's home. The technology is likely to be particularly useful for certain types of items, particularly complex, high-value and/or customized products that are hard to visualize remotely, including fashion, real-estate, tourism experiences, cars and luxury furniture. VR allows a much greater degree of consumer trial and product experience before purchase. The SapientNitro example in Table 1 shows a beautifully furnished apartment and allows consumers to carefully examine and then query price and other information on luxury items of furniture placed in a realistic setting. A number of automotive manufacturers have also developed applications for test-driving their vehicles, including Audi and Lexus; test drives are still considered the best tool in selling a new car. In some showrooms, such as city centre locations, test drives are not possible, and there are typically challenges finding cars with the right configuration. VR test drives potentially enable personalised product experiences anytime, anywhere. Several apparel retailers, including Topshop and Tommy Hilfiger have used VR to create virtual catwalk experiences for fashion shows. Software developers Marxent have demonstrated the vRetail platform, enabling VR to recreate and customize real-world stores, shelving and merchandising. Some analysts believe that VR will drive more consumers to buy online, reducing the overall amount of time spent on shopping (Morris 2016).

In the tourism sector, Marriott Hotels use VR to market honeymoon experiences in Hawaii: VR enables the virtual visitor to walk around accommodation, look at views and become part of some of the likely experiences, supported by sensory additions of mist and warm air. Ultimate Jet Vacations use VR to help hotels market their hotels, while Anchor Associates use VR to sell real estate in New York. Tourism attractions could also make use of the technology. Alton Towers have a VR roller coaster. Qantas provide VR experiences of the Great Barrier Reef

on some of their flights. Thomas Cook is piloting Samsung Gear VR headsets in stores in the UK, Germany and Belgium with experiences of a helicopter ride above Manhattan and sitting on the balcony of a Santorini hotel (Mandelbaum 2015). Reportedly, the company made a 40% return on investment (Rumsey 2016). Thomas Cook is expected to mail 5000 brochures and Google Cardboards to potential customers to link to hotel and holiday content during 2016. More generally, VR has the potential to provide immersive, emotional experiences in tourism and heritage, that are lived and visitor-controlled, including guided tours of cities and buildings, landscapes, histories of particular destinations, museum objects, and so on.

Promotion is predicted to be one of the most significant growth areas of VR marketing. This is likely to be driven by the entertainment industry. Indeed, by the end of 2016, it is predicted that promotional 360-degree video trailers will be available alongside all new film releases (Rumsey 2016). Facebook and YouTube's 360-degree video networks have provided a significant impetus to this trend. The Disney Steam VR app provides a hub for promotional material from key franchises, including most recently, Star Wars: The Force Awakens and The Jungle Book. Another example is the immersive Game of Thrones VR experience promoting series 4 in 2014. This enabled users to experience ascending The Wall with additional sensory feedback, including wind machine and rumble packs. Some analysts suggest that VR could provide a potential means of invigorating a channel that is waning in effectiveness – email marketing. Mobile is now a primary email marketing channel – 46.7% of all email clicks according to Yesmail (Warnock 2016). Promotional email content and apps could be pushed to consumers, although arguably other push channels might be more effective. Another possible means of promotion is to include pre-roll ads in VR content.

A number of examples of VR have emerged from public relations. These have included the New York Times film "Displaced" focusing upon the lives of three children who are war

refugees, Amnesty International's "VR Aleppo" to raise awareness of barrel bombing in Syria, and UNICEF's "Clouds over Sidra" which draws attention to the Syrian refugee crisis. These applications focus on building empathy with the audience. Alaimo (2016) suggests that VR may transform public relations, particularly through revolutionizing the way stories are told via immersive experiences, putting audiences in "other people's shoes", delivering captive and receptive audiences, without distraction, and providing a new medium for effectively pitching to journalists.

There are few current examples of VR used for customer and after sales service. However, in the future this is likely to be a popular area that will enable organizations to improve support at lower cost. Examples include step-by-step instructions delivered through VR (possibly more useful in mixed reality) as a replacement for difficult to understand PDF files, and individual customer support delivered through a 360-video interface (Mowad 2015). The Stihl example in Table 1 gives a fairly low-key example of practical tasks achieved using the company's tools filmed in VR video.

VR also poses opportunities for event management, through providing relevant immersive experiences at a physical event. Red Bull are experienced in this space and already provide VR experiences at many of their events including cliff diving and air racing. More broadly, VR combined with broadband provides the opportunity for any paying consumer to obtain the best seat at any event, at any theatre or stadium at any time, either to watch sports, interactive theatre performances or a concert. VR could become an important new platform for paid-for streaming content.

Figure 2 examines some of the examples above through the lens of Pine and Gilmore's (1998, 1999) Four Realms of Experience Framework. Pine and Gilmore (1998) characterize four different types of consumer experience using a framework that examines two dimensions:

customer participation and environmental relationship. Customer participation refers to the degree to which partakers in an experience can influence the overall performance. This varies from passive (e.g. an audience member in a classical music concert) to active (e.g. playing football as part of a team). The environmental relationship describes the type of connection between the customer and the performance and refers to how information is processed in relation to one's surroundings. This varies from absorption (e.g. listening to a marketing lecture) to immersion (e.g. abseiling down a building).

*** INSERT FIGURE 2 ABOUT HERE ***

Applying Pine and Gilmore's (1999) framework to the examples in Table 1, we find VR experiences in each of the four quadrants. There are numerous applications being developed that are immersive and that involve active participation. The Redbull Air Race, Tesco Pélé and Disney VR Steam App examples can all be considered Escapist, providing fully interactive VR consumer experiences, whether for gaming or shopping. At the other end of the spectrum, many 360-degree VR videos that are being developed provide passive, absorptive experiences, including the UN's Clouds over Sidra and Stihl's YouTube videos. These can be considered Entertainment within the framework. In between, we find Gabler's IC.IDO VR application, which although interactive, does not provide full immersion (see Table 1), and can be considered Educational. The VR experiences provides by Patrón Spirits and SapientNitro, although immersive, do not allow much in the way of interaction. The Patrón example, although aimed at the Occulus Rift, is scripted. The Apartment VR experience is largely aimed at providing context for products and informational content.

4. A Framework for VR Consumer Engagement

Now that we have established the mechanisms by which VR creates value, and have provided examples in some key functional marketing areas, we turn our attention to understanding how businesses can utilize VR for consumer engagement. In particular, we consider whether consumer engagement should be delivered through: passive VR (360-degree video, but where the consumer follows a linear path) or interactive VR (full VR providing high-levels of vividness, interactivity and socialness); or through in-store VR (provided via an event, store, mall or street environment) or remotely provided VR app content (typically from the comfort of the consumer's home or another social environment) – as shown Figure 3. In terms of Pine and Gilmore's (1998) framework, passive VR can be considered as a platform for delivering passive participation, particularly esthetic and entertainment experiences, while interactive VR is capable of active participation, and hence a suitable medium for educational and escapist experiences.

*** INSERT FIGURE 3 ABOUT HERE ***

A key element in decisions regarding consumer engagement in VR is understanding the benefits and limitations of the technology, what it can and cannot do. For example, VR can effectively replicate a music concert, such as TomorrowWorld, one of the world's largest dance music festivals, or Absolut Vodka, with high definition video and audio (Mandelbaum 2015). Such a concert is a realistic experience. However, the same experience of a honeymoon vacation in Hawaii may not be quite so realistic by virtue of the lack of feel of the sand, bed, sensations, and so on. VR cannot fully replicate certain senses. You would not be so convinced of an "actual" honeymoon visit to Hawaii, such as that provided by Marriott. However, combined with the store and the salesperson, active VR such as that provided by Marriott provides a new level of *complex product experience* that simply cannot be provided in any other way. In this case, VR is

not a substitute for the salesperson, but it is a valuable complementary aid for product experience. For example, North Face have in in-store application where they provide the VR experience of hiking, rock climbing and base-jumping – and then facilitate the consumer to buy gear in store. Thus, VR technologies can be used to provide educational experiences for consumers.

At the other end of the spectrum, consumer engagement can be provided remotely to consumers through *ubiquitous brand promotion* via VR video content, primarily aimed at entertainment or esthetics. One major player in this market is the automotive industry. Indeed, driving games have been core to the games industry for many years. However, although "VR can replicate the feel of speed and motion, it cannot replicate the essential Porsche-nesses of the feel of the road, the wind or the inertia thrust from the powerful engine" (Levine 2016). Thus, in marketing automotive brands, VR promotion efforts need to look beyond product capability. Indeed, Mercedes-Benz takes a different approach in its VR marketing focusing on the organic experience of the vehicle user, including as a passenger of a Smart ForTwo Cabrio travelling through Miami with street dancers and other experiences, and inside and outside the 2017 GLS SUV travelling through the mountains with Loki the wolfdog (Gaudiosi 2016).

In between these two, extremes, we find *blended relationship building* and *ubiquitous brand engagement*. An example of blended relationship building is the Boursin Sensorium in-store exhibit, which toured stores in the UK. This uses 360-degree video to give consumers a virtual 'ride' and build a relationship with the brand in an immersive and entertaining way, supported by a physical promotion team. On the other hand, *ubiquitous brand engagement* provides the opportunity for consumers to engage fully with the brand in an interactive VR experience from their own home. An example is the Disney Steam VR app mentioned above. This enables the consumer to interact with characters in vivid, social, natural environments via key branded virtual worlds, including Disney, Marvel, and Lucasfilm. This is an example of an

escapist experience.

5. Discussion and Conclusions

VR provides the potential conduit for delivering experience marketing to the masses. As we have seen from the examples above, there is clear potential for the future and many business opportunities are emerging. The immersive value of the medium surpasses that of traditional 2D screens and some evidence suggests that experienced presence might even surpass reality for some situations. The socially-connected nature of mobile devices (and other computing devices) means that instead of providing VR in stores, companies are increasingly likely to develop downloadable apps for consumers. Experiential marketing content can be convincing, immersive, and also potentially social and participatory, creating a potential for virality. This technology-fueled marketing innovation could potentially transform marketing, combining the emotional impact of experiential marketing with the viral scalability of Web campaigns (Elgan 2015).

There are some questions over whether VR adoption will be successful in the future, particularly given potential issues of cost and limited appeal to audiences. Undoubtedly, the earliest adopters of VR may be mobile and console gaming fans and of limited interest to many brands. There are 1.2 billion gamers worldwide, including 1 billion mobile gamers (Danova 2015). However, video content is also likely to be a key driver of adoption, and recent trends appear to suggest a fertile environment for VR adoption. YouTube has made all of its videos VR compatible (Mbryonic 2016). It is also predicted that by the end of 2016, 360-degree video trailers will accompany all major new film releases, particularly via YouTube and FaceBook's 360-degree video networks (Rumsey 2016).

The cost of VR is declining and it is becoming more accessible. VR headsets are a low cost product, which will boost adoption, although they typically require another computing

device such as a computer or a smartphone. Further, there is a possibility that headsets may even be given away with mobile phone contracts (Neff 2015). Cheaper versions such as the Samsung VR Gear and Google Cardboard are helping to create a mass market. The latter are particularly useful for quickly creating an active VR consumer base. The New York Times issued more than 1 million free Google Cardboard headsets to its readers. Similarly, McDonalds in Sweden created a Happy Meal box that converted into a VR headset called Happy Goggles. Such campaigns are likely to accelerate in the future.

Not surprisingly, VR technology is developing very quickly and there are a mixture of technological platforms and standards. To further add to the complexity, mixed reality technology is yet to become available to consumers, and will provide yet another dimension to an already powerful new medium. The first consumer experience is likely to be Microsoft's Hololens, predicted to be available at the end of 2016. By wearing goggles, MR creates the illusion of 3D, animated virtual objects in front of the consumer. Volvo are developing an app to be able to look in and around the new S90 sedan, turn it around, examine components, e.g. the engine, and, in the future, to sit in the car and use the dashboard controls (see Figure 4).

*** INSERT FIGURE 4 ABOUT HERE ***

Alongside the many positive aspects of VR, there are also a number of problems that are currently presented. One of these problems is that of motion sickness, which can be experienced by some consumers after viewing content, suggesting that they will be much less forgiving of poor VR content than they are of low quality content on other mediums. In particular, if the VR experience is not well shot or designed, this can affect an individual's sense of balance and inertia, creating nausea and reducing telepresence (Cassidy 2015). Another big challenge in the VR industry is the lack of technical expertise, and this would be particularly so in VR marketing

which is much less developed than the media and games sector. It will take some time for this sector to be recognized and for marketing departments to gain the requisite skills. More generally, the 'hard' skills sector of marketing, involving quantitative and computing skills, already appears to be playing catch-up. Finally, a key issue is the currently under-developed infrastructure and standards for supporting VR. There are many competing platforms, including Facebook, HTC and Sony. There are different standards for operating systems, different smartphones, varying screen standards, and a multitude of manufacturers. To add to this, although there are some standards for video content, there are not clear standards for providing full VR applications or software development guidelines. This is likely to providing a continuing fragmentation in the VR market and a barrier to growth, at least until standards are formed or one standard becomes 'dominant'.

References

Alaimo, K. (2016). A New Reality: 6 Ways VR Can Transform Public Relations. Available from: http://www.prsa.org/Intelligence/Tactics/Articles/view/11364/1121/A_New_Reality_6_Ways_VR_Can_Transform_Public_Relat#.Vz2FQirmppj

Al-Obaidi, Z. (2016). Project CARS Devs to Make Free VR Red Bull Air Race. Available from: https://www.vrfocus.com/2016/04/project-cars-devs-to-make-free-vr-red-bull-air-race/

Ashley, C., & Tuten, T. (2015). Creative strategies in social media marketing: An exploratory study of branded social content and consumer engagement. *Psychology and Marketing*, 32(1), 15-27.

Bainbridge, W.S. (2007). The scientific research potential of virtual worlds. *Science*, 317, 472-476.

Barnes, S.J. (2010). Virtual worlds come of age. *Journal of Virtual Worlds Research*, 3(3), 3-18.

Barnes, S.J. (2011). Understanding use continuance in virtual worlds: The effects of habit and absorption. *Information & Management*, 48(8) 313-319.

Barnes, S.J., & Mattson, J. (2011a). Exploring the fit of real brands in the Second Life virtual world. *Journal of Marketing Management*, 27(9-10), 934-958.

Barnes, S.J., & Mattsson, J. (2011b). Segmenting brand value perceptions of consumers in virtual worlds: An empirical analysis using the FIMIX method. *International Journal of Online Marketing*, 1(1), 1-11.

Barnes, S.J., Mattsson, J., & Hartley, N. (2015). Virtual experience services: Assessing the value of real-life brands in virtual worlds. *Technological Forecasting and Social Change*, 92, 12-24.

Barnes, S.J., & Pressey, A. (2011). Who needs cyberspace? Examining drivers of needs in Second Life. *Internet Research*, 21(3), 236-254.

Barnes, S.J., & Pressey, A. (2012). In search of the 'meta-maven': An examination of market maven behavior across real-life, web and virtual world marketing channels. *Psychology & Marketing,* 29(3), 167-185.

Barnes, S.J. & Vidgen, F. (2014). Technology socialness and Web site satisfaction. *Technological Forecasting and Social Change*, 89, 12-25.

Batchelor, J. (2016). Pokémon Go is the fastest mobile game to pass $600m in revenues. Available from: http://www.gamesindustry.biz/articles/2016-10-21-pok-mon-go-is-the-fastest-mobile-game-to-pass-usd600m-in-revenues

Beeli, G., Casutt, G., Baumgartner, T., & Jäncke, L. (2008). Modulating presence and impulsiveness by external stimulation of the brain. *Behavioral and Brain Functions*, *4*, 33.

Bellini, H. (2016). Profiles in Innovation: The Real Deal with Virtual and Augmented Reality. Available from: http://www.goldmansachs.com/our-thinking/pages/virtual-and-augmented-reality.html

Biocca, F. A., Harms, C., & Gregg, J. (2001). The Networked Minds measure of social presence: Pilot test of the factor structure and concurrent validity. *Proceedings of the 4th Annual International Workshop on Presence*, Philadelphia, Pennsylvania, May 21-23.

Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing*, 56(2), 57–71.

Blohm, I., & Leimeister, J. M. (2013), Gamification. *Business and Information Systems Engineering*, 5(4), 275-278.

Brooks, J. (2015). *Virtual Reality: Advancing Marketing Research … and Visualizing a Better World*. Los Angeles: Lieberman Research Worldwide.

Cacioppo, J.T., & Petty, R.E. (1979). Effects of message repetition and position on cognitive response, recall and persuasion. *Journal of Personality and Social Psychology*, 27, 97-109.

Carbotte, K. (2016). Facebook working to bring real social presence to virtual reality. Available from: http://www.tomshardware.co.uk/facebook-social-vr-experiments,news-52779.html

Cassidy, A. (2016). What does virtual reality mean for advertising in 2016? Available from: http://www.theguardian.com/media-network/2015/dec/03/virtual-reality-in-advertising-2016

Chahal, M. (2016). Why 2016 will be virtual reality's breakthrough year. Available from: https://www.marketingweek.com/2016/01/28/why-2016-will-be-a-breakthrough-year-for-virtual-reality/

Chi, H.-H. (2011). Interactive digital advertising vs. virtual brand community: Exploratory study of user motivation and social media marketing responses in Taiwan. *Journal of Interactive Advertising*, Vol 12 No 1 (Fall 2011), 44-61.

Chu, S.-C., & Kim, Y. (2011). Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites. *International Journal of Advertising*, 30(1), 47-75.

Coates, G. (1992). *Program from Invisible Site—a virtual sho*, a multimedia performance work

presented by George Coates Performance Works, San Francisco, CA, March, 1992.

Corriea, A. (2014). Supermarket giant Tesco looking into Oculus Rift to change consumer behavior. Available from: http://www.polygon.com/2014/3/26/5549890/supermarket-giant-tesco-looking-into-oculus-rift-to-change-consumer

Danova, T. (2015). Virtual-reality headsets are set to take off — here's how the market will grow. Available from: http://uk.businessinsider.com/virtual-reality-headset-sales-explode-2015-04?r=US&IR=T

Dessart, L., Veloutsou, C., & Morgan-Thomas, A. (2016). Capturing consumer engagement: duality, dimensionality and measurement. *Journal of Marketing Management*, 32(5-6), 399-426.

Elgan, M. (2015). How Virtual Reality Is Redefining Marketing. Available from: http://www.cioinsight.com/it-management/innovation/how-virtual-reality-is-redefining-marketing.html

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). Students' use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), http://jcmc.indiana.edu/vol12/issue4/ellison.html

eMarketer (2016). Virtual Reality Is an Immersive Medium for Marketers: Marketers should start experimenting sooner rather than later. Available from: http://www.emarketer.com/Article/Virtual-Reality-Immersive-Medium-Marketers/1013526

Ericsson ConsumerLab (2015). *10 Hot Consumer Trends 2016*. December 2015. Stockholm: Ericsson.

Feick, L. F., & Price, L. L. (1987) The market maven: a diffuser of marketplace information. *Journal of Marketing*, 51(1), 83–97.

Gambetti, R. C., & Graffigna, G. (2010). The concept of engagement: A systematic analysis of

the ongoing marketing debate. *International Journal of Market Research*, 52(6), 801-826.

Gaudiosi, J. (2015). How Ford goes further with virtual reality. Available from: http://fortune.com/2015/09/23/ford-virtual-reality/

Gaudiosi, J. (2016). Mercedes-Benz Drives Two Virtual Reality Experiences. Available from: http://fortune.com/2016/04/30/mercedes-benz-drives-two-virtual-reality-experiences/

Gilly, M. C., Graham, J. L., Wolfinbarger, M. F., & Yale, L. J. (1998) A dyadic study of interpersonal information search. *Journal of the Academy of Marketing Science*, 26(2), 83–100.

Goh., K.-Y., Heng, C.-S., & Lin, Z. (2013). Social Media Brand Community and Consumer Behavior: Quantifying the Relative Impact of User- and Marketer-Generated Content. *Information Systems Research*, 24(1), 88-107.

Graham, P. (2015). SapientNitro developing VR Shopping Experience for The Apartment. Available from: http://www.vrfocus.com/2015/06/sapientnitro-developing-vr-shopping-experience%e2%80%8f-for-the-apartment/

Guo, Y., & Barnes, S.J. (2011). Explaining purchasing behaviour in virtual worlds: The case of Second Life. *Information & Management*, 48(7), 303-312.

Guo, Y., & Barnes, S.J. (2009). Virtual item purchase behaviour in virtual worlds: An exploratory investigation. *Electronic Commerce Research*, 9(1-2), 77-96.

Hemp, P. (2006). Avatar-based marketing. *Harvard Business Review*, 84 (6), 48-56.

Hofacker, C. F., de Ruyter, K., Lurie, N. H., Manchada, P., & Donaldson, J. (2016). Gamification and mobile marketing effectiveness. *Journal of Interactive Marketing*, 34, 25-36.

Hoffman, D. L., Novak, T. P, & Stein, R. (2012). Flourishing independents or languishing interdependents: Two paths from self-construal to identification with social media, *SSRN*. Available from http://ssrn.com/abstract=1990584

Hudson, S., Huang, L., Roth, M. S., & Madden, T. J. (2016). The influence of social media interactions on consumer–brand relationships: A three-country study of brand perceptions and marketing behaviors. *International Journal of Research in Marketing*, 33(1), 27-41.

Hung, K. H., & Li, S. Y. (2007). The influence of eWOM on virtual consumer communities: Social capital, consumer learning, and behavioral outcomes. *Journal of Advertising Research*, 47(4), 485-495.

Juniper Research (2015). Virtual Reality: Market Dynamics & Future Prospects 2015-2020. Available from: https://www.juniperresearch.com/researchstore/enabling-technologies/virtual-reality/market-dynamics-future-prospects

Keng, C. J., Chang, W. H., Chen, C. H., & Chang, Y. Y. (2016). Mere virtual presence with product experience affects brand attitude and purchase intention. *Social Behavior and Personality*, 44(3), 431.

Kober, S.E., & Neuper, C. (2013). Personality and presence in virtual reality: Does their relationship depend on the used presence measure? *International Journal of Human-Computer Interaction*, 29(1), 13-25.

Laarni, J., Ravaja, N., Saari, T., & Hartmann, T. (2004). Personality-related differences in subjective presence. In M. Alcañiz & B. Rey (Eds.), *Proceedings of the Seventh Annual International Workshop Presence 2004* (pp. 88–95). Valencia, Spain: UPV.

Lavidge, R.J., & Steiner, G.A. (1961). A model for predictive measurements of advertising effectiveness. *Journal of Marketing*, 25(6), 59–62.

Lee, A.Y., Keller, P. A., & Sternthal, B. (2010). Value from regulatory construal fit: The persuasive impact of fit between consumer goals and message concreteness. *Journal of Consumer Research*, 36(5), 735-747.

Levine, B. (2016). What does VR-based marketing offer that other tech does not? Available

from: http://marketingland.com/what-does-vr-based-marketing-offer-that-other-tech-does-not-167876

Lim, J. S., Hwang, Y., Kim, S., & Biocca, F. A. (2015). How social media engagement leads to sports channel loyalty: Mediating roles of social presence and channel commitment. *Computers in Human Behavior*, 46, 158-167.

Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication*, 3(2). Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.1997.tb00072.x/full

Lu, B., Fan, W., & Zhou, M. (2016). Social presence, trust, and social commerce purchase intention: an empirical research. *Computers in Human Behavior*, 56, 225-237.

Lui, T.-W., Piccoli, G., & Ives, B. (2007). Marketing strategies in virtual worlds. *The Data Base for Advances in Information Systems*, 38 (4), 77-80.

Mandelbaum, A. (2015). How Companies Are Marketing with Virtual Reality. Available from: http://www.chiefmarketer.com/companies-marketing-virtual-reality/

Mbryonic (2016). *Virtual Reality Primer*. London: Mbryonic.

McLaren, S. (2016). Could virtual reality kill experiential marketing? Available from: http://wallblog.co.uk/2016/04/15/could-virtual-reality-kill-experiential-marketing/

Medina, N.D. (2016). Disney VR Steam App: Try 'Star Wars,' 'Avengers' Experiences On Both HTC Vive And Oculus Rift. Available from: http://www.idigitaltimes.com/disney-vr-steam-app-try-star-wars-avengers-experiences-both-htc-vive-and-oculus-rift-534112

Mennecke, B. E., Triplett, J. L., Hassall, L. M., Conde, Z. J., & Heer, R. (2011). An examination of a theory of embodied social presence in virtual worlds. *Decision Sciences*, 42(2), 413-450.

Microsoft Hololens (2015). Microsoft HoloLens: Partner Spotlight with Volvo Cars. Available from: https://www.youtube.com/watch?v=DilzwF90vec

Milk, C. (2015). The United Nations: Clouds Over Sidra. Available from: http://vrse.works/creators/chris-milk/work/the-united-nations-clouds-over-sidra/

Moon, Y. (2000). Intimate exchanges: Using computers to elicit self-disclosure from consumers. *Journal of Consumer Research*, 26(4), 324–340.

Morris, C. (2016). Virtual reality and the new sales experience. Available from: http://www.campaignlive.com/article/virtual-reality-new-sales-experience/1392253

Mowad, A. (2015). Virtual Reality – The Future of Customer Service. Available from: http://www.virtualhold.com/blog/customer-experience/virtual-reality-future-customer-service/#.VzthGyrmppg

Munster, G., Jakel, T., Clinton, D., & Murphy, E. (2015). *Next Mega Tech Theme is Virtual Reality*. Minneapolis: Piper Jaffray.

Murray, C.D., Fox, J., & Pettifer, S. (2007). Absorption, dissociation, locus of control and presence in virtual reality. *Computers in Human Behavior*, *23*, 1347–1354.

NASA (2016). Virtual Reality: Definition and Requirements. Available from: http://www.nas.nasa.gov/Software/VWT/vr.html

Nass, C., & Moon, Y. (2000). Machines and mindlessness: Social responses to computers. *Journal of Social Issues*, 56(1), 81–103.

Neff, J. (2015). How Virtual Reality Could Change Shopper Marketing, B2B and More. Available from: http://adage.com/article/digital/virtual-reality/299336/

Nicovich, S.G., Boller, G.W., & Cornwell, T.B. (2005). Experienced presence within computer-mediated communications: Initial explorations on the effects of gender with respect to empathy and immersion. *Journal of Computer-Mediated Communication*, *10*(2).

Novak, T.P. (2012). Quality of virtual life (QOVL). In D. Mick, S. Pettigrew, C. Pechmann, and J. Ozanne, J. (Eds.), *Transformative Consumer Research for Personal and Collective Well*

Being: Reviews and Frontiers (pp. 225-246). New York: Routledge.

Nunatak (2014). Update: Virtual Reality. Available from: https://www.superdataresearch.com/market-data/virtual-reality-industry-report/

Petty, R.E., and Cacioppo, J.T. (1986). *The Elaboration Likelihood Model of Persuasion*. New York: Academic Press.

Petty, R.E., and Krosnick, J.A. (1995*). Attitude Strength: Antecedents and Consequences*. Mahwah, NJ: Erlbaum Associates.

Pine, B. J., & Gilmore, J. H. (1998). Welcome to the experience economy. *Harvard Business Review*, 76(4), 97-105.

Pine, B. J. & Gilmore, J. H. (1999). *The Experience Economy: Work is Theatre and Every Business a Stage*. Boston: Harvard Business School Press.

Poeschl, S., & Doering, N. (2015). Measuring co-presence and social presence in virtual environments - Psychometric construction of a German scale for a fear of public speaking scenario. *Studies in Health Technology and Informatics*, 219, 58-63.

Pressey, A., Salciuviene, L., & Barnes, S.J. (2013). Uncovering relationships between emotional states and higher-order needs: Enhancing consumer emotional experiences in computer-mediated environment. *International Journal of Online Marketing*, 3(1), 31-46.

Quenqua, D. (2016). What Patrón's CMO learned from taking a chance on virtual reality. Available from: http://www.campaignlive.com/article/patrons-cmo-learned-taking-chance-virtual-reality/1391374

Reeves, B., & Nass, C.I. (1996). *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*. New York: Cambridge University Press.

Riva, G., Mantovani, F., Capideville, C. S., Preziosa, A., Morganti, F., Villani, D., & Alcañiz, M. (2007). Affective interactions using virtual reality: the link between presence and emotions.

CyberPsychology and Behavior, 10(1), 45-56.

Riva, G., & Mantovani, F. (2014). Extending the self through the tools and the others: A general framework for presence and social presence in mediated interactions. In Riva, G., Waterworth, J., and Murray, D. (Eds.), *Interacting with Presence: HCI and the Sense of Presence in Computer-Mediated Environments* (pp. 19-31), Berlin: de Gruyter.

Rumsey, A. (2016). Is Virtual Reality Viable for Marketers In 2016? Available from: http://www.cmo.com/articles/2016/1/22/is-virtual-reality-viable-for-marketers-in-2016-.html

Rutgers Online (2014). Virtual Reality: Changing the Way Marketers are Conducting Research. Available online: http://online.rutgers.edu/resources/infographics/virtualreality/

Sas, C., & O'Hare, G. (2003). Presence equation: An investigation into cog- nitive factors underlying presence. *Presence, 4th Annual International Workshop Presence 2001*, *12*, 523–537.

Schell, J. (2008). *The Art of Game Design: A Book of Lenses*. Burlington, MA: Morgan Kaufmann.

Schmitt, B. (1999). Experiential marketing. *Journal of Marketing Management*, 15,53-67

Sheehan, P.W. (1967). A shortened form of Betts' questionnaire upon mental imagery. *Journal of Clinical Psychology*, *23*, 386–389.

Sherman, W. & Craig, W. (2003). *Understanding Virtual Reality. Interface, Application and Design*. San Francisco: Morgan Kaufmann.

Short, J. A., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. New York: John Wiley & Sons.

Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin*, 20, 580–591.

Sivunen, A., & Nordbäck, E. (2015). Social Presence as a Multi-Dimensional Group Construct in

3D Virtual Environments. *Journal of Computer-Mediated Communication*, 20(1), 19-36.

Statista (2016). Number of monthly active Facebook users worldwide as of 1st quarter 2016 (in millions). Available from: http://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/

Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication*, 4(24), 73-93.

Talks, M. (2015). 10 ways marketers can use virtual reality right now. Available from: https://econsultancy.com/blog/66587-10-ways-marketers-can-use-virtual-reality-right-now/

Tellegen, A., & Atkinson, G. (1974). Openness to absorbing and self-altering experiences ("absorption"), a trait related to hypnotic susceptibility. *Journal of Abnormal Psychology*, *83*, 268–277.

Tikkanen, H., Hietanen, J., Henttonen, T., & Rokka, J. (2009). Exploring virtual worlds: Success factors in virtual world marketing. *Management Decision*, 47(8), 1357-1381.

Trusov, M., Bucklin, R. E., & Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: Findings from an Internet social networking site. *Journal of Marketing*, 73(5), 90-102.

Utz, S., & Muscanell, N. (2015). Social media and social capital: Introduction to the special issue. *Societies*, 5, 420-424.

van Laer, T., de Ruyter, K., Visconti, L. M., & Wetzels, M. (2014). The extended transportation-imagery model: A meta-analysis of the antecedents and consequences of consumers' narrative transportation. *Journal of Consumer Research*, 40(5), 797–817.

Verhoef, P. C., Lemon, K. C., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer experience creation: Determinants, dynamics and management strategies. *Journal of Retailing*, 85(1), 31-41.

Villani, D., Repetto, C., Cipresso, P., & Riva, G. (2012). May I experience more presence in doing the same thing in virtual reality than in reality? An answer from a simulated job interview. *Interacting with Computers*, 24(4), 265-272.

von der Pütten, A. M., Krämer, N. C., Gratch, J., & Kang, S.-H. (2010). ‘‘It doesn’t matter what you are!” Explaining social effects of agents and avatars. *Computers and Human Behavior*, 26, 1661-1650.

VRS (2016). History of Virtual Reality. Available from: http://www.vrs.org.uk/virtual-reality/history.html

Wallach, H. S., Safir, M. P., & Samana, R. (2010). Personality variables and presence. *Virtual Reality*, *14*, 3–13.

Warnock, J. (2016). Why Virtual Reality May Become The New Normal In Email Marketing. Available from: http://marketingland.com/virtual-reality-may-become-new-normal-email-marketing-165534

Warshaw, J., Matthews, T., Whittaker, S., Kau, C., Bengualid, M., & Smith, B. A. (2015). Can an algorithm know the “real you”? Understanding people’s reactions to hyper-personal analytics systems. *Proceedings of CHI 2015*, Seoul, Korea, April 18-25.

Wasserman, S. (2015).Can Virtual Reality Help Optimize Product Engineering, Manufacturing and Operations? Available from: http://www.engineering.com/PLMERP/ArticleID/9484/Can-Virtual-Reality-Help-Optimize-Product-Engineering-Manufacturing-and-Operations.aspx

Wirth, W., Hartmann, T., Böcking, S., Vorderer, P., Klimmt, C., Schramm, H., et al. (2007). A process model of the formation of spatial presence experiences. *Media Psychology*, *9*, 493–525.

Witmer, B.G., & Singer, M.J. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence: Teleoperators and Virtual Environments*, *7*, 225–240.

Wojdynski, B. W. (2016). Native advertising: Engagement, deception, and implications for theory. In Brown, R., Jones, V. K., and Wang, B. M. (Eds.), *The New Advertising: Branding, Content and Consumer Relationships in a Data-Driven, Social Media Era*. Santa Barbara, CA: Praeger/ABC Clio.

Wojdynski, B. W., & Evans, N. J. (2016). Going native: Effects of disclosure position and language on the recognition and evaluation of online native advertising. *Journal of Advertising*, *45*, 157-168.

Wu, C. H.-J. (2007). The impact of customer-to-customer interaction and customer homogeneity on customer satisfaction in tourism service—The service encounter prospective. *Tourism Management*, 28(6), 1518–1528.

Wu, M., Huang, Y., Li, R., Bortree, D. S., Yang, F., Xiao, A., & Wang, R. (2016). A tale of two sources in native advertising: Examining the effects of source credibility and priming on content, organizations, and media evaluations. *American Behavioral Scientist*, 60(12), 1492-1509.

Yadav, M. S., & Pavlou, P. A. (2014). Marketing in computer-mediated environments: Research synthesis and new directions. *Journal of Marketing*, 78, 20–40.

You, Y., Gadakkepatt, G. G., & Joshi, A. M. (2015). A meta-analysis of electronic word-of-mouth elasticity. *Journal of Marketing*, 79(2), 19-39.

Zahorik, P., & Jenison, R. L. (1998). Presence as being-in-the-world. *Presence*, 7(1), 78-89.

Zhang, Y., & Shrum, L. J. (2009). The influence of self-construal on impulsive consumption. *Journal of Consumer Research*, 35, 838–850.

Zhao, Y., Wang, W., & Zhu, Y. (2010). Antecedents of the closeness of human-avatar relationships in a virtual world. *Journal of Database Management*, 21(2), 41-68.

Table 1.

Examples of VR in Marketing and Marketing-Related Functions

Function	Example	Screenshot[a]
Brand Management	*Patron Spirits*. VR of Hacienda tequila distillery in Jalisco, Mexico (May 2015). Education about brand to add substance to perception of being cool, increasing brand awareness, brand affinity and loyalty (around 70% of ultra-premium tequila market) (Quenqua 2016).	
Market Research	*Tesco "Pélé" virtual supermarket* (March 2014). Strategize store and shelf layouts; improve marketing and advertising for Tesco brand. Shelf planning software saves time and money in planning store layout. Potential future retail environment (Corriea 2014).	
Research and Development	*Gabler's IC.IDO VR System* (January 2015). Enabled the reduction of product development times by 15%. Allows operators to assess production operations as if real (e.g. install part with a tool). Can use human mannequin to assess safety of operations (Wasserman 2015).	
Promotion and Advertising	*Disney VR Steam App* (May 2016). Visit themed worlds, including Disney, Marvel, and Lucasfilm, and interact with characters in their natural environments. Includes 360-degree video and full VR.	

Sales/Retail	*The Apartment* (June 2015). Developed by SapientNitro for The Line, this is a VR recreation of brand's Manhattan store. The viewer can explore the apartment, listen to audio, and if an item is of interest it can be selected to find out more information and to add it to the shopping cart (Graham 2015).	
Public Relations	*Clouds Over Sidra* (Milk 2015). A United Nations VR film following a twelve-year-old girl as she goes to school in the Za'atari camp of 84,000 Syrian refugees in Jordan. Focuses on empathy, community and vulnerability of those displaced by war.	
Customer and after sales service	*Stihl VR videos* (available on YouTube). Although effectively these are sponsored competitions, the time-lapse VR shows a how-to and best practice for a variety of practical activities utilising the company's products.	
Events Management	*Redbull Air Race.* Redbull provide VR simulators at the Air Race and other events to enable visitors to experience more fully what it is like to be a competitor. A new free VR simulator will be a platform for advertising partner brands (Al-Obaidi 2016).	

Image sources: https://www.youtube.com/watch?v=cr3V4xt2710, http://www.polygon.com/2014/3/26/5549890/supermarket-giant-tesco-looking-into-oculus-rift-to-change-consumer, http://www.engineering.com/PLMERP/ArticleID/9484/Can-Virtual-Reality-Help-Optimize-Product-Engineering-Manufacturing-and-Operations.aspx, http://www.theverge.com/2016/3/15/11234272/star-wars-trials-on-tatooine-virtual-reality-ilm-ilmxlab-lucasfilm, http://www.cnet.com/news/will-virtual-reality-make-you-want-to-shop-more-retailers-are-betting-on-it/, http://vrse.com/watch/clouds-over-sidra/, https://www.youtube.com/watch?v=E3jpO8Q4vDw, https://www.vrfocus.com/2016/04/project-cars-devs-to-make-free-vr-red-bull-air-race/

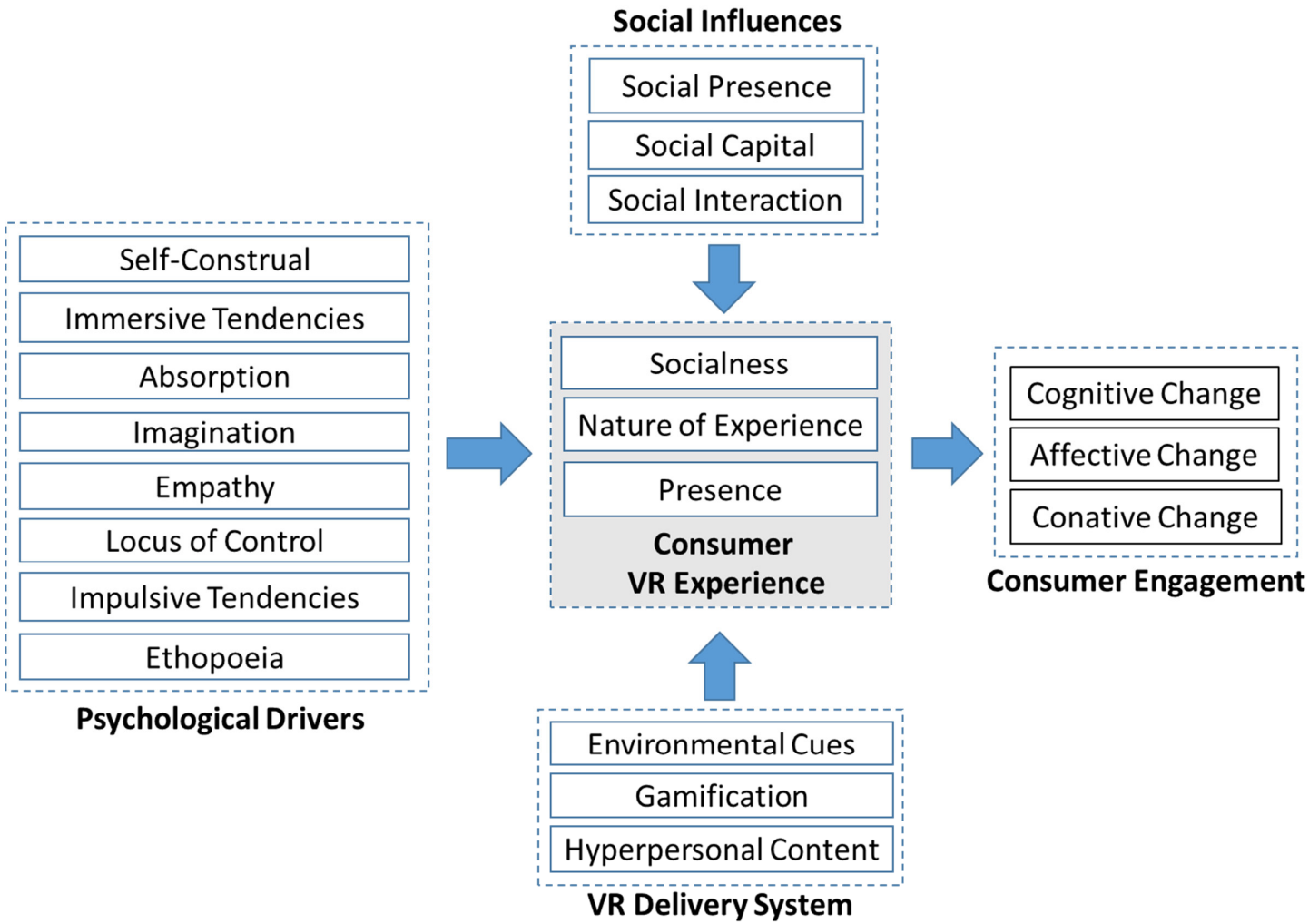

Figure 1: Framework for Understanding the VR Consumer

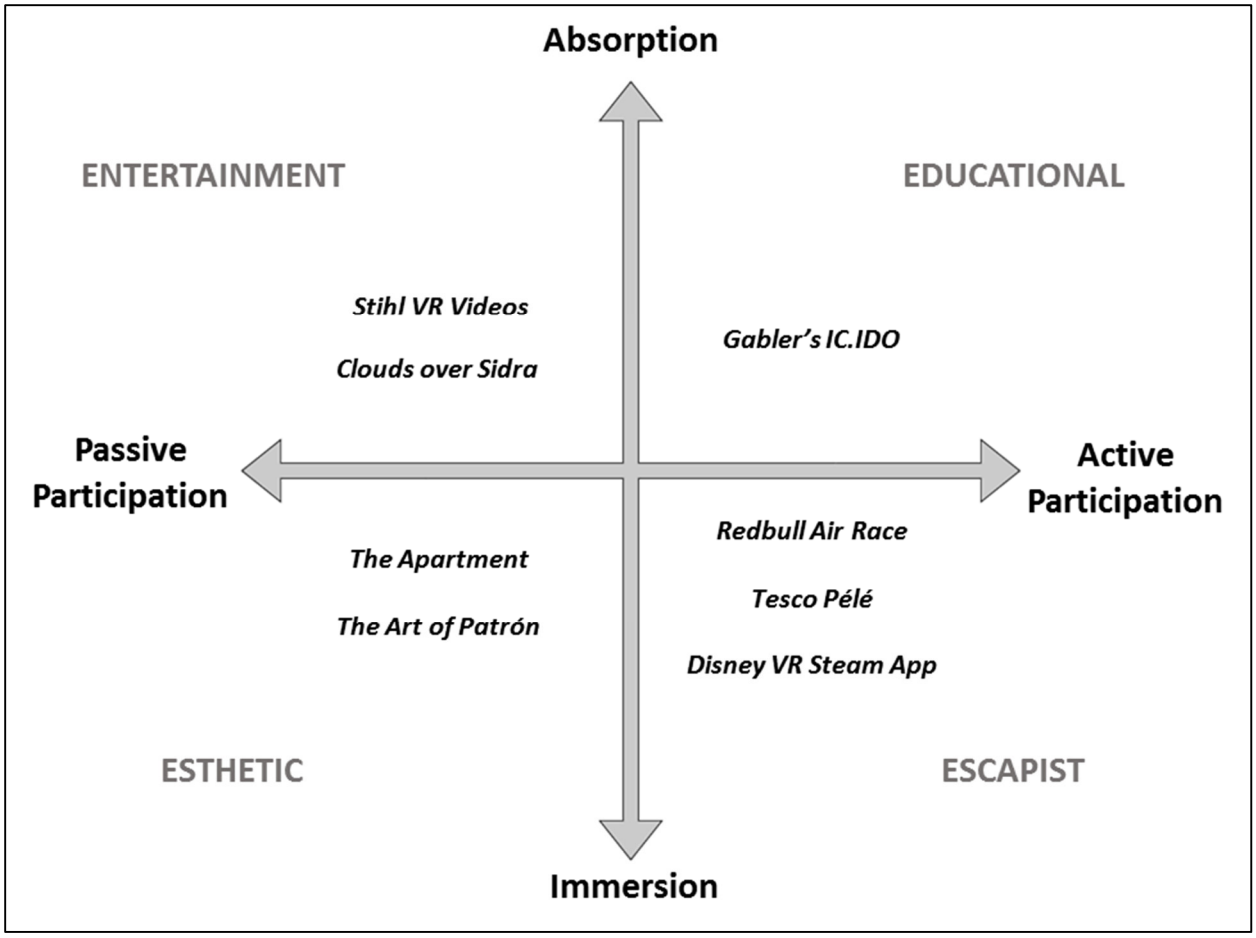

Figure 2: VR Applications Positioned within Pine and Gilmore's Framework

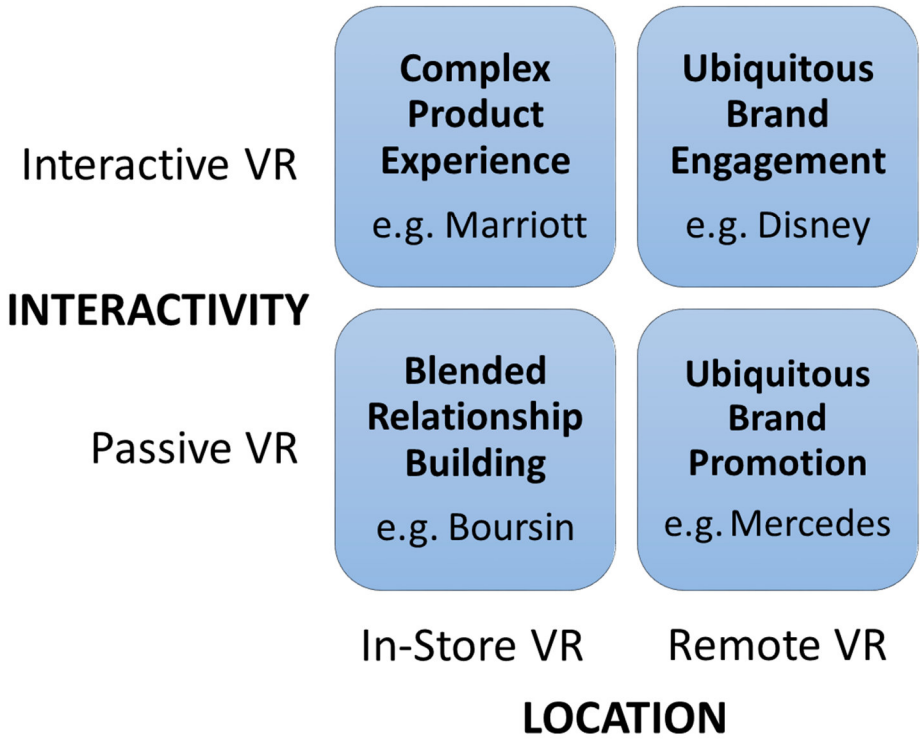

Figure 3: Framework for VR Consumer Engagement

Figure 4: The Volvo S90 through Microsoft Hololens (Microsoft Hololens 2015)