

Impact of Augmented Reality on Purchase Intention of Foreign Products Online

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Abstract

Augmented reality (AR) is a significant technology that holds the promise to transform how consumers interact with products before purchasing. It creates immersive experiences that enable people to engage with digital material in a more intuitive and straightforward manner. When used effectively, AR can be influential in every stage of customer journey including purchase intention stage. Assessing purchase intention of international consumers is critical for organizations because it allows them to plan and make choices about marketing, inventory, and expenses. Purchase intent provides international companies with information on what their global consumers are willing to purchase enabling them to modify their marketing and goods to better fit their customers' demands. This research examined how augmented reality increase the purchase intention of global customer using the data, which includes data for 810 different overseas visitors of an e-commerce site. We collected these data from visitors of a global e-commerce shop that integrated augmented reality (AR) into their smartphone app to enable users to imagine how they would appear with various items. The study performed a Robust Least Squares Method-estimation. Our research's findings provide some early proof that using AR increases the level of purchase intention of foreign products. The findings also indicate that price, and the number of positive reviews increase the purchase intention of foreign products. Customers' buying intentions may help firms predict future trends and organize their strategy appropriately. Businesses must also understand the elements that drive purchase intent, such as immersive experience with AR, consumer demographics, nationality, product attributes, pricing, and customer experience.

Keywords: *Augmented reality, Customer experience, International consumers, Purchase intention, Robust Least Squares*

Introduction

As smartphone technology has improved, so have the prospects for integrating consumers into the digital experience. While the notion of electronic augmented reality has been there for years, its implementation for the average user is a relatively new development.

AR has a broad wide range of real usage, and one domain where it is now being employed widely is customer experience. Forward-looking businesses are using augmented reality apps across the user journey to generate more engaging interactions with their consumers. Customers' views of the real world are being modified by augmented reality (AR), which enables them to see digital content, places, and photographs placed on top of anything they observe around them in the physical realm [1]. AR customer experience methods enable businesses to connect with clients at every point of the consumer experience. Because of improvements in augmented reality, organizations now have an apparently infinite number of methods to engage with consumers in three dimensions using their mobile devices [2].

The main distinction between VR and AR is the fact that the former is intended to remove individuals from their immediate surroundings. A component of the actual environment is superimposed with projected digital material in augmented reality, which merges the real and the virtual [3]. Therefore, augmented reality breaks the boundaries between the actual world and the projected one, but virtual reality entirely isolates the user from it.

A consumer who has an immersive encounter enters an enhanced environment where their creativity comes to life. It is a reliable method to communicate in person with anybody users know, wherever they may be right now. We describe immersive experiences as multimodal engagements that a user has with any form of brand service, system, or environment over a trip. It is much more than a virtual or enhanced interaction; rather, it is the satisfying emotional attachment that a person feels during an engagement. That comprises encounters on three different levels [4]–[6]:

- a) Flat interaction design, such as those seen in conventional websites and mobile applications.
- b) Natural interactions, such as touch and haptic (spatial, voice, sound, gesture) experiences.
- c) AR, VR, and mixed reality interactions as part of extended reality.

There are several types of immersions. Immersions are a technological reinterpretation of how we normally experience the world. In order to develop a user-friendly environment that retains us engaged in our present activity, it adds a touch of creativity to extremely flexible technology.

The many types of immersions that may be produced are as follows: a) Strategic immersion. Strategic immersion, often described to as the feeling of touch, occurs when a person really touches an item. It uses skin contact to measure, identify, and send communication signals between the person and the surfaces of a physical item [7], [8]. The vibration a user experiences during tactical immersion magnifies the experience in a special way. Although it is one of the most successful types of immersion, it has not been

actively studied in the business sector as of yet. It may be remarkable but it might also influence how we interact in the here and now.

b) Vision immersion. A technique to include VR or AR to describe a product's characteristics is via visual immersion. These kinds of visual encounters are powerful engagement points that help customers remember the brand for the rest of their lives. Large virtual art projects and holographic artworks are included in a number of international art exhibitions, immersing spectators in a tech-driven creative environment.

c) Storytelling immersion. Storytelling is still valued by audiences [9], [10]. The likelihood that someone will buy Abc product improves when a digital marketing campaign for it delivers a fascinating origin story. Through realistic sound and imaginative pictures, narrative or clearly audible immersion enables viewers to immerse themselves more in a product. Utilizing this method, immersive theaters operate. By making the audience the subject, they provide a sensation that is both surreal and more real than actual. As users pick their own journey, they may engage with the actors, offer dialogue, and alter the finale.

Good immersive encounters give emotional significance that boosts the advocacy and loyalty of both customers and employees. Brands may be distinguished, kept, and energized with the use of these experiences [11]. This is crucial in sectors like travel, product support, and e-commerce where goods and services have been reduced to commodities.

Additionally, engaging experiences may boost conversion rates and engagement. For instance, someone who can engage with a 3D item when buying on an site is more likely to engage with it for a longer period of time compared to interacting with a plain (2D) picture [12]. Customers may arrange things from one store in their rooms to get a feel for how they'll appear in their own houses by uploading images of their homes to the retailer's application. Consumers are more inclined to purchase and less prone to return a product when they are sure that their transaction will be successful [13].

There frequently has to be a cultural shift for a business to prosper via the creation of immersive experiences. To thrive with immersive experiences, certain businesses will need to increase their innovation and experimenting mindset. This is due to the fact that technology and customer tastes are changing so quickly that what is fantastic now may not be desired within a year, forcing organizations to continuously explore and change direction [14], [15].

Building a launch-and-learn experimentation culture and methodology enables businesses to swiftly develop immersive models and get instant response from clients and staff [16]. They may then continue to provide the experiences that foster a closer emotional connection, offer value, and promote loyalty and advocacy.

Purchase intent refers to a customer's desire to purchase a specific item or service [17]. The boost in return on investment for marketing efforts results from marketing that uses purchase intent as a measurement [18]. Knowing a client's intentions in advance or being able to measure them precisely would enable to better focus marketing efforts and provide the intended outcomes, such as stronger customer engagement and return on investment. This occurs because there is no need that a brand first raise customer awareness of a good or service provided by it before advertising it [19]. When a consumer attempts to

make a purchase but the transaction is declined or the purchase doesn't take place, the intention to buy may be explicitly documented or projected based on the client's behavior or the engagement record.

Stage 1: Recognition of awareness or demand

During the awareness phase of the process, the consumer recognizes their desire for a certain product. For example, a consumer can realize that their couch is worn out, doesn't fit in their ideal room design, is broken, or both. At this point, the consumer is aware of the need for a purchase, but due to the necessity for initial research, they may not yet be prepared to convert this awareness into intent [20].

Stage 2: Search or interest

Information seeking is the second step in the customer purchase process. Before making a final selection, the customer now starts to hunt for and study information about different goods and services available on the market. The sources of information accessible to customers are many. Customers could order catalogs, browse websites for different furniture retailers, or ask relatives and friends about their prior purchases, for example, in the couch example [21]. The client may not be certain which merchant to buy from and may just have a tentative desire to buy. Knowing if buyers are at this phase of the buying cycle may help businesses tailor marketing initiatives like their advertising or attempts to raise brand recognition.

Stage 3: Want

The customer may assess the various items that are accessible to them after they have acquired enough information to support their buying choice. Purchase intentions are firm at this point.

4) Take Action

The consumer actually purchases the product then consumes it at the conclusion of the buyer journey, either either away or at a later time. However, research demonstrates that there are sometimes discrepancies between a consumer's intentions and actions. Customers could have decided to buy a sectional couch, for instance, but change their minds as soon as they go inside the shop to complete the transaction [22]. Therefore, at this point, companies should learn as much as they can about the details of the planned purchase decision, such as how much the buyers anticipate spending.

Development hypothesis

Augmented reality and purchase intention

Despite the widespread interest in augmented reality, little study has been done to show how it really affects situations in the actual world. It is critical to comprehend how AR may boost sales in order to rationalize investing in this cutting-edge technology. The effect of AR on real product sales, however, is currently unclear. AR might decrease product fit anxiety by assisting buyers in seeing things in their consuming settings, which would increase sales. Contrarily, if AR creates the impression that the things would not fit properly, it may potentially deter purchasing. The effect of AR on revenue could possibly be minimal since the technology cannot communicate sensory product qualities that can be relevant in purchasing choices (such as product feel or fragrance). Even while

most businesses are aware of the tremendous prospects that augmented reality (AR) provides, they are still cautious to use the technology for a number of reasons, one of which is the ambiguity around its effects.

These days, it seems like people want everything to be customized [23], [24]. Fortunately, AR makes it simple for business to let customers participate actively in product creation. They are able to submit their choices, which enables immediate personalization. Personalization and customization in particular benefit greatly from the integration of AR into a comprehensive marketing strategy.

Giving the business the capacity to connect with its consumers more successfully is another way that AR may improve existing marketing plan. The business might include a scan code, for instance, inside a brochure. Customers may see a movie that showcases company's name, logo, goods, services, or other details the business wishes to communicate when the barcode is scanned. Of course, this is a lot more powerful than static words on a simple brochure. Similar modifications may be made to business cards to better communicate with prospective clients beyond the text written on them.

Consumers that want to sample items before they purchase them, which is the majority of today's customers, may benefit from immersive material that is realistic and engaging. Businesses employ augmented reality to provide their clients the option to make educated decisions, from cosmetics to cars.

When selecting whether to buy a product or service, the majority of buyers use a mix of emotion and reason. Customers with reservations about an item or service may have those worries removed because to AR's visualization capabilities. They will be more certain in their choice and have fewer second-guesses afterwards.

Throughout the entire customer experience, immersive technology may provide useful assistance. With so many useful tools at their disposal, AR and VR can swiftly and effectively enhance the customer experience. These tools range from making product instructions more accessible to consumers to making it simpler for customers to contact with customer assistance.

Many customers no longer want to cope with the bother of stumbling through a store looking for certain items. One of the nicest things about augmented reality technology is how quickly it enables consumers to explore even the biggest shops, discover the items they are searching for with ease, and have them delivered directly to their home.

Because an AR software has a game component, users keep coming back. Users repeatedly interact with the same business or promotion, boosting the cost-to-efficiency ratio, bringing into focus the cost-effectiveness of Augmented reality applications. Because the app gives the user happy feelings, when a business spends in the experience of its customers and promotes interaction with the brand, the consequence is long-term customer loyalty. This is the gaming effect: utilizing it makes people happy, which encourages repeat business and high consumer lifetime values.

Image of the country-of-origin purchase intention

One of the aspects of international marketing that has received the most attention and research is the effect that a product's country of origin (COO) has on the consumer's opinion of that product [25]–[27]. Research on country stereotypes may be found in the

literature of social psychology dating all the way back to the beginning of the 20th century. The results from this field captured the interest of marketing researchers in the 1960s, which is also when the idea of "country of origin" (CoO) was first introduced into the body of academic literature. It is widely accepted that Schooler 1965 was the first academic to scientifically explore the CoO effect. He made the discovery that customers gave various ratings to items that were equal in every regard save from the COO. The increasing internationalization of today's company has led to difficulties that have never been seen before for distributors, producers, and customers [28].

The effect of country image is the impact that the nation of manufacturing has on the judgment of the customer, whether that assessment is good or negative. Studies have demonstrated that when a client learns the nation of origin of a product, his or her impression of the product is changed either favorably or adversely, depending on the customer's opinions about the product's country of origin [29]. Customers have a propensity to have preconceived notions about products and nations that have been shaped by personal experience, rumour, and myth.

A nation's or country's image may be described as the aggregate of all of the knowledge that consumers have in their heads about that nation or country [30]. A "Made In" label is equally as influential and just as useful as a "Made By" label, which has been a truth that has been recognized for a long time.

Ethnocentrism purchase intention

There are several possible causes for people's unfavorable sentiments toward goods imported from other countries. Consumers may harbor negative views about a nation, believe that purchasing goods from that country is unethical or even immoral, or believe that the items from that country are of a worse quality than those from other countries. On the other hand, some consumers choose international products over domestic ones due to the higher quality of the former or the lower complexity of the latter. Furthermore, local governments occasionally appear to welcome foreign firms and their products since the former can sometimes have become source of revenues or support for the latter's economy, particularly when they offer FDI (foreign direct investment) to the latter's nation.

Both favorably and adversely, ethnocentrism has a significant impact on the operations of multinational businesses.

The practice of assessing another culture according to the norms and principles established in one's own culture is an example of ethnocentrism. It is a kind of prejudice when people have a tendency to instantly label another culture as being "evil" or "wrong" based upon their behavior, particularly if their ideals do not line with their own ideas. The term "consumer ethnocentrism" refers, more particularly, to the ethnocentric beliefs held by customers in one nation, also known as the "in-group," about goods from another nation, also known as the "out-group." There is a segment of the consumer population that maintains the position that purchasing goods made in other nations is not just inappropriate but also unethical. The purchase of imported goods may be seen as unethical due to the fact that it results in the loss of employment in the home market and is detrimental to the economy. It's possible that buying things made in other countries is just perceived as being disloyal.

When there is a high level of consumer ethnocentrism, there is an exaggeration of items created in the country in question, while there is an underestimating of products made in other countries [31]. When the domestic item is not present, consumers who have a strong ethnocentric orientation have a tendency to purchase the alternative that was produced in the country that is culturally closest to them. This is due to the representational shared value that the products have of them among those of other cultures that are the furthest away. This phenomenon is not limited to occurring between nations; rather, it may also be found in sub-national contexts, in particular those characterized by a significant gap in cultural norms.

Image of the Brand purchase intention

Customers' impressions of a certain company's brand are referred to as the brand's image. The image of every brand has a tendency to evolve over the course of time. Customers' perceptions of a brand are shaped by their experiences and the manner in which they engage with the brand [32], [33]. These interactions may take place in a variety of ways and are not limited to just purchasing or using the product or service in question.

The most important idea that lies at the heart of the notion of brand identity is that when a client purchases a product or service, they are also purchasing the image that is linked with that service or product. It is imperative that businesses make every attempt to create a distinct, favorable, and immediate image for their brands. In addition, the image of the brand may be improved by using brand communication strategies such as packaging, advertising, publicizing via word of mouth, and utilizing various other platforms for promotional purposes [34], [35].

Because it represents an accumulation of thoughts and emotions connected to a particular brand, a company's strong brand is a highly crucial aspect in determining whether or not a product will be successful in the marketplace. That specific brand's value and personality are communicated via its image, which ultimately serves as a mirror that reflects the core values of the business.

Having a great relationship with customers and a high level of overall satisfaction may contribute to a favorable brand image, which in turn can lead to positive customer behavior. Customers are most influenced to make a buying decision based on their perception of the brand.

Experiments and Results

The purchase intention scale was created with questionnaire available the literature [17], [36], [37]. The price index was calculated by dividing the item price by the average prices of the items from competitors. After obtaining all the variables' dataset we applied Robust least square method. Robust least squares regression is a type of linear regression that is more resistant to outliers and other types of noise than regular least squares regression [38], [39]. It is especially helpful when dealing with outliers or data from many sources. The regression is adjusted to minimize the worst-case value of the residual norm rather than the average value in order to conduct resilient least squares.

Figure 1 depicts the pairwise correlation and purchase intention score, AR, and other variables. The correlation on heatmap on the left shows that there is a positive and high correlation between purchase intention and price index, between purchase intention and number of positive reviews and a weak correlation between AR purchase intention. The

weak correlation might be due to the fact that AR feature is binary variable and the Pearson correlation could not find a strong association. We applied the Robust least square method further investigate the impact of AR features on purchase intention of international products from e-commerce site. It can be seen from the table that AR features has positive and significant impacts on purchase intention of international products from e-commerce site, as p-value is less than 0.05. the table also shows that price index and positive reviews have positive and significant impact on purchase intention of international products from e-commerce site. This implies that when an item has an AR feature, price is fair and has positive reviews, the purchase intention of the visitor become strong.

Figure 1. The pairwise scatterplot with one instance of reviews vs sales

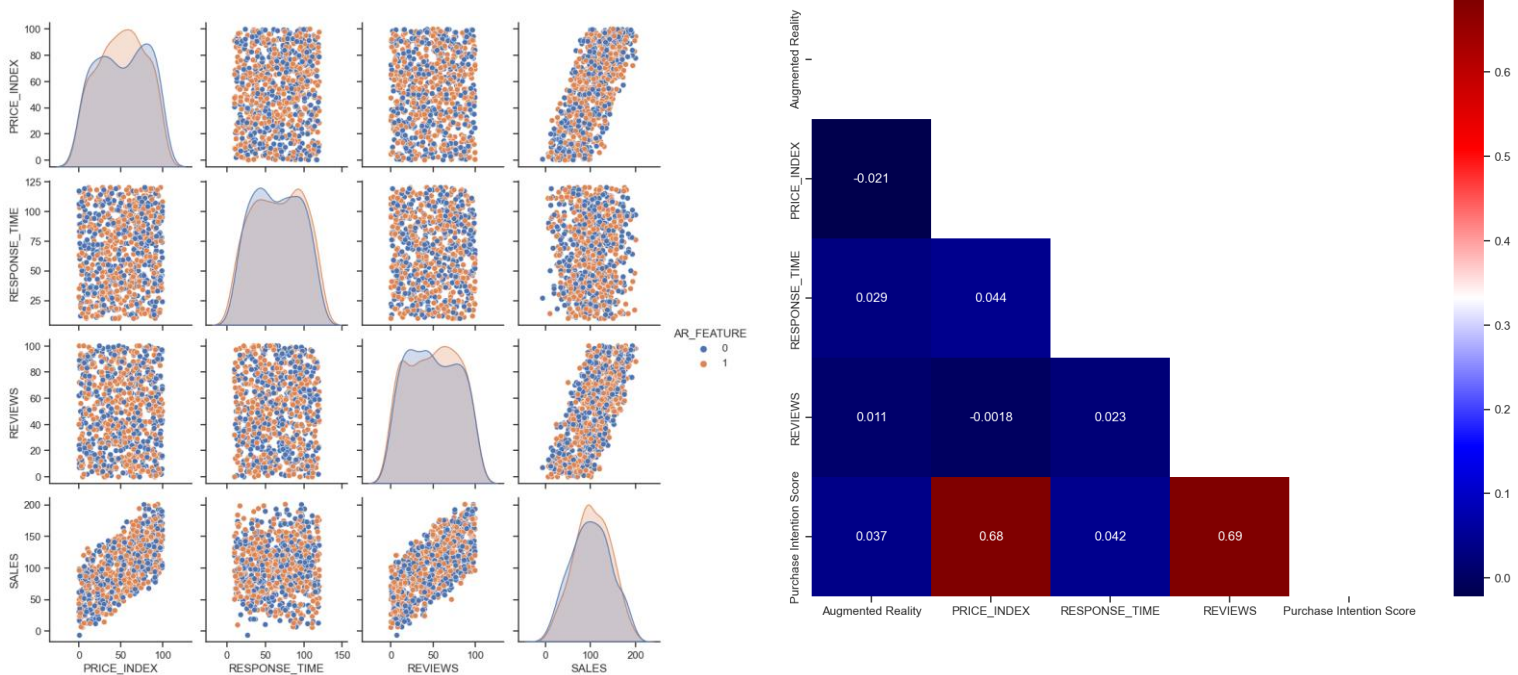


Table 1. Robust Least Squares

Dependent Variable: SALES
 Method: Robust Least Squares
 Sample: 1 810
 Included observations: 810
 Method: M-estimation
 M settings: weight=Bisquare, tuning=4.685, scale=MAD (median)

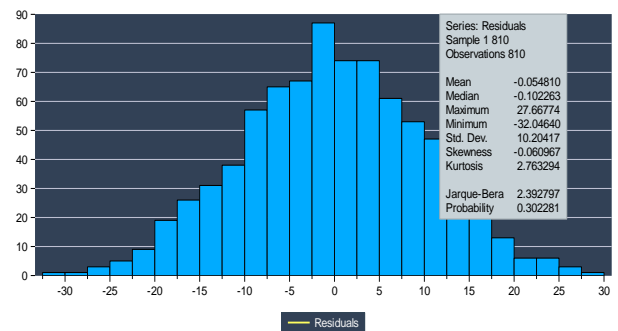
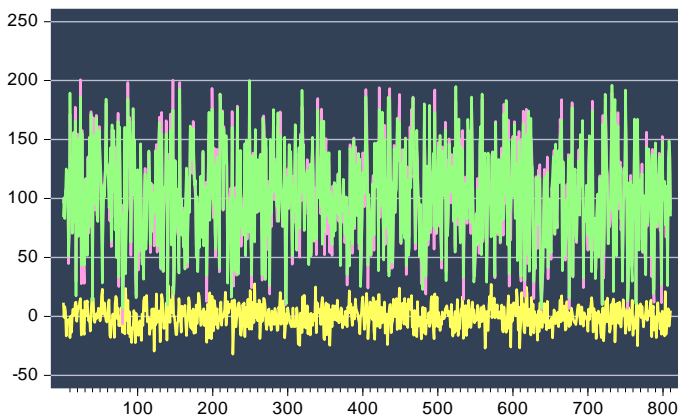
centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
AR_FEATURE	3.747739	0.747949	5.010688	0.0000
PRICE_INDEX	1.010183	0.013049	77.41357	0.0000
RESPONSE_TIME	-0.007890	0.012098	-0.652181	0.5143
REVIEWS	0.997225	0.012806	77.87107	0.0000
C	-0.536536	1.297155	-0.413625	0.6791

Robust Statistics			
R-squared	0.819121	Adjusted R-squared	0.818222
Rw-squared	0.949630	Adjust Rw-squared	0.949630
Akaike info criterion	682.5090	Schwarz criterion	708.2203
Deviance	74903.53	Scale	10.53621
Rn-squared statistic	12064.29	Prob(Rn-squared stat.)	0.000000

Non-robust Statistics			
Mean dependent var	102.2047	S.D. dependent var	42.32697
S.E. of regression	10.22964	Sum squared resid	84239.68

Figure 2. Residual diagnostics



Literature suggest that the effect of AR is particularly powerful for less well-known companies and products with a narrower market appeal. The rise in sales is significantly bigger for more costly items, suggesting that AR might boost merchants' total profits. Consumers who are newcomers to the online platform or the specific product are also more likely to make a purchase after utilizing AR, indicating that AR seems to have the ability to promote the adoption of the online channel and the growth of the category.

These results show that AR works best when there is a significant level of product-related confusion, suggesting that uncertainty reduction may be a way for AR to increase sales.

Conclusion

AR may be utilized to produce interesting and instructive experiences in a variety of settings, from education to entertainment. AR may also be utilized to increase productivity and accuracy in a variety of sectors, including healthcare, production, and retail, by presenting the user with augmented visuals and data. Furthermore, since AR has the potential to become viral and reach a large audience, it may be leveraged to develop appealing and successful marketing campaigns. Consequently, augmented reality is a significant technology that may be utilized to create novel experiences, increase accuracy and efficiency and engage consumers in novel and interesting ways.

By allowing users to actively engage with the material they see, augmented reality (AR) surpasses more conventional forms of advertising including television, print media, and mobile apps. It demands attention and involvement like no other marketing medium. It is gradually transforming the 2D customer experience into a completely immersive 3D interactive area. As metaverse platforms and augmented reality glasses become more widely used, we will soon be able to do more than just superimpose digital alternatives over our audience's physical surroundings.

More and more businesses are employing technology to combine diverse and more contemporary sorts of experiences at multiple touchpoints, resulting in interactions that are not only individualized but also go beyond what is expected in terms of ease and sensory attractiveness. Despite the constant evolution of interaction platforms and consumer expectations, such immersive experiences are quickly becoming a competitive need for organizations looking to stand out from the crowd and reinforce client loyalty.

For every company, the question of whether or not to implement AR technology is a complicated one. Issues like as development expenses, identifying relevant use cases, and operating the technology have discouraged many businesses from producing AR experiences.

AR may assist to lower buy fear for people who are hesitant to make online orders. Likewise, AR has a bigger influence on customers who are buying from the product line for the very first time relative to those who have bought from the product line previously. Thus, when buyers are uninformed of a product line, they depend more on AR to lessen the risk of completing a possibly unpleasant purchase. AR therefore has the ability to boost the use of digital platforms and attract new category customers for merchants and enterprises.

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