

Proposal of a Measurement Scale and Test of the Impacts on Purchase and Revisit Intention

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Abstract: Online immersion is considered as a determining factor of web surfers' reactions. Its importance may be greater in a 3D-enriched environment. However, little research has explored it in marketing and less has investigated its impact on consumer behaviour in an enriched commercial website. In addition, when it comes to its operationalization, many weaknesses are noticed in the existing literature. Accordingly, the objective of this study is two-fold: in order to test the impact of immersion on purchase and revisit intentions to a 3D-enriched commercial website, a scale measurement of immersion tailored to this specific context is proposed. Following Churchill's framework and the recommendations of Rossiter, a number of methodological instruments, including two focus groups (the first with 4 experts; the second with 18 consumers) and three surveys (first: 140 students; second: 350 Internet users; third: 200 Internet users), are used. The confirmatory factor analysis resulted in an 8-item scale which seems to exhibit evidence of reliability and validity. The predictive validity was confirmed since the impacts of immersion on the intentions to buy and revisit the website are significant. The proposed scale measure may help academics conduct better and more reliable studies on consumer behaviour online.

Keywords: Scale measure, online immersion, merchant website, Internet users, Digital Marketing

Introduction

Much research has been conducted to examine consumers' behaviour while visiting commercial websites. Indeed, this type of website presents the products and services of companies and may lead to a purchase. Attracting visitors and retaining them is therefore the big challenge of the e-commerce industry. Thanks to virtual reality technologies, managers

enrich their commercial websites to offer unique and long-lasting experience to visitors. Previous studies, mainly in psychology, have drawn attention to the phenomenon of immersion online. In fact, the Internet stimulates senses ([Zhang, Phang & Zhang , 2022](#); [Chen & Lin, 2022](#); [Volle, 2000](#)) and increases immersion, which may lead to a real and unique experience ([Carù & Cova, 2006](#); [Holbrook & Hirschman, 1982](#); [Mathwick & Rigdon, 2001](#)) producing specific consumer reactions ([Ayari, Ben Yahia & Debabi, 2022](#)).

When it comes to marketing, online immersion is considered as a determining factor of web surfers' reactions ([Demangeot & Broderick, 2007](#); [Pentina & Taylor ,2010](#); [Charfi & Volle, 2011](#); [Charfi, 2012](#)). Its importance may be greater in an enriched 3D environment with virtual technologies ([Ayari & Ben Yahia, 2023](#)). In fact, the development of immersive virtual reality technologies allows Internet users to live virtual experiences ([Schnack, Wright & Elms 2021](#); [Banfi, 2021](#)) by interacting with an artificial environment (real or imaginary) ([Coban, Bolat & Goksu, 2022](#)) and exercising cognitive activities ([Smith, 2019](#)) impacting their performance ([Leung, Hazan & Chan, 2022](#)).

Despite the growing importance of immersion, little research has explored it in marketing ([Wang et al., 2021](#); [Volle & Charfi, 2011](#)) and less has investigated its impact on consumer behaviour in a 3D-enriched commercial website ([Kowalczyk , Siepmann & Adler, 2021](#); [Banfi, 2021](#)). In fact, directly manipulating a virtual object leads to an easier online immersion of Internet users ([Schlosser, 2003](#); [Coban, Bolat & Goksu , 2022](#); [Leung, Hazan & Chan, 2022](#)). Besides, when it comes to its operationalization, many weaknesses are noticed in the existing literature. Thus, its conceptualization, measurement and impacts on consumers' behaviour is not explored enough ([Daassi & Debbabi, 2021](#); [Schnack, Wright & Elms , 2021](#)). For instance, some authors consider Immersion as a process and as a state. Others consider it as an experience. Also, so far, authors either use scales of immersion developed in other offline contexts ([Rosza et al., 2022](#)) or adapt scales that had not been rigorously developed. For instance, Charfi & Volle ([2011](#)) used the scale measure of Fornerino, Helme-Guizon & Gotteland ([2008](#)), which was designed within the context of a cinematographic experience, video games and leisure, and does not take into account the specificity of the web. Yet, the context of a website may stimulate reactions and behaviours different from another context; especially since a commercial website enriched by virtual reality technologies is more interactive than other traditional web sites ([Antunes & Correia, 2022](#)).

Accordingly, the objective of this study is two-fold: in order to test the impact of immersion on purchase and revisit intentions to the commercial website, a scale measurement of immersion tailored to the context of commercial web sites will be proposed. In fact, as

highlighted by previous researchers on the conditions to create a new measurement scale (Kalafatis, Sarpong & Sharif, 1995; Frikha, 2019), two reasons justify our proposal: the existing instruments of immersion are not applicable to the context of 3D-enriched commercial websites and do not take into account certain specificities of the web.

The proposed scale measure may help academicians perform better and more reliable studies on consumer behaviour online. At a managerial level, it may help managers improve traffic on their websites by offering Internet users a unique, rich and effective immersive experience at all levels.

This paper is then structured as follows. First, the concept of immersion is defined and confusion about its conceptualization clarified. Second, the impacts in 3D-enriched websites will be developed. Third, the existing measurements of online immersion will be presented and their weaknesses highlighted. The methodology will later detail the different stages of the development of the measurement scale following Churchill's paradigm (Churchill, 1979) enriched by the recommendations of Rossiter (2002). Finally, results will be exposed and discussed, before concluding with the contributions and limitations of the study.

Defining Online Immersion

The literature on immersion distinguishes between three conceptualizations of immersion: as a process and as a state and as telepresence. In fact, some authors consider immersion as telepresence of Internet users (Grinberg *et al.*, 2014). However, several researchers have stipulated that presence or telepresence is the antecedent of immersion (Hoffman & Novak, 2009; Griffith & Chen, 2004). In addition, according to Carù & Cova (2006), immersion is “the process of accessing the optimal experience called the state of flux”. It represents the steps that allow the consumer to reach the experience when interacting with the experiential context. The authors added that it arises from the interaction between a consumer and an enclosed, secure and themed experiential context (Carù & Cova, 2003) during which the individual connects to this context and disconnects from the real world. In other words, it is a “dip” or a gradual entry into the experiential context. In the same line, it also presents as “a strong moment experienced by the consumer and resulting from a partial or complete process of appropriation on his part” (Carù & Cova, 2006, p. 60).

For instance, Fornerino, Helme-Guizon & Gotteland (2008) defined immersion as “the state of intense activity in which the consumer finds himself when he fully accesses the experience”. Indeed, it represents the set of reactions manifested by the individual during the experience. These reactions can be cognitive, sensory, affective, social or even physical. In this context, Tamás *et al.* (2022) have studied immersion while using entertainment and digital communication applications. A consumer who strongly immerses in an experiential

environment is involved, absorbed and fully engaged ([Lombard & Ditton, 1997](#)). He or she forgets the external reality, losing consciousness of what he or she is in the real world in favour of a new self in the experiential context.

Immersion in 3D-enriched Websites

Hyper-real environments have an important role in the process of accessing the experience, making it easier for consumers to immerse themselves in the context and improving the quality of the visit. In effect, virtual reality technologies can provoke emotional reactions in Internet users similar to those caused by physical environments, often leading to immersion.

In the same framework of analysis, virtual environments aim to create positive effects on Internet users, both cognitively and emotionally ([Hoffman & Novak, 2009](#)). Immersion in experiential environments therefore leads to behavioural changes ([Vézina, 1999](#)). In other words, the intention to buy is a redundant concept in the literature on merchant sites ([Poddar et al., 2009](#)). This is a concept at the heart of the concerns of managers. In addition, to understand the conative reactions of Internet users within a merchant website, researchers have often studied the intention to revisit the site ([Hausman & Siekpe, 2009](#)).

The escape experienced at the time of the visit prompts the user to return to the site and visit similar sites. Therefore, we formulate the following hypothesis:

H1: Immersion positively influences (a) purchase intention and (b) intention to revisit the site.

Pointing Out the Weaknesses of Existing Scale Measures

To operationalize the concept of online immersion, previous research has opted for an existential phenomenological approach. Data was collected through written accounts or interviews, during which the researcher asks the subject to contextualize a specific experience and to relate it to the first person, step by step, as it was lived ([Thompson, Locander & Pollio, 1989](#)). Despite the importance of the concept however, many weaknesses are witnessed in the existing papers operationalizing immersion. For instance, Mathwick & Rigdon ([2004](#), p. 330) proposed a measurement scale of a three-item-dimension, which was later translated by Simon ([2007](#)). This scale is not adequate for immersion, because it only takes into account the “escape” factor identified by Mathwick & Rigdon ([2004](#)). Also, which is worthy of note, the authors did not proceed to scale purification and empirical validation. As highlighted by Fornerino, Helme-Guizon & Gotteland ([2008](#)), Mathwick & Rigdon’ scale ([2004](#), p. 330) is not developed properly in line with Churchill’s procedures ([1979](#)). Besides, the theoretical online immersion items established by Mathwick & Rigdon ([2004](#)) are not

empirically validated. Furthermore, other items are observed and the scale failed to include important items.

Also, in their research, Grinberg *et al.* (2014) used the Barfield *et al.* (1995) scale to measure immersion. However, this scale was created to measure the presence of Internet users and not to measure their immersion. In addition, it is measured by only one item which has not been used in previous literature. Hudson *et al.* (2019) adapted the scale from Jennett *et al.* (2008) to measure the immersion of Internet users during a virtual reality (VR) underwater seascape exploration. This scale was created in a game context. In addition, it seems that the process of its creation is not rigorous.

Noticing the shortcomings of previous measurement scales of immersion, Fornerino, Helme-Guizon & Gotteland (2008) proposed a new 15-item scale to measure immersion in a cinematographic context. The authors have finally confirmed a unidimensional scale consisting of six items reflecting the cinematographic context. This scale was created to measure immersion in a context different from the context of the web. Yet, Charfi & Volle (2011) used it to study consumer behaviour online. Table 1 exposes the measurement scales and highlights their limitations when applied online.

Table 1. Existing measurement scales of online immersion

Authors	Objective	Scale measuring immersion	Limitations
Mathwick & Rigdon, (2004)	Measure consumer online immersion.	Three items divided into a single dimension called "escape". It was translated by Simon (2007).	This measure reflects the distortion of time that manifests itself in the Internet user, as well as insensitivity to any attentional solicitation outside of the visit experience. They did not proceed to scale purification and empirical validation.
Jennett <i>et al.</i> (2008)	Measure consumer online immersion.	Scale is designed within the context of games. Four items measured on a 7-point Likert scale. This scale is adapted by Hudson <i>et al.</i> (2019).	A context different from the context of the web. It does not take into account the specificity of the web.
Fornerino, Helme-Guizon & Gotteland (2008)	Measure consumer online immersion.	Scale is designed within the context of a cinematographic experience, video games and leisure. This scale was subsequently used and adapted by Charfi & Volle (2011).	A context different from the context of the web. It does not take into account the specificity of the web.

Research Method

In the following sections, the different steps leading to the development of a scale that may help researchers operationalize immersion while studying web surfers' behaviour will be presented. To this effect, it seems convenient to proceed with a triangulation approach, including both qualitative and quantitative methods. Based on Churchill's recommendations

(1979), the procedure is threefold: (a) generating an initial pool of items; (b) data collection and purification of measures; and (c) estimating the scale's validity. The following table presents the steps of Churchill (1979).

Table 2. Application of Churchill's paradigm (1979)

Steps	Studies
1st step: Specify the domain of the construct	<ul style="list-style-type: none"> • Definition of the concept of online immersion • Qualitative study: 18 consumers questioned about their browsing behaviour on merchant websites (semi-structured individual interviews)
2nd step: Generate a sample of statements	<ul style="list-style-type: none"> • Drafting of 12 items • Submission to 4 experts • Test content validity <p>This leads to the deletion of two items</p>
3rd step: First data collection	<ul style="list-style-type: none"> • Data collection: 140 consumers asked about their browsing behaviour in merchant websites • Selection of a 5-point Likert format • Exploratory factor analysis (analysis principal component factorial) <p>This leads to the deletion of two items</p>
4th step: Second data collection	<ul style="list-style-type: none"> • Data collection: 350 consumers asked about their browsing behaviour • Selection of a 5-point Likert format • Exploratory factor analysis (analysis principal component factorial). <p>The number of items kept is 8</p>
5th step: Purification phase	<ul style="list-style-type: none"> • Confirmatory factor analysis: PLS 3 • Evaluation of convergent and discriminating validity based on responses from 350 consumers • Testing predictive validity: the effect of online immersion on the intentions of Internet users (200 consumers)

Specifying the domain of the construct and generating statements

The simple recourse to literature seems insufficient to us to define such a controversial and variously treated topic. Indeed, in spite of the plethora of works on this topic, it remains poorly known. Admittedly, this is not a new concept, since the literature dealing with immersion in a commercial website is abundant. Understanding our research more precisely then requires a confrontation in the field of the different interpretations. In addition to the literature review, several steps are in order to generate an initial pool of items. Specifically, two focus groups are held. The first one is held with four experts who are teachers-researchers specialized in online immersion and merchant websites.

Following this experts meeting, at first, we sought to check whether the study of online immersion within a web enriched by virtual reality techniques needs a specific measurement tool. On this latter point, the experts have insisted on the web specificity. One of them has emphasized that 'when in a 3D context, it becomes different'. Another specified that 'a site is a number of links ... there are people who talk about sites as if they were people or locations'.

Another expert then highlighted that ‘we will not find the same concepts, the same items ...’. The experts have finally agreed that an online immersion measurement instrument specific to a web context needs to be developed.

The meeting’s objective was then to discuss the items of online immersion and the items that could represent each dimension. Another participant added that ‘if you log on to a web site, you don’t know where you are already, you cannot situate yourself. You don’t know what ... well ... how you can reach such or such objectives’. The experts noted: ‘Can we convert, transpose this concept?’ The experts have finally agreed that an online immersion measurement instrument specific to a web context needs to be developed.

Then, semi-structured interviews were conducted with 18 Internet users, which constitutes a collection method allowing specific themes to be addressed ([Evrard, Pras & Roux, 2009](#)). Internet users have been asked to browse the [matterport.com](#) website. Eighteen people agreed to participate in this study. To find out more about our sample, we asked for their gender, age category, profession and income. We thus met 10 men (55.6%) and 8 women (44.4%). The people are between 25 and 44 years old; the majority are in the age category between 35 and 44, in this case 10 people, and 8 people are in the age category between 25 and 34 years old. Theoretical saturation is reached after the 18th interview. After welcoming and thanking the participants for their collaborations, they were exposed to the site in question and called upon to explore it. Then, the topics of the interview guide were discussed. The site selected for the study mobilizes virtual reality devices (virtual agents and 3D environments).

Respondents described their concentration during navigation and their implications in the offer: *“I was concerned and focused all the time”*; *“Avatars speak directly to us about what makes us more involved”*; *“It’s like I’m at the agency; I think it’s a real success ... ”*; *“The conversation between the two virtual agents allows us to listen to the message and stay focused ...”*; *“I was focused with what the avatars were saying, I didn’t see the time pass”*. In some cases, when the user integrates the experiential components of the site, he or she is engaging in the experience. This immersive experience leads to a disconnection from the real world, similar to the feeling of being present in the virtual environment. This is justified by the following verbatims:

“As absorbed by the site.... I was very comfortable”; *“I was at the heart of the site, I participated fully, I gave my choices ...”*; *“I forgot the people around me ... the real world”*; *“I would like to buy a house”*; *“I was curious, intrigued, I wanted to find out what was going on”*; *I was waiting for the rest, I was listening to the presenters”*.

Thus, the results identify the main levels of immersion. According to the responses, there are people who are drawn to the experience. These individuals have expressed their focus and involvement. Others are more committed. They are so out of touch with the real world that they lose their spatio-temporal landmarks. We can therefore conclude that the immersion is explained by the implication, the concentration and the commitment. The majority of the respondents admitted their curiosity, concentration and disconnection. According to the results, we note that the qualitative study allowed us to identify two new items of immersion (I was curious... I wanted to find out what they wanted to present to me, I focused, disconnected, curious involved).

Following the recommendations of Rossiter (2002), several items were formulated. Afterwards, a qualitative pretest was conducted by submitting the statements to four experts. The experts gave their opinion on the clarity of the proposals. Two proposals were deleted, as they were deemed too redundant or not applicable to our construct. Some proposals have also been reformulated. Indeed, the qualitative study allowed us to specify the domains of the constructs and to produce an initial list of items. Thereby, the review of the literature and the qualitative study allowed us to identify 10 items of online immersion.

Exploratory analysis

Table 3. Factor analysis and reliability test results

Item	Quality of representation	Factor loading
The site created a new world which suddenly disappeared at the end of the visit	0.863	0.923
At times, I lost consciousness of my surroundings	0.876	0.932
During the visit, my body was in front of the screen, but my mind was in the world created by the site	0.858	0.915
The site made me forget the realities of the outside world	0.887	0.939
While viewing the site, what happened before the visit or what would happen afterwards no longer mattered	0.857	0.912
Visiting the site made me forget my immediate surroundings	0.874	0.928
I was curious... I wanted to find out what they wanted to present to me	0.814	0.898
I focused, disconnected, curious involved	0.756	0.869
I felt detached from the outside world	0.301	0.411
I felt completely immersed	0.402	0.422
Eigenvalue	6.866	
% of variance explained	78.735	
Cronbach's alpha (standardized)	0.902	
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.898	

In the previous section, a set of items representing different items of online immersion adequate for a web surfing context are outlined. To ensure the reliability of these items, a website (<https://www.darellamma.com/darellamma>), which is likely to generate the

immersion of Internet users, is chosen. In fact, directly manipulating a virtual object leads to an easier online immersion of Internet users ([Schlosser, 2003](#); [Coban, Bolat & Goksu, 2022](#); [Leung, Hazan & Chan, 2022](#)). Within laboratory conditions, 140 Tunisian business students are invited to surf this web site, which offers stays in a guest house, during a 15-min period. Once they finish, the participants are administered a questionnaire consisting of the previously generated items and are asked to rate the items on a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). The collected data are processed by a principal components factor analysis and a reliability test.

These preliminary results seem to be interesting in that the generated items are often represented in the literature. Besides, six items have been debated by several authors ([Charfi & Volle, 2011](#); [Fornerino, Helme-Guizon & Gotteland, 2008](#)) who supported the idea that these items represent a unique one dimension rather than separate dimensions. However, the last two items of the qualitative study have been deleted. Therefore, eight items are retained.

Test and confirmatory analysis of the scale

A new data collection phase is undertaken to attest to the validity of the scale. To this effect, the scale is tested again using the previously mentioned website. In fact, the previous purification stage was conducted for Internet users within laboratory conditions. In this phase, the objective is to check for the psychometric quality of items. For the choice of this website, eight different site links have been created, which the surfers have no knowledge of and are likely to immerse in the context. The choice of unknown websites is motivated by the concern to neutralize any familiarity effects with the website. Then, a sample of individuals is asked to navigate the websites and rate them on their potential to immerse. Then, these web sites are classified and the one which seems to mostly generate immersions is chosen (<https://pyntopyn.com/DarEllamma/?i=3>). The scale has been tested over a heterogeneous population of web surfers and in off-laboratory conditions. Consistent with previous research ([Fornerino, Helme-Guizon & Gotteland, 2008](#)), participants are asked to surf on the website for 15 minutes and to respond to a questionnaire. A pool of 360 questionnaires is collected. Nevertheless, some of them are eliminated because the participants knew the website (a question was included for the purpose). Therefore, 350 questionnaires are retained; 52 % of the respondents are female and 48% are men. A majority of these respondents have university education and belong to different socioeconomic categories. Following Gerbing & Anderson's ([1988](#)) recommendations, an exploratory factor analysis (EFA) is performed before conducting a confirmatory factor analysis (CFA). To carry out an EFA, we must verify the factorization conditions of the measurement scale relating to immersion. It is worth

noting that the obtained results during this second phase corroborate those collected during phase 1 in two major aspects. First, the KMO index (0.962) shows a value greater than 0.5 and Bartlett's test is significant. Furthermore, we performed an EFA on the eight items of the measurement scale. This solution explains 85.875% of the variance. Thus, we have found that all the factor contributions of the immersion variable vary between 0.872 and 0.947, so all the items of this measurement scale have been kept. The results of the EFA are presented in the table.

Table 4. Purification test of the Immersion variable

Item	Quality of representation	Factor loading
The site created a new world which suddenly disappeared at the end of the visit	0.872	0.934
At times, I lost consciousness of my surroundings	0.887	0.942
During the visit, my body was in front of the screen, but my mind was in the world created by the site	0.873	0.934
The site made me forget the realities of the outside world	0.897	0.947
While viewing the site, what happened before the visit or what would happen afterwards no longer mattered.	0.861	0.928
Visiting the site made me forget my immediate surroundings	0.897	0.947
I was curious... I wanted to find out what they wanted to present to me	0.824	0.908
I focused, disconnected, curious involved	0.760	0.872
Eigenvalue	6.870	
% of variance explained	85.875	
Cronbach's alpha (standardized)	0.976	
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.962	

Second, after having verified the unidimensionality, we move on to the internal consistency of the selected items. Cronbach's alpha for each dimension must be greater than 0.6. For the dimension chosen for immersion, the value of Cronbach's alpha, 0.976, is therefore close to 1, which reflects good internal consistency of the items. Principal component factor analysis of the eight retained items shows the one-dimensional character of the scale. These factors together explain 85.875% of the total variance. The contributions of the items to immersion are all significant, since their values are greater than 0.5. The EFA made it possible to retain only one dimension concerning this measurement scale.

From these results we can conclude that Bartlett's sphericity test ($p = 0.000$) makes it possible to safely reject the hypothesis of nullity of the correlation coefficients. The KMO index = 0.962 explains a level of appreciation judged to be meritorious by Kaiser, Meyer and Olkin.

Following this second purification phase, a CFA is applied using Smart PLS 3. The indicators for the evaluation of the quality of the measurement can be grouped according to Roussel *et*

al. (2002) into three different categories. According to Roussel *et al.* (2002) and given the large number of indices, it is advisable to retain 4 indices. Table 5 summarizes the thresholds of the various indices according to Roussel *et al.* (2002).

Table 5. Key values of the adjustment indices used

CR: Composite Reliability	> 0.7	Nunnally & Bernstein (1994)
AVE: Average Variance Extracted	> 0.5	Fornell & Larcker (1981)
T-value	> 1.96	Hensler <i>et al.</i> (2009)
Cronbach's Alpha	> 0.7	Nunnally & Bernstein (1994)

By calculating the PLS Algorithm on our entire sample (350 respondents), we check the convergent validity for each of the constructs. Thus, convergent validity is examined by calculating the Composite reliability index (CR), Cronbach's alpha index, and the Average Variance Extracted, AVE. The acceptability thresholds required for the measurement criteria are shown in Table 6.

Table 6. Convergent validity criteria

	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Online immersion	0.976	0.980	0.859

From Table 6, the composite reliability (CR) exceeds the required threshold of 0.7 (Chin, Peterson & Brown, 2008), and the AVE (shared mean variance) exceeds the required threshold of 0.5 (Fornell & Larcker, 1981). Consequently, the convergent validity of our model is thus assured, especially since discriminant validity is assessed by examining the factorial contributions (loadings) of the items to their respective constructs.

We have checked, in particular, if, for each construct, the factor contributions are greater than the cross-factor contributions between each item and the other constructs. Thus, the discriminant validity is assured, because our construct has factorial contributions which are greater than the cross-factorial contributions. The discriminant validity is also evaluated according to Fornell & Larker (1981) by checking that the square root of the AVE for each construct exceeds the inter-construct correlations concerning it.

Predictive validity of the scale: mediating role of immersion between virtual technologies and loyalty

As a follow-up to these results, we proceeded to estimate the structural relationships between immersion and users' intent to revisit and purchase. To this end, purchase intention was measured using the Yoo & Donthu (2001) scale, while the intention to revisit the site was measured using the Demangeot & Broderick (2007) scale. These scales have been shown to have excellent psychometric qualities (Yoo & Donthu, 2001; Demangeot & Broderick, 2007).

For the scale measuring purchase intention, it turns out that only one factor has an eigenvalue greater than one. The items therefore all seem to be strongly linked to a factor. They are very well represented (quality of representation > 0.8). Bartlett's test is significant ($p = 0.000$) and the KMO index reaches a value of 0.875. The data are therefore factorizable. Likewise, the scale exhibits excellent internal consistency (Cronbach's alpha = 0.970).

Factor analysis performed on the intention-to-revisit scale revealed that it is a one-dimensional scale. We are led to retain a single factor explaining 89.296% of the variance. In addition, the items are well represented (> 0.8) and linked to the factor (> 0.8). Bartlett's test records a significant value ($p = 0.000$) and the KMO is 0.917. This proves that the factor analysis is of good quality. This scale is also reliable (Cronbach's alpha = 0.970).

We can currently estimate the structural relationships between constructs. The correlation relationships between the constructs are estimated by examining the standardized correlation coefficients (path-coefficients) and the statistical T-values (obtained following the Bootstrapping analysis), which express the degree of significance of the correlations. A correlation relationship is significant if the statistical T value (or student's t) is greater than the threshold of 1.96 (if $p < 0.05$). The positive correlation coefficients that are close to 1 assume a strong correlation link between the constructs.

Table 7. Search model result

Correlation relationship	Correlation coefficients (standardized)	T-statistic	P value
Immersion -> purchase intent	-0.402	4.858	0.000
Immersion -> intention to revisit the site	0.430	5.687	0.000

Table 8. Regression results on PLS

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic (O/STDEV)	P Value
Immersion -> purchase intent	-0.402	-0.405	0.083	4.858	0.000
Immersion -> intention to revisit the site	0.430	0.426	0.076	5.687	0.000
Online immersion	R Squared			R Squared Adjusted	
	0.914			0.912	

Two hundred Internet users were selected (part of the 350 consumers questioned during the second data collection). The results of the analysis show that there is a significant link between immersion and intention (intention to buy: $t = 4.858$; $p = 0.000$; intention to revisit

the site: $t = 5.687$; $p = 0.000$). Examining the relationship between the different variables, we found that web-driven online immersion, measured by our scale, has a significant impact on some surfers' responses. The obtained results confirm the predictive validity of the scale and confirm **H1**.

Discussion and Conclusion

As a consequence of the shortcomings of the literature review regarding a valid scale measure of online immersion, this research develops, first, a scale measure of it following the Churchill paradigm enriched with Rossiter's (2002) recommendations, before testing the impacts on the revisit and purchase intentions on a 3D-enriched commercial website. The study results in a unidimensional scale represented by 8 items. Unlike previous research, this scale is adjusted to the context of commercial websites, especially enriched ones, and is developed rigorously following the Churchill paradigm as a threefold process: (a) generating an initial pool of items; (b) data collection and purification of measures; and (c) estimating the scale's validity. Similar to previous research (Charfi & Volle, 2011; Fornerino Helme-Guizon & Gotteland 2008), our results confirm the uni-dimensionality of the scale. In addition, they confirm that immersion fosters online consumer behaviour. It is determining in enriched commercial websites.

At a methodological level, several phases were followed to develop a valid and reliable measurement scale to accurately operationalize the concept of online immersion. In addition, the development of this measurement scale and the assessment of its validity used a triangulation of several data collection methods and a review of the literature to cross-check the relevance of items generated with respect to previous research on the subject.

At a theoretical level, the developed scale measure may support the digital marketing field by helping researchers conduct valid studies on online consumer behaviour. In past researches, immersion in video games and movies has been examined but less immersion in commercial websites. The proposed scale may help academics to conduct better and more reliable studies on online consumer behaviour.

At a managerial level, companies need to evaluate the performance of their websites. They may use the current scale measure to assess the capacity of their website to stimulation immersion, since it is a determinant of net-surfers' retention. It may also help administrators improve their website traffic by providing a unique, rich and effective experience at all levels.

This study has some limitations as well. First, our empirical tests are exclusively conducted on a sample of Tunisian web surfers who are not necessarily representative of the world's Internet users. Future research may test the scale in other contexts and on other categories

of social presence online, like social media. Second, developing a valid and a reliable measurement scale is a long and an ongoing process. Accordingly, we recommend the use of this measurement scale for future online immersion-based research so as to further test its validity. Third, this scale is tailored to a 3D-enriched commercial website. However, visual social media platforms, like Instagram, may stimulate immersion and may lead to purchase (Ben Yahia *et al.*, 2018). Future research may investigate immersion on Instagram considering the characteristics of the platform, the number and quality of the interactions, and also the social presence.

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