

# If you build it will they come?—An empirical investigation of consumer perceptions and strategy in virtual worlds

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**Abstract** There is increased interest in, and accelerating technological development of, internet-based persistent three-dimensional (3D) virtual environments. The applications of these ‘virtual worlds’ are growing in the fields of entertainment and information assimilation such as virtual real estate, brand building, and marketing. Such applications could, in time, lead to serious economic and business transformation. However, there is a lack of empirical work examining differences between virtual worlds and traditional virtual channels such as websites, and suggesting effective entry strategies for organizations that seek to leverage their presence in virtual worlds. This paper attempts to provide a starting point for such a discussion. Results from our qualitative and quantitative analysis indicate that there is a significant difference in perceptions of trust, product diagnosticity, informativeness, and product descriptions between websites and virtual worlds. Results also suggest that organizations need to employ a synergy strategy when marketing experience goods in virtual worlds.

**Keywords** Virtual worlds · Virtual channel strategy · Web 2.0 · Virtual world marketing

## 1 Introduction

There is increased interest in, and accelerating technological development of, internet-based persistent three-dimensional (3D) virtual environments, or virtual

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worlds. A persistent world is a virtual world that is always available, where world events happen continually and change is persistent even if a user is not logged-in. Characters in virtual worlds, called ‘avatars’, can influence and change the persistent world. Applications of these virtual worlds are growing in the fields of entertainment and information assimilation, such as virtual real estate, brand building, and marketing.<sup>1</sup> Organizations are already sensing the potential of 3D environments in marketing and collaboration with customers. Toyota and Reebok, amongst others, use Second Life, a virtual world, for brand awareness, and to collect customer preference information. Such applications could, in time, lead to serious economic and business transformations [24, 31].

Though virtual worlds are increasingly gaining attention in popular media as well as academia, there is still skepticism on whether they will be adopted on a large scale by businesses [41]. One reason for this skepticism is technological problems with current virtual worlds [30]. However, according to ‘Moore’s Law’, which steadily produces cheaper and more effective hardware, resulting in faster and richer 3D environments [38], it is likely that technology will cease to be an issue. A second reason is the learning curve needed for people to migrate from websites to 3D platforms [15]. However, we see a steady evolution of representation of information from basic text to richer, more intuitive forms that include multimedia such as sound, video, animation, and life-like structures. The new generation<sup>2</sup> is comfortable using virtual platforms for social networking, education, business transactions, and telework [14]. Virtual networks and crowd-sourcing<sup>3</sup> platforms (such as Wikipedia, epinions, MySpace, and YouTube) are now a prominent source of information [4, 10, 16]. With the required technological development to support them, it seems intuitive that 3D environments that support networking with richer audio, visual, and textual features will replace the current form of standard two dimensional information representations on the web [23, 31]. Hence, studying the business potential of virtual worlds in terms of the marketing opportunities presented by them is imperative. However, given the pervasiveness of websites and the relative unfamiliarity with virtual worlds, it is unclear what the current state of affairs is when comparing between the two. Companies are still struggling with what entry strategy they need to adopt when dealing with customers in these new channels [19].

The goal of this paper is twofold. First, we examine differences between websites and virtual worlds with regard to consumers’ perceptions of factors that have been demonstrated to be important in e-commerce. Specifically, we study perceptions of trust, product diagnosticity, informativeness, and product description in websites and virtual worlds. We wish to clarify that we are not considering websites and virtual worlds as contrasting or opposing channels, but rather two distinct virtual channels

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<sup>1</sup>For example, see <http://secondlifegrid.net/how>.

<sup>2</sup>It is important to clarify that the target population that this study wishes to generalize to is not the entire world, but rather potential consumers in virtual worlds. This restricts the scope of this research to a sample that is, to some degree, familiar with technology and has access to the Internet. We thank Reviewer #1 for bringing this to our attention.

<sup>3</sup>‘Crowd sourcing’ is a term employed for leveraging the productive potential of an undefined group of people, usually connected to the internet to pool resources such as information, images, videos etc. For example, see <http://www.wired.com/wired/archive/14.06/crowds.html>.

in which consumer perceptions can adopt a range of values in a continuum. Virtual worlds differ from websites in specific ways due to the differences in what the technology offers or “affords”, which affect aspects such as social presence and immersiveness, and our goal is to identify the influence of these differences on consumer perceptions. Our second objective is to ascertain what strategies organizations can employ when marketing experience products in virtual worlds. Through a theoretical sampling of contrastive strategies, we compare between the “mirror” and “synergy” strategy. In doing so, we measure the effect on consumers’ intention to buy, general brand satisfaction, and intention to re-visit the channel.

To achieve our objectives, we conduct an experiment with four randomized treatments—varying across the channel (2D websites versus 3D virtual worlds) and strategy. We supplement our results with qualitative data obtained through interviews of subjects in a quasi-experiment in a virtual world. Our results indicate that, as of now, consumers are far more comfortable shopping in websites rather than in virtual worlds, and perceive significantly higher levels of trust, product diagnosticity, informativeness, and product descriptions on websites. We also find that adopting the right strategy for marketing in the virtual world is important for organizational outcomes, such as intention to transact and intention to re-visit the channel. We conclude with a discussion of our findings with the caveat that given the nascent stage of the technology, our work is intended to be of an exploratory nature. We intend to provide a starting point for a research agenda on treating virtual worlds as channels distinct from other channels, such as websites, on the Internet.

## 2 Literature review

In order to better structure our theoretical underpinnings, we divide this section in accordance with our research objectives. First, we discuss our variables of interest pertaining to consumer perceptions. Next, we hypothesize on the business strategies of companies in virtual worlds. In each section, we present our related hypotheses.

### 2.1 Consumer perceptions

With the popularity of the Internet, there has been a plethora of research that looks at leveraging virtual opportunities for e-commerce. E-commerce literature has identified the roles of trust [37], product diagnosticity [26], informativeness [44], and product descriptions [33] in forming intentions to buy which translates into actual purchases. It is unclear how these factors are different in virtual worlds. While some products and services cater specifically to avatars, most companies may seek to leverage their virtual presence to reach real-life (RL) customers. Hence studying the impact of virtual worlds on RL customers is imperative to organizations that wish to use virtual worlds as a marketing channel. We next present our theoretical background and hypotheses relating to each of the four factors of trust, product diagnosticity, informativeness and product description.

### 2.1.1 Trust

One major limitation of web-based channels is that of trust. Trust is a psychological state, which is arguably the most influential in online transaction outcomes. E-commerce literature looks at trust as a multidimensional construct including buyers' perceptions of the sellers' competence, integrity, and benevolence [37]. Accordingly, trust in an online transaction is defined as a buyer's belief that the transaction with the seller will meet expectations due to the seller's competence, integrity and benevolence. Research in e-commerce has recognized that a significant impediment of virtual stores is consumers' lack of trust in its legitimacy [6, 21]. Perceived risk is found to be significantly lower (thereby increasing trust) in physical establishments where consumers feel they have a place where they can return goods, register complaints, or speak with someone [32]. Additionally, physical businesses are often embedded in social networks, which enhance trust [22]. Consumers see, and can interact with each other, when shopping through physical channels. Consequently, organizations try to create online social networks through virtual forums where consumers can exchange opinions, chat with customer service personnel, and rate products or services [2, 25, 54].

Virtual worlds provide a richer platform for development of social networks [9], and hence increased trust [17], among consumers. The nature of these virtual worlds enables virtual co-location of multiple avatars in the same virtual space. This is not possible in traditional online forums where communication is mainly through asynchronous text between people represented through nicknames. Avatars are customizable in several dimensions, based on body size, shape, hairdo, makeup, clothes, accessories, and possessions (such as virtual houses or vehicles). Having such a virtual 'life' and interaction with other avatars in this persistent world increases the 'embeddedness' [22] of individuals in the social networks, increasing their sense of trust. There is previous research which shows that online retailers who use avatars have a competitive advantage because they provide customers with enhanced perceptions of human connections and the formation of emotional bonds [55]. Hence, based on social network theory, we hypothesize that:

*H1: Trust is higher in virtual worlds as compared to websites.*

### 2.1.2 Informativeness

We derive the concept of informativeness from 'website informativeness', which was posited by Pavlou et al. [44] to be an important determinant of e-commerce success. Informativeness, in the context of virtual channels, can be defined as the degree to which the channel offers information that the buyers perceive as useful. Informativeness is perceptual, and differs from the objective number and type of informational cues afforded by the medium. It could include any information that is directly, or indirectly related to the transaction, such as the seller's selling practices, track record, feedback, privacy and security practices. Consumers look for such information especially when shopping in virtual channels [7]. By increasing informativeness related to a transaction, a seller increases the signals conveyed to the buyer regarding the credibility and reliability of the transaction [44]. Informativeness may also come from

prior knowledge that the consumer has about the brand and the particular product. For example, a consumer may be familiar with the specifications of cars offered by Scion, or with a particular car dealer. However, prior knowledge does not eliminate the need for the consumer to be able to access such information. For example, even when buying a car at a Scion dealership, the consumer would demand warranty information about that car.

Since virtual worlds do not provide a record or archive of information that a buyer can refer to, we argue that virtual worlds are lower on informativeness as compared to websites. Virtual worlds have the capability of adding textual information in the form of “note cards” or signs in the virtual environment. However, the environment is, at least in its current form, more experience-oriented rather than information-oriented. Virtual world stores often link to their respective websites to offer more information about the seller and the product. We hence hypothesize that:

*H2: Informativeness is higher in websites as compared to virtual worlds.*

### *2.1.3 Product diagnosticity*

Product diagnosticity is the degree to which a buyer perceives the channel to be helpful in evaluating a product [26, 28]. In physical channels, product diagnosticity is high as buyers have a higher degree of freedom in trying out a product. By providing a real feel for products and enabling evaluation, sellers convey more information through more signals [28]. Traditional virtual channels such as websites inhibit buyers from physically inspecting products, thus hampering product diagnosticity [44].

Virtual worlds differ in the level of immersiveness and presence afforded by the technology to individuals [46, 48] as compared to other technologies. While immersiveness refers to technological features such as the degrees of freedom of movement in the environment, the viewing angles, etc., the level of social presence refers to how real the environment and other inhabitants of the medium feel to an individual [51]. Social presence theory has been primarily used to study the effects of an individual’s awareness of his interaction partners in a particular medium. Though our focus is the awareness of the individual of the products and features of the environment that are relevant to the product, higher social presence could also be hypothesized to enhance the “realness” of those elements within a medium. Immersion in virtual worlds has been shown to elicit real life-like physiological and psychological reactions from individuals [36, 49]. Hence technological features of virtual worlds, through the immersiveness [46] and social presence [50] afforded by the medium, facilitate a more realistic feel of the product [34]. We thus hypothesize that:

*H3: Product Diagnosticity is higher in virtual worlds as compared to websites.*

### *2.1.4 Product description*

Product description refers to the use of text, pictures, and multimedia to describe the products. Though, to our knowledge, scales for product description are not well established, literature in e-commerce has suggested the importance of product description in online transactions [33]. We propose that to the extent a product is described

with more textual, pictorial, and multimedia data, a seller can increase the signals conveyed to the buyer.

Virtual worlds may provide a richer multimedia experience, but are inherently low on textual cues. Conversely, websites do not support high multimedia but rely heavily on textual descriptions. In terms of describing a product, individuals can be hypothesized to rely heavily on textual cues [42]. In particular, text allows for depiction of information such as product warranty, functionality, certifications, standards, etc. that may not be as easily depicted through pictures or multimedia. This is consistent with media richness theory, which posits that written media is preferred for unequivocal messages while richer media (such as face-to-face) is preferred for ambiguous messages [11]. To the extent that a product can be described in an explicit, unequivocal manner, we hypothesize that:

*H4: Product Description is higher in websites as compared to virtual worlds.*

## 2.2 Business strategy

The advantages of web channels over physical channels, derived from transaction cost economics, include economies of scale from reaching a wider customer base, lower sunk costs in ‘brick-and-mortar’ set-ups and inventory, lower costs due to bypassing retail distribution intermediaries, higher degree of transaction automation, and availability of the channel 24/7 at no extra cost. The decision to engage in a particular e-commerce strategy can be seen to stem from cost reduction, value-addition, and market extension [53]. 3D worlds, by virtue of being internet-based, can be hypothesized to enjoy the same advantages as traditional web channels. However, the new environment presents unique opportunities for representation of products and services.

Given the novelty of the concept and the technology, little is known about whether the same strategies that were used for web-channels will apply to virtual worlds. Some strategies used by organizations that have virtual and physical presences are ‘virtual’, ‘parallel’, ‘mirror’, and ‘synergy’ [52].<sup>4</sup> A virtual strategy is one where the organization does not have a physical presence. A parallel strategy is one where an organization’s virtual presence is not explicitly linked to its physical presence. When adopting the mirror strategy, firms develop a web channel that resembles their physical channel as closely as possible in terms of the look and feel, and the offerings of products and services. When adopting a synergy strategy, firms explicitly link their virtual and physical presence, but exploit each channel’s unique strengths. While organizations are using virtual worlds for different purposes (e.g. brand awareness, customer preferences), we believe that the strategy pursued by the firm influences the impact of its presence in the virtual world on consumers.

Products offered by firms can be classified based on a typology of their attributes. Nelson’s search-experience product classification framework [39] classifies products

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<sup>4</sup>Stenfield et al. [52] identify two more—‘anti-mirror’ and pure ‘physical’. A company that adopts a pure physical strategy does not have a virtual presence, and one that adopts an anti-mirror strategy changes its physical channel to resemble its virtual one. Since our focus is on the virtual channels, we choose to examine the four other strategies, which are concerned with how organizations use the virtual channels.

based on the extent of the search and experience attributes they have [40]. An item is a search good if quality and performance can be determined before purchase, and an experience good if quality can only be assessed after purchase. Darby and Karni [12] added credence attributes to the product classification, defining them as those attributes that a customer cannot verify even after purchase. Due to their unpredictable nature, we exclude credence goods from our study. While it is possible for all goods to have search, experience, and credence attributes, such a perspective makes classification difficult [5]. Instead, we adopt an approach that classifies products by their dominant attributes [29] such that certain products can be classified as predominantly search products or predominantly experience products.

Online purchases of search products are primarily motivated by cost reduction [29]. Hence, we do not expect them to perform differently in websites or virtual worlds and expect a purely virtual, or parallel, strategy to work well for such products [20]. We focus our attention on experience goods, i.e. goods for which the quality and performance is assessed post purchase. Information about attributes of experience products is costly to obtain without direct experience with the product [29]. We expect experience goods to derive more advantages from virtual worlds contingent on the strategy employed. The ‘synergy’ strategy allows for capitalizing on the features of the particular channel, while the ‘mirror’ strategy tries to emulate the physical channel. Both these strategies can be better supported in virtual worlds than on websites and we see examples of companies that have adopted each of these types of strategies in virtual worlds. However, we believe that virtual worlds allow consumers to “play around” with products in a way that is different from real life or websites. We hence hypothesize that *the synergy strategy is more effective than the mirror strategy for experience goods in virtual worlds*. We examine the effectiveness of a given strategy through consumers’ general satisfaction with the brand, consumers’ intention to transact with the retailer (also known as willingness to purchase), and consumers’ intention to revisit the channel.

Satisfaction of consumers can be measured for a consumer who has either used or viewed the product or service, and focuses on the experience from his/her point of view [1]. Consumers’ satisfaction can be an indicator of the brand loyalty. We propose that a synergy strategy allows a firm to capitalize on the benefits offered by the virtual world such as allowing the consumer to view the product in different ways and “play around” with the product to customize it in ways that may not be possible in the real world, whereas a mirror strategy does not. We hence believe that employing a synergy strategy would lead to higher customer satisfaction with the brand.

Another important outcome measure for companies is asking consumers whether they intend to purchase the brand [1]. Previous research on B2C e-commerce shows that buyer intentions to engage in online purchase are a good predictor of actual purchases [43]. As above, we argue that pursuing a synergy strategy (as opposed to a mirror strategy) in a virtual world allows the firm to leverage the benefits offered by the virtual world, resulting in a higher intention to transact. This is specified in our hypotheses below:

*H5: Consumers’ satisfaction with the brand will be higher for experience goods following the synergy strategy compared to the mirror strategy.*

*H6: Willingness to purchase (WTP) will be higher for experience goods following the synergy strategy compared to the mirror strategy.*

Our third outcome measure of the effectiveness of a given strategy is a consumer's intention to re-visit the channel, which we refer to as channel preference. Consumers' satisfaction with a channel, the information, and the experience that it provides, can be measured by the consumer's intent to visit the channel again before making the purchase. We propose that if the firm chooses a synergy strategy in a virtual world, capitalizing on the benefits offered by it, the experience offered to the consumer is better. This in turn results in a higher likelihood to return to the channel before making a purchase. Thus:

*H7: Channel preference will be higher for experience goods following the synergy strategy compared to the mirror strategy.*

### 3 Empirical approach

We first collected preliminary qualitative data of consumers in virtual worlds for exploratory purposes. While we do not claim that this data is representative or generalizable, we use this data to get an initial impression of themes and concepts for our research. The qualitative study also helped validate our theoretical sampling of companies based on the subjects' perceptions of the companies' strategies. Since virtual worlds are a new phenomenon, we feel that obtaining subjects' opinions and perceptions through open-ended questions is important. This allows us to obtain richer insights that are not possible through only quantitative methods. We next employed a quantitative experiment-based approach to test our seven hypotheses. We describe both parts of our study—the qualitative and quantitative approach—in detail.

#### 3.1 Qualitative study

A qualitative study was conducted with fourteen subjects who had avatars in Second Life.<sup>5</sup> The subjects were visitors of two islands in Second Life—Scion City (a brand of Toyota) and Reebok. There was no incentive offered to the subjects for participating in the study. Interviews were all conducted in-world (i.e. inside Second Life), logged, and stored in a qualitative data analysis tool, NVivo, which was also used to analyze the data. The data were analyzed with our theoretical framework of marketing strategies in mind. Analysis was done using hermeneutics [47] such that the researcher looked for themes in the data based on the theoretical lens chosen. The interviews consisted of open-ended questions about the subjects' satisfaction with the virtual stores, perceptions of the brand, and a description of their experiences with the products and services the stores offered. While some products and services are designed exclusively for avatars in the virtual world rather than for individuals in real life, these transactions play an increasingly important role in the organization's commerce. Some virtual worlds such as Second Life have an economy of their own.

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<sup>5</sup>Second Life is a virtual world owned by Linden Labs: [www.secondlife.com](http://www.secondlife.com).



Currency in Second Life is in the Linden Dollar, which has an exchange rate of approximately 263 Linden Dollars for 1 US Dollar. Avatars in Second Life can own and create products and services in Second Life and retain the exclusive rights for them. They can buy and sell these products and services ‘in-world’ for Linden Dollars, which are fully transferable with US Dollars. In September 2008, 293,102 customers spent approximately \$1,931,011 in one day in Second Life. (See more statistics at [http://secondlife.com/whatis/economy\\_stats.php](http://secondlife.com/whatis/economy_stats.php).) Second Life has a total population of 15,138,094, with 1,233,967 members active in the last 60 days.<sup>6</sup> Hence virtual worlds have a growing healthy economy that mimics that of the real world.

The two stores were selected based on a theoretical sampling of their strategy in Second Life. We argue that Scion adopts a mirror strategy, where Scion’s Second Life showroom emulates a real life showroom where avatars can test drive cars. Reebok, on the other hand, offers services that are more geared towards avatars and therefore adopts a synergy strategy. Cars (products offered by Scion) and shoes (products offered by Reebok), are considered examples of experience goods since their quality and performance can only be determined after purchase. While consumers may have prior information regarding the products (such as the reliability of Scion cars in general, or the durability of Reebok shoes), attributes of a particular car or a pair of shoes can only be judged by a consumer after s/he drives the car or wears the shoes. On the other hand, because consumers already know what to expect from search goods such as a textbook or a pen, companies need to spend less time ‘convincing’ a customer about the quality of the good. Marketing experience goods involves a lot more than marketing search goods, and we believe virtual worlds provide an exciting opportunity for these companies. Data from the qualitative study are used to validate our theoretical sampling such that we gain confidence in our selection of the companies as representative of the respective strategies. We discuss relevant quotes that help us validate our selection of Scion and Reebok as following the mirror and synergy strategy respectively.

The first island visited was Scion City (Toyota). This island is used by Scion as a virtual car store where avatars can see new models and test drive the cars. While it is common for avatars to create and own vehicles (though they are not of much use since avatars can fly and teleport in Second Life), being able to test-drive a car from a real world company was unique. This is reflected in the quotes below:

I felt like this could be a place where I could hangout with friends and why not organize a race!!!!

The image of this store (brand) has improved because I would not think they would have a store on Second Life. They are trying to stay ahead of the game, which I believe is a positive message.

I feel that the store (brand) appreciates me as a customer because they offered me to test drive a Scion. I think this a great way to remind people about the brand.

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<sup>6</sup>These numbers are statistics obtained from [www.secondlife.com](http://www.secondlife.com) as of 09/16/2008.

The consumers appreciated the fact that Scion is one of the early adopters of virtual worlds and enjoyed the driving experience from the perspective of their avatar. However, this did not reflect the strategy of Scion, which was to mirror a physical showroom where potential customers can test drive new models of their cars. Simulating the high degree of the sense of experience, and look-and-feel associated with test-driving a car is difficult. From the quotes below, it is clear that customers felt a sense of disappointment with the experience:

[The store] wasn't attractive in the first place, it looked dull, the cars was placed here and there and didn't have the style or anything to attract me as a customer. The driving experience was strictly ok; it was more similar to driving a car in a video game. I don't think they made it feel like a virtual store or anything.

I felt disappointed. There's really nothing to interact with other than the cars to test-drive them.

I didn't like the store because they focused on testing the car but the reality is that the customer won't really know what the car is like just by testing it on Second Life. More company and vehicle information or video ads should be available.

As can be seen in the quotes above, Scion's strategy was to provide a virtual showroom where potential customers could test drive the car. While the subjects appreciated the idea, there is a marked disappointment with the inadequacy of the experience of test-driving a car virtually.

The second island visited was that of Reebok. Reebok allows avatars to buy "blank shoes", which are basic white shoes in different sizes. Each pair of shoes costs 50 L\$ (approximately 18 cents USD). The avatar can then customize the shoe by changing colors of different areas in the shoe. Each additional customization costs the avatar 5 L\$. Reebok can easily gather data on how consumers customize their shoes. The virtual store also advertises sports apparel of the brand on posters displayed on the walls of the stores. Hence, the products offered are for in-world avatars, but the channel is also used for brand imaging and marketing real-world offerings. This suggests that the company follows a synergy strategy—one that is targeted towards enhancing avatars' experience in Reebok's Second Life store and leveraging the company's presence in the new channel. Excerpts from some interviews in Reebok are given below:

I like the store because I was able to customize Reeboks product real time and was able to zoom in for detail.

The image of this store (brand) has improved because they already have a presence in second life even though it is a somewhat new system.

I feel that the store (brand) appreciates me as a customer because the store was made just for the customers, selection is easy, customization also was quite easy though it was a bit hard initially but then it was fine. So it did care about the customers.

It was a very easy experience to buy the shoes and wear it, just needed to left click on it and we had the option to pay it right away and get it, wearing the

shoes also was really easy so over the purchase at Reebok was pretty much similar to what was in the real life world so it was a very neat kind of thing which second life provided in the Reebok store.

Hence, customers appreciated the fact that Reebok had a presence in the new environment, and that there were products targeted for in-world avatars. The shoes offered by Reebok could be customized and bought by avatars for themselves (as avatars), or for their real life selves. Though not mentioned in the quotes, the store also provides free goodies for avatars—such as Reebok jewelry and backpacks. The store ‘felt’ very much like a virtual store rather than simply a representation of a real-life store.

### 3.2 Quantitative study

The aim of our quantitative study was to test our hypotheses regarding the differences between websites and virtual worlds. In addition, we also aim to examine the overall effectiveness of the strategy used by a company in virtual worlds.

#### 3.2.1 *Participants, design, and procedure*

One hundred students from two large metropolitan universities participated in an online study in exchange for course credit. One group of participants was undergraduate students enrolled in business classes at a large southern university in the US. The second group of participants consisted of students enrolled in business classes in a large university in France.<sup>7</sup>

Participants were randomly assigned to one of the four conditions in a 2 (Dimension: 2D/3D) × 2 (Strategy: Mirror/Synergy) between-subjects design. Participants were assigned randomly to one of the four conditions. Random assignment was done by the survey software. The first page of the survey was common to all conditions. It described the nature of the study and asked for their consent to participate in it. Based on the treatment they were assigned to, the participants were then shown screen shots of the brand’s (Reebok/Scion) store (website/virtual world) and description of it. Then they were shown a second screen shot inside the store (website/virtual world) where they could see the product in question (sport shoes/car) up close. They were also presented with a detailed description of what the store (website/virtual world) offers in terms of customization, customer assistance, product trial, interaction with other customers, etc.

After this, all participants responded to the measures described below. We also collected information about age, gender, and involvement with purchase of shoes/cars. The results were unaffected by these control variables, so they are not described further.

#### 3.2.2 *Independent variables*

**Dimension:** Participants in the 2D (website) conditions were presented with screen shots of the brand’s (Reebok/Scion) website, whereas participants in the 3D (Virtual

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<sup>7</sup>The classes at the French university are taught in English. There was no significant statistical difference in the responses from the two groups of students, allowing us to aggregate the data.

World) conditions were presented with screen shots of the brand's Second life store. Participants in the 2D conditions were also shown descriptions of the brand's website and the possibilities for the customer in terms of product visibility, customization, customer service, customer reviews, etc. Similarly, participants in the 3D conditions were presented with detailed descriptions of the Second Life store and the possibilities that Second Life can offer to the customer. Following this, all the participants responded to the measures described below.

**Strategy:** The strategy was manipulated between subjects. The participants in the 'mirror' conditions were shown screen shots of the Scion store, based on our qualitative responses. In the 'synergy' conditions, participants were presented with screen shots of the Reebok store. There was a detailed description provided of what all the participants could do in the virtual store.

The order of presentation was identical in all conditions. As we mention in our discussion section, using screen shots may be viewed as a limitation of the study. However, doing so enabled us to exercise further control over the two conditions such that noise coming from extraneous factors (i.e. novelty effects, encountering other avatars, etc.) could be minimized.

### 3.2.3 *Dependent variables*

**Trust:** The present study uses the 8-item measure of trust developed by Gefen [18] (Table 1). The scale has good levels of reliability (coefficient  $\alpha = .93$ ).

**Product Diagnosticity:** Product Diagnosticity was assessed via the Jiang and Benbasat [26] scale. This scale is a two-item scale. This measure used a seven-point Likert scale and demonstrated adequate levels of reliability (coefficient  $\alpha = .84$ ).

**Website/Virtual World Informativeness:** Informativeness was measured with the Website Informativeness Questionnaire [35], a 4-item scale with responses ranging from strongly agree to strongly disagree on a seven-point Likert scale. The scale was adapted for the conditions examining the virtual world informativeness (see Table 1). The scale has good levels of reliability (coefficient  $\alpha = .95$ ).

**Product Description:** We measured product description by asking participants about the extent of their agreement with these three statements, "I found the textual information available in the Reebok/Scion Website/Second Life store to be very helpful", "I found the visual information available in the Reebok/Scion Website/Second Life store to be very helpful", and "I found the multimedia information available in the Reebok/Scion Website/Second Life store to be very helpful". This scale demonstrated good levels of reliability (coefficient  $\alpha = .86$ ). Hence, these three items were averaged to form an index of product description.

**Intention to Transact:** This scale was adapted using the original scale by Ajzen [3]. The original scale is a 2-item scale. We adapted the scale by adding one more item: "I would consider buying the shoes/car I have seen on Reebok's/Scion's Second Life store/website for myself". The final 3-item scale demonstrated a high level of reliability (coefficient  $\alpha = .90$ ).

**Consumers' satisfaction with the brand:** We measured satisfaction with the brand by asking participants for the extent of their agreement with these two statements, "I am happy with Reebok/Scion as a brand", and "I am satisfied with Reebok/Scion

**Table 1** Measurement items for dependent variables*Trust* (adapted from Gefen [18])

Reebok/Scion understands the market they work in.  
 Reebok/Scion knows a lot about sport shoes/cars.  
 Promises made by Reebok/Scion are likely to be reliable.  
 I do not doubt the honesty of Reebok/Scion.  
 I expect that Reebok/Scion will keep promises it makes.  
 I expect that Reebok/Scion has good intentions toward me.  
 I expect that the intentions of Reebok/Scion are benevolent.  
 I expect that Reebok/Scion is well meaning.

*Website/virtual world informativeness* (adapted from Luo [35])

Reebok's/Scion's Website/Second Life store would give me quick and easy access to lots of information.  
 Information in the Reebok/Scion Website/Second Life store would be useful.  
 I would learn a lot from using the Reebok/Scion Website/Second Life store.  
 I think the information obtained in Reebok/Scion Website/Second Life store would be helpful.

*Product diagnosticity* (adapted from Jiang and Benbasat [26])

I expect that the Reebok/Scion Website/Second Life store will help me get a real feel for shoes/cars.  
 I expect that the Reebok/Scion Website/Second Life store will help me carefully evaluate shoes/cars.

*Intention to transact (also referred to as WTP)* (adapted from Ajzen [3])\*

Given the need, I intend to buy shoes/car from the Reebok/Scion store in the near future.\*  
 Given the need, I plan to purchase shoes/car from the Reebok/Scion store.\*  
 I would consider buying shoes/car I have seen in Reebok's/Scion's Website/Second Life store for myself.

as a brand". The correlation between these two items was 0.97. Hence these two items were averaged to form an index of general satisfaction with the brand.

**Channel preference:** We measured channel preference by asking participants the extent to which they agreed with the following two statements, "If I intend to buy Reebok shoes/Scion car, I will check out Reebok's/Scion's Website/Second Life store", and "Visiting Reebok's/Scion's Website/Second Life store may help me decide whether to buy Reebok shoes/Scion car". The correlation between these two items was 0.84. Hence these two items were averaged to form an index of channel preference.

In addition, we measured the frequency of purchasing online by asking participants the extent to which they agreed with the following statement, "I often make online purchases." Frequency of purchasing was used as a covariate in further data analysis.

## 4 Results

We analyzed the results by specifying a two-way ANOVA with two levels of dimension (2D/3D) crossed with two levels of strategy (mirror/synergy), both specified as

between-subjects independent variables. We specified frequency of online purchasing as a covariate after ensuring that the homogeneity of the slopes criterion was met.

#### 4.1 Consumers' perceptions

In H1 we proposed that trust is higher in virtual worlds compared to websites. We observed a significant main effect of the dimension manipulation, but in the opposite direction. Those in the 2D condition reported higher trust toward the brand than those in the 3D condition,  $F(1, 93) = 4.21$ ,  $p < .04$ ,  $M(2D) = 5.09$  versus  $M(3D) = 4.63$ . These results indicate that websites are more trustworthy compared to virtual worlds. Therefore, H1 was not supported. In addition, we observed a significant main effect of strategy on trust,  $F(1, 93) = 9.17$ ,  $p < .003$ , with the synergy strategy (Reebok) having significantly higher trust compared to the mirror (Scion) strategy,  $M(\text{Synergy}) = 5.20$  versus  $M(\text{Mirror}) = 4.52$ . No other effects were observed.

In H3 we argued that product diagnosticity is higher in virtual worlds compared to websites. This hypothesis was not supported. We observed a significant main effect of dimension manipulation, but in the opposite direction,  $F(1, 93) = 11.25$ ,  $p < .001$ ,  $M(2D) = 4.88$  versus  $M(3D) = 4.00$ . The results indicate that websites offer higher product diagnosticity compared to virtual worlds. In addition, we also observed a significant main effect of strategy on product diagnosticity,  $F(1, 93) = 8.52$ ,  $p < .004$ , with the synergy strategy (Reebok) having significantly higher product diagnosticity compared to the mirror (Scion) strategy,  $M(\text{Synergy}) = 4.82$  versus  $M(\text{Mirror}) = 4.06$ . No other effects were observed.

In H2 and H4 we predicted that informativeness and description, respectively, are higher in websites as compared to virtual worlds. We found support for both of these hypotheses. With respect to H2, we observed a significant main effect of dimension on informativeness,  $F(1, 93) = 3.92$ ,  $p < .05$ ,  $M(2D) = 5.17$  versus  $M(3D) = 4.67$ . Therefore, websites offer higher informativeness to consumers compared to virtual worlds. No other effects were observed. With respect to H4, we observed a significant main effect of dimension on description,  $F(1, 93) = 3.97$ ,  $p < .05$ ,  $M(2D) = 4.86$  versus  $M(3D) = 4.39$ . Therefore, websites offer higher description to consumers compared to virtual worlds. No other effects were observed.

#### 4.2 Strategy

In hypothesis 5 we predicted that the synergy strategy for the experience goods in the virtual world will result in higher willingness to pay (WTP) compared to the mirror strategy. We observed a marginally significant interaction effect on the WTP,  $F(1, 93) = 2.53$ ,  $p < .10$ . An examination of the simple main effects suggested that in the synergy strategy (Reebok), there was no significant difference between the 2D and the 3D condition,  $M(2D\text{-Reebok}) = 4.10$  versus  $M(3D\text{-Reebok}) = 4.34$ , *n.s.* In the mirror strategy condition, consistent with our hypothesis, there was (marginally) significantly lower willingness to transact in the 3D condition ( $M(3D\text{-Scion}) = 3.00$ ) versus the 2D condition ( $M(2D\text{-Scion}) = 3.75$ ),  $p < .09$ . Thus, H5 received support.

Additional results include a main effect of dimension on intention to transact (also referred to as willingness to purchase (WTP)),  $F(1, 93) = 7.37$ ,  $p < .008$ . Those in

the 2D condition were more willing to transact with the retailer than those in the 3D condition,  $M(2D) = 4.22$  versus  $M(3D) = 3.38$ .

In hypothesis 6 we predicted that the synergy strategy for the experience goods in the virtual world will result in higher brand satisfaction compared to the mirror strategy. However, we did not observe a significant interaction effect on brand satisfaction,  $F(1, 93) = 0.00$ , *n.s.* Thus, H6 was not supported.

Additionally, we observed a main effect of strategy on consumers' satisfaction with the brand,  $F(1, 93) = 5.82$ ,  $p < .02$ . Those in the synergy strategy condition (Reebok) were more satisfied with the brand than those in the mirror strategy condition (Scion),  $M(\text{Reebok}) = 4.50$  versus  $M(\text{Scion}) = 3.79$ .

In hypothesis 7 we predicted that the synergy strategy for the experience goods in the virtual world will result in higher channel preference compared to the mirror strategy. We observed a significant interaction effect on the channel preference,  $F(1, 93) = 4.41$ ,  $p < .04$ . An examination of the simple main effects suggested that in the synergy strategy (Reebok), there was no significant difference between the 2D and the 3D condition,  $M(2D\text{-Reebok}) = 5.04$  versus  $M(3D\text{-Reebok}) = 4.68$ , *n.s.* In the mirror strategy condition, consistent with our hypothesis, there was significantly lower channel preference in the 3D condition ( $M(3D\text{-Scion}) = 3.77$ ) versus the 2D condition ( $M(2D\text{-Scion}) = 5.35$ ),  $p < .0002$ . Thus, H7 received support.

### 4.3 Discussion

In the first part of our research, we argued that virtual words are higher in trust (H1) and product diagnosticity (H3) compared to websites, whereas websites are higher in informativeness (H2) and description (H4) compared to virtual worlds. We found

**Table 2** Cell means

	Synergy		Mirror	
	2D	3D	2D	3D
Trust	5.38 (0.20)	5.03 (0.25)	4.81 (0.23)*	4.24 (0.21)
Product diagnosticity	5.21 (0.24)	4.43 (0.29)**	4.55 (0.27)	3.57 (0.25)***
Informativeness	5.24 (0.23)	4.86 (0.28)	5.09 (0.26)	4.48 (0.24)*
Description	4.91 (0.21)	4.71 (0.26)	4.81 (0.24)	4.07 (0.22)**
WTP	4.10 (0.28)	4.34 (0.34)	3.75 (0.32)	3.00 (0.29)*
Consumer's satisfaction	4.53 (0.27)	4.47 (0.32)	3.89 (0.30)	3.70 (0.28)
Channel preference	5.04 (0.26)	4.68 (0.32)	5.35 (0.30)	3.77 (0.27)***

*Note:* Standard errors are in parentheses. Within rows and within type of Strategy (i.e., 2D versus 3D contrast within type of strategy), cell means with triple (\*\*\*) , double (\*\*), and single asterisks (\*) are significantly different at  $p < .01$ ,  $p < .05$ ,  $p < .1$  respectively (two-tailed)

support for H2 and H4, but not for H1 and H3. In the second part of our research, we argue that the appropriate strategy for experience goods in the virtual worlds is the synergy strategy. Furthermore, we argue that when the synergy strategy is used, it leads to higher willingness to purchase (H5), higher consumer satisfaction with the brand (H6) and higher channel preference (H7). After controlling for the effects of frequency of purchasing online, we found support for H5 and H7, which shows that using a mirror strategy as opposed to the synergy strategy leads to lower WTP and channel preference in virtual worlds, when compared to websites. The cell means are provided in Table 2.

## 5 Implications and future research

Though virtual worlds promise a radical change in the way companies conduct operations, there is little empirical support for how they can be used. This paper is an attempt to provide such support. However, we advocate caution in interpreting the results. The technology of virtual worlds is still very much in its infancy. While virtual worlds are now restricted to proprietary software (such as Second Life by Linden Labs) or intra-firm applications (such as Sun Microsystem's MPK20), there is a possibility for the Internet, as we know today, to migrate to an open virtual world form.<sup>8</sup> These possibilities necessitate a strong research agenda investigating the possibilities that such a platform would offer. We can see rapid changes in features offered by even the existing virtual worlds, which far outpace the research on them. Hence, the empirical results presented in this paper should be seen as indicators of the future potential of the technology rather than as the immutable state of affairs.

For example, we found significant support for Hypotheses 2 and 4, which posit that websites provide higher informativeness and product descriptions than virtual worlds. These results are based on what websites and virtual worlds offer as of today. However, virtual worlds may very well incorporate textual capabilities that match or outdo those of websites. In the same vein, we believe that Hypothesis 1 did not find support due to the unrealized potential of virtual worlds. Trust is inextricably linked to perceptions of legitimacy [8]. At this stage, shopping on websites has been legitimized and companies frequently advertise their websites as points of contact. Virtual worlds do not enjoy the same acceptance by consumers, at least as of now. Our discussion of prior literature indicates that virtual worlds may in the future help alleviate problems faced due to lack of trust. However, since virtual worlds are mostly populated with early adopters, we feel that the lower trust we found reflects the lack of legitimacy consumers feel in virtual worlds. We also explored a new construct—channel preference—that tapped into the role of the channel in individuals' intention to transact. We believe that future research is needed to build upon new constructs engendered by the new channel. Another conclusion of our study was that adopting the wrong strategy could result in lower willingness to pay and channel preference as compared to websites. Hence it is important for companies seeking the right entry strategy in virtual worlds to think of them as a distinct channel and not equate them

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<sup>8</sup>[http://www.businessweek.com/magazine/content/07\\_33/b4046064.htm](http://www.businessweek.com/magazine/content/07_33/b4046064.htm).



to websites. This result underscores the need for further research on what companies need to do differently in virtual worlds.

Our study suffers from limitations associated with cross-sectional analysis. Further research may focus on providing a longitudinal insight into how variables like trust develop in virtual worlds. Another limitation could be the choice of treatment, particular for our strategy dimension. Though we try to alleviate some concerns by conducting a qualitative study to see if the subjects do indeed perceive the difference in the strategies adopted by the companies, we cannot be certain that the chosen treatments truly represent the mirror and synergy strategy. Though in this study we adhere to the definitions of mirror and synergy strategies as put forth in earlier literature in order to restrict our scope, an avenue for future research is the development of a typology for virtual strategies with specific characteristics of each strategy. In the same vein, consideration needs to be given to strategies that integrate multiple channels, such as both real-world as well as virtual world.

Yet another concern is the choice of products. We tried to restrict our focus to experience goods since we feel that companies that offer such goods would benefit highly from virtual worlds. However, our results may come from other differences in the two products. In particular, cars and shoes differ in terms of monetary value. Since we did not find an appropriate typology that incorporated both experience and cost, we focused on the dimension of experience. However, the cost of the product is directly related to the risk the buyer undertakes [27], and it could be the cost that engenders a need for a different strategy. This may call for future research into a more relevant typology of products with respect to products sold virtually [20].

There are also limitations associated with our chosen methodology for the quantitative study of using screen images of websites and virtual worlds. However, given the newness of the technology, we anticipate drawbacks in using virtual worlds as an experimental platform. Specifically, results from virtual worlds can suffer from problems of internal validity due to prior experience of subjects with a virtual world environment, unforeseen presence of other avatars (which does not occur in websites), the sense of fun or playfulness due to the immersiveness in a virtual world. In summary, websites and virtual worlds differ among many other variables besides those we are interested in, any of which could confound our results. In order to make claims of internal validity and maximize the control over the study, we chose to adopt a conservative methodology. As part of a future research program, a series of experiments may be conducted where all subjects could be trained over an extended period of time in virtual worlds, and samples from this pool of subjects can be drawn to differentiate between perceptions of channels and strategies. Such a research program would be fruitful in further understanding virtual worlds. However, such a study is beyond the scope and the aim of this paper, which has been to discover the state of affairs today. By training users and then obtaining their perceptions, we would be changing our objective to one where we test strategies assuming consumers are comfortable shopping and interacting in virtual worlds.

Future research is also needed to study virtual worlds from the perspectives of other theoretical lenses such as the diffusion of innovation [45], the technology acceptance model [13], or social network theory [22]. Studying such theoretical frameworks in the context of virtual worlds may help provide an understanding of how they

differ from other technology enabled media. As with any new technology, there are risks related to economic, technological, or legal aspects, as well as privacy and security issues that need to be considered. Future research that explores these avenues would further understanding of the potential of virtual worlds.

In summary, we feel it is imperative for scholars to continue to study ways in which virtual worlds differ from traditional channels, firstly, because the evidence we have presented already suggests that virtual worlds differ significantly from websites along several dimensions. We can liken the change due to the advent of virtual worlds to the change brought about by the commercialization of the Internet. Secondly, research needs to inform practitioners about new opportunities afforded by the channels that were nonexistent in the traditional channels. This paper intends to provide a starting point for such a discussion.

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