Uncertainty Avoidance and Consumer Cognitive Innovativeness in E-Commerce

Osama Sohaib, University of Technology Sydney, Sydney, Australia

Kyeong Kang, University of Technology Sydney, Sydney, Australia

Iwona Miliszewska, University of Technology Sydney, Sydney, Australia

ABSTRACT

This article describes how despite the extensive academic interest in e-commerce, an investigation of consumer cognitive innovativeness towards new product purchase intention has been neglected. Based on the stimulus–organism–response (S–O–R) model, this study investigates the consumer cognitive innovativeness and the moderating role of the individual consumer-level uncertainty avoidance cultural value towards new product purchase intention in business-to-consumer (B2C) e-commerce. Structural equation modelling, such as partial least squares (PLS) path modelling was used to test the model, using a sample of 255 participants in Australia who have had prior online shopping experience. The findings show that the online store web atmosphere influences consumers' cognitive innovativeness to purchase new products in countries with diverse degrees of uncertainty avoidance such as Australia. The results provide some guidance for a B2C website design based on how individual's uncertainty avoidance and cognitive innovativeness can aid the online consumer purchasing decision-making process.

KEYWORDS

Cognitive Innovativeness, Consumer Innovativeness, Culture, E-Commerce, New Product Purchase, Social Networking Services, Uncertainty Avoidance, Web Accessibility, Web Design

INTRODUCTION

The primary way a business-to-consumer (B2C) e-commerce firm communicates with its consumers is through their website. According to the Australian Nielsen Connected Consumers Report (2016), a large number of consumers go to manufacturers' and retailers' website directly, with 65% of consumers visiting the retailer's website and 36% visiting the manufacturer's website for online purchase (Zrim, 2016). Therefore, it is necessary to evaluate the effectiveness of websites' components to understand whether online stores are providing the interaction desired by the consumers. E-retailers should provide important stimuli and ensure that their website offers unique benefits and values to encourage consumers to buy products online. If e-retailers intends to turn first-time consumers into repeat online consumers, the e-retail experience has to deliver unique value regarding the consumer's interaction

with the website. In the area of B2C e-commerce, the web cognitive landscape refers to whether consumers believe that the information presented on the website makes it easy for them to purchase products. E-commerce web design is vital because businesses can lose 50% of the potential consumer due to consumer unable to find the product what they want (van der Merwe & Bekker, 2003). This means that the structural assurance of the website provided by the e-retailer should demonstrate a clear understanding of the reasons why consumers cognitively believe that they should shop at one specific website rather than at other ones (Li, Yen, Liu, & Chang, 2013).

Countries vary significantly on innovativeness as measured by consumer reluctance (Tellis, Yin, & Bell, 2009). The concept of consumer innovativeness denotes "inter-individual differences that characterize people's responses to new things" (Goldsmith & Foxall, 2003). The success of e-commerce also depends on a consumer's culture (Sohaib and Kang, 2015a) as culture influences consumer innovativeness. Often country is used as a proxy for culture at a group level; however, it is more appropriate to measure culture at the individual level because online purchasing is an individually oriented one-person action (Sohaib and Kang 2015b). The innovative consumer plays a vital role in the adoption of new products. There are at least three approaches to the conceptualisation of innovativeness: behavioural, global traits and domain-specific activity (Goldsmith & Foxall, 2003). Behavioural refers to whether consumers are innovators or non-innovators in their attitude to adopting new products, global traits are personality traits, while domain-specific activity denotes a consumer's innovativeness within specific product categories. The most significant aspect of behaviour is its connection to cognition. Behaviour results from some form of cognition (Faiola & Matei, 2006). Our concern is with the behavioural perspective of consumers' innovativeness, which identifies consumers as innovators or non-innovators depending on their purchase of a new product. A person's perceptions may change their attitudes to new products and ideas and their level of innovativeness (Rogers, 1995).

In the context of e-commerce, how consumers react to innovation, specifically whether consumers adopt new products or not, depends on their purchasing decision-making process and a variety of internal and external influences. The measurement of cognitive innovativeness is important to this process. Consumer perception of information is directly related to cognition (Ha, John, & Chung, 2016). In addition to this, cultural experiences influence cognitive processes (Faiola & Matei, 2006), for example, online transactions can provoke a high level of uncertainty (Sabiote, Frías, & Castañeda, 2012). The cultural value of uncertainty avoidance is significantly connected to innovativeness (Dobre, Dragomir, & Preda, 2009). Therefore, consumer innovativeness plays an important role in encouraging consumers to shop online.

The first objective of this study is to investigate the influencing factors of consumer cognitive innovativeness regarding new product purchase intention. This study extends the work of Sohaib and Kang (2015b) by including the role of cognitive innovativeness towards new product purchase intention and using the moderating role of individual consumer level uncertainty avoidance (UA) cultural value. The second objective of this study is to investigate whether high UA and low UA consumers have different cognitive innovativeness towards purchasing intentions. The research questions of this study are as follows:

Research Question 1: Do web design factors affect consumer cognitive innovativeness towards purchase intention of new products in B2C e-commerce?
Research Question 2 and 3: Does the consumers' level of UA play an important moderating role between factors that affect new product purchase intention in B2C e-commerce? Moreover, what are the difference between high UA and low UA consumers?

For this study, 'new product purchase' refers to any product not purchased online in the past. To the best of the authors' knowledge, this is the first research study that investigates the role of consumer cognitive innovativeness and different levels of uncertainty avoidance cultural value in

e-commerce. As such, it contributes to the understanding of online vendors' perception of innovative approaches to B2C websites.

This paper is structured as follows. We first critically analyse the literature on the consumer cognitive innovativeness, web cognitive landscape, and the cultural value of uncertainty avoidance. We then discuss the theoretical background from which we developed our research model and hypotheses. Following that, we describe our research methodology and present the results of this study. Finally, we discuss the practical and theoretical implications of the study and conclude with the limitations and future direction for research.

THEORETICAL BACKGROUND

Consumer Cognitive Innovativeness

This research defines 'consumer cognitive innovativeness' as a consumer's rational thinking, problem-solving and decision-making tendencies as related to new product purchase in a B2C e-commerce website. Scholars have enriched consumer innovativeness by measuring its various dimensions. Venkatraman and Price (1990) distinguish cognitive from sensory innovativeness, with cognitive innovativeness referring to cognitive qualities that influence individuals to seek stimulation of the mind while sensory innovativeness refers to the cognitive qualities that influence individuals to seek sensory stimulation. Consumer innovativeness refers to consumers' proneness to adopt new products (Tellis et al., 2009).

Manning, Bearden and Madden (1995) characterise two aspects of consumer innovativeness: consumer independent judgment-making and consumer novelty-seeking. Consumer independent judgment-making refers to the degree to which an individual makes innovation decisions independently, while consumers' novelty-seeking denotes the desire to look for new product information. According to Blake, Neuendorf and Valdiserri (2003), innovativeness is the relative willingness of an individual to try a new product. In the context of B2C e-commerce, this means the tendency to buy new products soon after they appear online. Consumers are categorised as innovators or non-innovators depending on their purchase of a new product (Goldsmith & Foxall, 2003). According to Lim et al. (2004), the cognitive cues of a B2C website form a basis of consumer trust in an online store that does not have an established reputation. Kim (2005) notes that cognition-based trust is associated with consumers' observations and perceptions regarding the features and characteristics of an e-commerce website.

The value with the most proximate impact on an individual's cognitive interpretations is personal innovativeness (Lu, 2014). According to Venkatraman and Price (1990), individuals who have a high need for cognition are more likely to analyse information than those with a low need for cognition because they have a need to structure situations in meaningful ways. In particular, consumers with high cognitive innovativeness are more likely to adopt a technology (Venkatraman and Price, 1990). In addition to this, online consumers with high cognitive innovativeness put more emphasis on usefulness and aesthetic design (T.-L. Huang & Liao, 2014). However, "consumers with low cognitive innovativeness lack ability, knowledge, and involvement with regard to new technology; they are insensitive to the effect of the new technology in accomplishing a task" (T.-L. Huang & Liao, 2014). Considering B2C e-commerce websites, various web cognitive factors may stimulate a positive relationship with consumers with different levels of cognitive innovativeness.

Website Accessibility/Ease of Use

Website accessibility increases when a website has a high ease of use. Ease of use includes accessibility factors such as navigation, website content structure and search facilities (Lodorfos, Trosterud, & Whitworth, 2006). When a consumer visits a website for the first time, their trust is primarily based on initial perceptions of the trust-related attributes of the website, such as the cognition-based aspects which are formed from quick cognitive cues or first impressions

(McKnight, Cummings, & Chervany, 1998). For example, the visual design of a website consists of graphical and structural factors from which consumers develop their first impression (Karimov, Brengman, & Hove, 2011). In the context of e-commerce, usefulness is how effective shopping on the Internet is in helping consumers to accomplish their task, and ease of use is the consumer's perception regarding how easy the Internet is to use as a shopping medium and how free the process is of effort in leading the consumer to achieve their final task (Monsuwe, Dellaert, & Ruyter, 2004). Brick-and-mortar stores are not designed to improve efficiency but to enhance persuasion opportunities. The same principle applies in the e-commerce environment, such as in designing web usability to maximise persuasion interaction (Schaffer, 2009). Website design factors such as information design and navigation design should be used in e-commerce websites to build consumer trust and subsequently enhance purchase intention (Dianne Cyr, 2013; Ganguly, Dash, & Cyr, 2010).

Therefore, the website accessibility concept adopted here considers the ease of use and usefulness aspects together with various design features that contribute to the overall website usability such as navigational design, information content and design.

Colour and Product Images

Once consumers interact with an e-commerce website, initial perceptions concerning website aesthetics often persuade the consumer to stay on the website for a longer duration (Alhammad & Gulliver, 2013). The aesthetic elements of a website such as colour and graphics usage are the most effective trust attributes of B2C websites (Tan, Tung, & Xu, 2009). The colour appeal of a B2C website is the degree to which the colours used, for example the background and font colour, are perceived as pleasing, appealing and appropriate. Product images are interactive image features, such as 3D virtual models, that consumers can operate to view product information by zooming in on product features, rotating a product to different angles and changing product colours. Visual design cues such as colour and product images can provide information about the Internet vendor as well as have an impact on consumers' emotional responses (Eroglu, Machleit, & Davis, 2003).

Social Networking Services

Social networking services are defined as a set of actors (people/organisations) and the set of connections among the actors representing some relationship (friendship/affiliation/information exchange) (Grabner-Kräuter, 2009). These include web communities and communication media. Web communities are online social networking sites, blogs, newsletters, forums and online product reviewing/ratings. Communication media include instant messaging, online help emails and chat. Social influence is a vital factor that determines user behaviours on social networking sites (Cheung, Lee, & Chan, 2015). Persuasive interaction ensures the perception of an acceptable level of social interaction via the use of social networking services (Alhammad & Gulliver, 2013). Consumers' trust is formed through permeating the mode of communication with a high social presence in a B2C e-commerce website. Gefen and Straub (2004) found a significant influence of social presence on consumer trust in B2C e-commerce, such as ability, integrity, predictability and benevolence. The opinions of others can impact consumers' purchasing intention (Lee, Shi, Cheung, Lim, & Sia, 2011). A model proposed by Brengman and Karimov (2012) investigated whether integrating social media cues (such as Facebook and blogs) as stimulus into an online store's website may provide a signal regarding the cognitive trust (organism) of an online vendor. The results show that social media cues have a significant effect on consumers' cognitive-based trust towards purchase intentions (response). In addition to this, Facebook advertising has a significant positive influence on consumer attitude towards the intention to purchase (Duffett, 2015). Guo, Wang, and Leskovec's (2011) study shows that information processing and trust positively influence consumer choice.

Uncertainty Avoidance

Geert Hofstede (1980) refers to the uncertainty avoidance cultural as having a certain degree of uncertainty. Australia is a practical society regarding uncertainty avoidance, with an index score of 51, and has a high degree of acceptance for new ideas, technology and business practices. For a B2C e-commerce to be successful, it is essential to note the cultural themes of targeted consumers. In particular, the uncertainty avoidance (UA) cultural value is closely associated with innovativeness in e-commerce (Dobre et al., 2009). Due to the high level of uncertainty of the virtual world, individual trust is affected (Al-Debei, Akroush, & Ashouri, 2015). As noted by Karahanna, Williams, Polites, Liu, and Seligman (2013), "Online purchasing is a decision-making process that involves inherent uncertainty". Uncertainty is an important moderator in online purchasing (Zhu, Chang, & Chang, 2015). Individuals with high uncertainty avoidance tend to desire outcomes by following the right direction for action (Duffett, 2015). Existing studies have applied Hofstede's (1980) cultural dimensions to examine the effect of cultural values on online purchasing decisions. However, in these studies, national cultural differences were observed at the country level. This is an issue as the assumption of homogeneity in any nation is not suitable, in particular, if the national cultural concepts are to be integrated into information systems models that reflect individual behaviour (McCoy, Galletta, & King, 2005).

Culture is a significant influence on consumers' purchasing decisions (Constantinides, 2004; Ha & Janda, 2014), producing a range of emotional effects to a given stimulus (G. Hofstede, 2001). Srite and Karahanna (2006) argue that national culture is a macro-level phenomenon, whereas online purchasing is a one-person action; therefore, measuring culture at the individual consumer level is the most appropriate way to look at the effect of technology acceptance (Sohaib & Kang, 2015a). In addition, consumers with dissimilar cultures might have different expectations of what makes an online store trustworthy (Ganguly et al., 2010; Kim, 2005; Kim & Park, 2013; Sia, Lim, Leung, Lee, & Huang, 2009), which affects the establishment of trust.

Researchers (Hwang & Lee, 2012a; McCoy et al., 2005; Srite & Karahanna, 2006; Yoon, 2009) found Hofstede's cultural scales at the individual level acceptable in information systems research (more specifically, in e-commerce research). As B2C e-commerce continues to grow across cultures, it becomes critical to understand the cognitive influences between the consumer and the Internet vendor and the nature of cultural differences at the individual consumer level (Hwang & Lee, 2012a). Furthermore, cultural experiences influence cognitive processes that influence website design and its use (Faiola & Matei, 2006).

RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

The stimulus–organism–response (S–O–R) model identifies cognitive aspects to determine the cognitive innovativeness towards purchasing intention. The S-O-R paradigm was first proposed by Mehrabian and Russell (1974) in the context of environmental psychology. The paradigm suggests that stimuli from the environment influence an individual's cognitive reactions, which in turn lead to a response. This paradigm was later extended and has been extensively applied to online shopping outcomes (Sohaib & Kang, 2015b).

The stimulus (S) is defined as "the total sum of all the cues that are visible and audible to the online shopper"; for example, "cognitive states are related to a consumer's information processing, retention, and retrieval ability" (Sheng & Joginapelly, 2012). The organism (O) represents the consumer's intermediary states of cognitive innovativeness. These internal states affect the consumer's approach, such as new product purchase intention, which is the response (R). Additionally, we also suggest the uncertainty avoidance cultural orientation moderates the effects of cognitive influences and cognitive innovativeness towards new product purchase intention. Research has shown that the uncertainty avoidance cultural value is significantly connected to innovativeness (Dobre et al., 2009). Figure 1 shows the proposed research model.

Figure 1. Research model
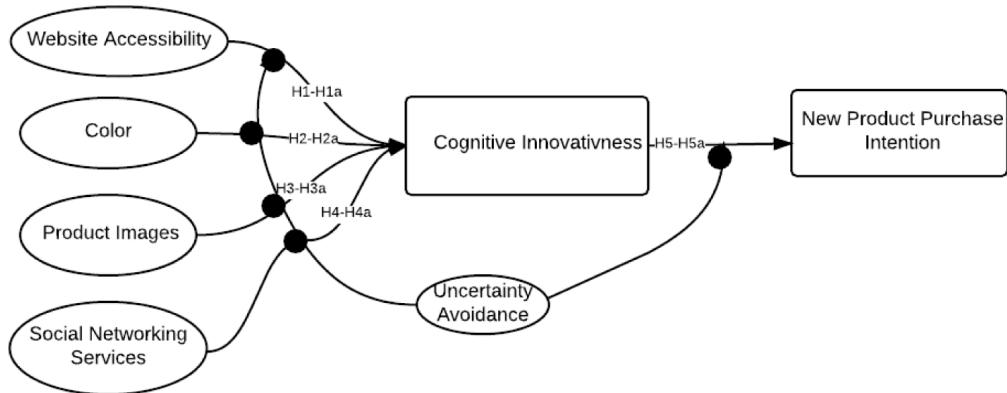
Hypothesis Development

Website Accessibility/Ease of Use

The navigation, page layout consistency and ease of access to an e-commerce website have to be designed with a complete understanding of a consumer group's culture (Cyr, 2008). According to Huang and Liao (2014), the perceived ease of use means that the consumer does not need to employ excessive cognitive resources when using technology. Singh, Kumar and Baack (2005) state that online consumers from high uncertainty avoidance (UA) societies need better e-commerce website accessibility so that they do not leave the website. D. Cyr (2008) also finds that consumers who are high on the UA scale give a high value to web navigational design about to their purchasing intention. Therefore, we hypothesise:

H1: Individual level UA will moderate the relationship between website accessibility and consumer cognitive innovativeness such that the relationship is stronger for consumers in Australia.
H1a: The relationship between website accessibility and consumer cognitive innovativeness is stronger for high UA individuals than low UA individuals.

Colour and Product Images

The complexity of a B2C website, which includes the richness of factors such as colour scheme and use of product images, impacts online consumers with high cognitive innovativeness (T.-L. Huang & Liao, 2014). Additionally, S. Lee and Rao (2010) argue that in B2C e-commerce, aesthetic design produces differential responses in individuals. These visual appearances (colour and images) are more important to high UA consumers than low UA consumers (Ganguly et al., 2010). Therefore, we hypothesise:

H2: Individual level UA will moderate the relationship between colour and consumer cognitive innovativeness such that the relationship is stronger for consumers in Australia.
H2a: The relationship between colour and consumer cognitive innovativeness is stronger for high UA individuals than low UA individuals.
H3: Individual-level UA will moderate the relationship between product images and consumer high cognitive innovativeness such that the relationship is stronger for consumers in Australia.
H3a: The relationship between product images and consumer cognitive innovativeness is stronger for high UA individuals than low UA individuals.

Social Networking Services

Online consumers with high cognitive innovativeness tend to make decisions on their own (T.-L. Huang & Liao, 2014). The integration of virtual communities like social network sites has a positive influence on cognitive-based trust towards purchasing intentions (Brengman & Karimov, 2012). In addition to this, social influence can build consumer trust in online shopping more effectively in high UA cultures than in low UA cultures (M. K. O. Lee et al., 2011). For example, people in high UA cultures such as South Korea, which has a UA index score of 85, are likely to obtain opinions of a website's reputation from friend and family recommendations, whereas those from low UA cultures such as Australia are more likely to make independent decisions. This means consumers who are from low UA cultures avoid getting into groups and instead perform online purchasing on their own without asking anybody for any help. Therefore, we hypothesise:

H4: Individual level UA will moderate the relationship between social networking services and consumer cognitive innovativeness such that the relationship is stronger for consumers in Australia.
H4a: The relationship between social networking services and consumer cognitive innovativeness is stronger for high UA individuals than low UA individuals.

Cognitive Innovativeness and New Product Purchase Intention

According to Thakur and Srivastava (2014), innovativeness affects purchasing intentions. High cognitive innovative consumers not only enjoy thinking for its sake but also tend to apply a great deal of mental energy to solve problems they encounter (Huang & Liao, 2014). Additionally, as noted by Lim, Leung, Sia and Lee (2004), online shopping naturally involves more uncertainties than buying from a brick-and-mortar business. Therefore, the adoption rates of online shopping are higher for high UA cultures than for low UA cultures (Lim et al., 2004). Yoon (2009) also highlights that high UA cultures are usually more willing to rely on online purchasing than low UA cultures. Therefore, we hypothesise:

H5: Individual level UA will moderate the relationship between cognitive innovativeness and new product purchase intention such that the relationship is stronger for consumers in Australia.
H5a: The relationship between cognitive innovativeness and new product purchase intention is stronger for high UA individuals than low UA individuals.

RESEARCH METHODOLOGY

To validate the research model, we carried out an empirical survey. This study used an online survey methodology where participants were asked to choose a localised online vendor. A localised retailer website is considered to be appropriate to the culture and the most workable option for research (Dianne Cyr, 2013). The survey was announced through university webmail and social network pages. For the validation and testing of the hypotheses, data were collected from online shoppers in Australia. Criteria for selecting participants were to have a minimum of six months online shopping experience and is an Australian citizen by birth. To determine the participant's culture, it is important to ensure that each participant had lived in Australia for most of their lives and spoke the native language (English) as their primary language (Dianne Cyr, 2013).

After visiting the chosen website e-commerce website, respondents were required to fill out a closed-ended questionnaire on a seven-point Likert scale, with responses ranging from (1) strongly disagree to (7) strongly agree. Multi-scale items using at least three observable indicators measured all constructs. Previously validated survey instruments were modified to ensure the adequate reliability and validity of the measurement scales. Table 5 in the Appendix shows all items used in the study.

DATA ANALYSIS

A total of 260 responses were collected. After removing incomplete responses, a total of 255 samples were used to test the proposed model. 53% of respondents were males, and 47% were females, 95% respondents had seven or more years of Internet experience, 65% respondents had online purchasing experience of between one to three years, and 35% had more than three years.

To test the research model, a variance-based structural equation modelling (SEM) statistical technique, partial least squares (PLS) path modelling using SmartPLS version 3 (Ringle, Wende, & Becker, 2015), was used. The partial least squares (PLS-SEM) approach is a preferred analysis technique in information systems and business research because it offers several flexibilities. For example, this approach is well suited for prediction-oriented research, does not require a large sample size, does not require normality and subsequently works without distributional assumptions and with nominal, ordinal and interval-scaled variables (Haenlein & Kaplan, 2004; F. Hair, Marko, Lucas, & Volker, 2014). PLS is considered suitable as it allows investigators to evaluate measurement model parameters and structural path coefficients at the same time. It also allows both formative and reflective factors to be tested together (Chin, Marcolin, & Newsted, 2003).

In our research model, website accessibility, colour and product images, cognitive innovativeness and new product purchase intention were modelled as reflective indicators because they were viewed as effects of latent constructs (Hwang & Lee, 2012b; D. J. Kim, 2005). This is because reflective indicators are interchangeable. For example, different indicators reflect website accessibility, such as easy to learn, understandable and easy to use, to which these indicators are highly correlated. This means that an increase in website accessibility is reflected by increases in all indicators. Social networking service (SNS) is formative because it is a multidimensional factor (Sohaib & Kang, 2015b) that covers various referent groups such as social networking sites, friends and family, online help, reviews and rankings. Formative constructs are not interchangeable, which means a change in one indicator does not necessarily denote a change in other indicators. For example, an increase in influence from family would influence individuals to purchase online even if there were no influence from other sources. Additionally, the moderating effects of culture (UA) were performed using the product indicator approach. The product indicator approach by Chin (2003) refers to the products of each indicator of the independent latent variable with each indicator of the moderator variable.

To investigate the moderating influences of individuals' cultural orientation, we used the multi-group PLS analysis method to determine whether the individual uncertainty avoidance (UA) differs for high versus low uncertainty avoidance (UA) subgroups of participants, which is considered appropriate for this study (Sia et al., 2009). Multi-group PLS analysis allows for the comparisons of structural model differences between groups (Chin, 2004). The analysis was conducted by taking the standard errors of the structural models' paths by comparing equivalent paths across two groups (high UA and low UA) by performing t-tests on their path coefficients.

Although Hofstede's (1980) cultural values are significant at the societal level, his cultural dimensions also tend to differ widely over individual members within societies (Tsai & Bagozzi, 2014). Yoon (2009) found Hofstede's national cultural values at the individual level impact consumers' acceptance of e-commerce. We use a median split to separate the sample according to the participants' composite score of high versus low on two UA items: (1) "I prefer to avoid making changes while online shopping because things could get worse"; and (2) "The rules and regulations of the online stores are important to me because they inform buyers what the online store does."

Reliability and Validity Assessment

The reliability and validity of the measurement model in PLS were assessed by examining internal consistency, convergent validity and discriminant validity. Convergent and discriminant validity were assessed by applying two criteria: (1) that the square root of the average variance extracted (AVE) by a construct from its indicators was at least 0.70 and was greater than that construct's correlation

with other constructs; and (2) item loadings were at least 0.70 and are more strongly on their assigned construct rather than on the other constructs. Table 5 in the Appendix shows all item loadings the social networking service (SNS) factor weights. Table 1 shows the Cronbach's reliability, composite reliability and the AVE of all constructs values exceed the recommended value of 0.70. An SNS is a formative construct that cannot be analysed in this procedure. For formative indicators (social networking services), the validity of variables using outer weights was significant (p-value < 0.05). In addition to this, to determine the reliability for formative indicators, the variance inflation factor (VIF) value was less than 5, which means there is no multi-collinearity.

Cross-sectional design surveys are susceptible to common method bias, particularly if the data collection method is only perceptually anchored (Sharma, Yetton, & Crawford, 2009). However, the PLS method requires practically no bias when estimating data from a composite model population, regardless of whether the measurement model is reflective or formative (Sarstedt, Hair, Ringle, Thiele, & Gudergan, 2016). However, according to Kock (2015), if all factor level VIFs resulting from a full collinearity test are equal to or lower than 3.3, the model can be considered free of common method bias. In our research model, all factor level VIFs are lower than 3.3, indicating no bias data.

Concerning goodness-of-fit (GoF) indices for partial least squares path modelling, Jörg Henseler and Sarstedt (2013) show that the GoF and the relative GoF index are not appropriate for model validation. However, the model fit was assessed by examining the model fit of the PLS path models; namely, the standardised root mean square residual (SRMR). The SRMR 0.07 is lower than the recommended value of 0.08, which indicates a good fit.

Structural Model Testing

The structural models and hypotheses were tested by examining the significance of the path coefficients and the R^2 variance for the dependent variable. The significance of the paths was determined using the t-statistical test calculated with the bootstrapping technique. A 5% significance level was employed. SmartPLS 3 can perform bootstrapping (a nonparametric procedure that can be applied to test whether coefficients such as outer weights, outer loadings and path coefficients are significant by estimating standard errors for the estimates) (Ringle et al., 2015) for both the inner and outer model to specify the t-value for significance. In order to get approximate t-values for the significance test, we used a large subsample (5,000) from the original sample to draw a standard error and the number of cases were equal to the number of observations in the original sample (F. Hair et al., 2014; J. F. Hair, Ringle, & Sarstedt, 2011). We examined the coefficients of the causal relationships between constructs in our model in order to approve or disprove the hypotheses. The coefficients and their t-value on the structural model are shown in Table 2 and 3 and the coefficients of determination-(R^2) for the dependent constructs are shown in Figure 2.

Table 1. Cronbach's reliability, composite reliability and the AVE

	AVE	CR	C-Alpha	CInn	COL	IMG	SNS	WA	UA	NPINT
CInn	0.81	0.91	0.88	**0.90**						
COL	0.75	0.87	0.81	-0.18	**0.86**					
IMG	0.73	0.84	0.73	0.10	0.10	**0.84**				
SNS	NA	NA	NA	0.14	0.07	-0.08	1			
WA	0.88	0.89	0.91	0.21	0.10	0.05	0.07	**0.93**		
UA	0.84	0.88	0.82	0.09	0.05	0.13	-0.1	-0.02	**0.85**	
NPINT	0.88	0.90	0.87	0.47	0.01	-0.02	0.1	0.05	0.14	**0.93**

Notes: CR: composite reliability, C-Aplha: Cronbach's alpha, CInn: cognitive innovativeness; COL: colour; IMG, image; SNS: social networking services; WA: website accessibility; NPINT: new product purchase intention; UA: uncertainty avoidance

Table 2. Hypothesis testing

|	Path	Path Mean	StDev	t-Value	P Value	Supported?
H1	WA * UA -> CInn	0.25	0.03	1.98	0.003*	Yes
H2	COL* UA -> CInn	0.14	0.03	1.20	0.336	No
H3	IMG * UA -> CInn	0.31	0.03	3.61	0.000***	Yes
H4	SNS * UA -> CInn	0.42	0.05	4.79	0.000****	Yes
H5	CInn* UA -> NPINT	0.24	0.03	1.99	0.002*	Yes

Notes: CInn: cognitive innovativeness; COL: colour; IMG, image; SNS: social networking services; WA: website accessibility; NPINT: new product purchase intention; UA: uncertainty avoidance; * Significant at 0.05 level; ** Significant at 0.01 level; *** Significant at 0.001 level

Table 3. Hypothesis testing

	Path	High UA (Subsample 140)		Low UA (Subsample 115)		Mean Difference	t-Value	p-Value	Supported?
		Mean	SD	Mean	SD				
H1a	WA -> CInn	0.20	0.04	0.15	0.04	0.05	1.957	0.049**	Yes
H2a	COL -> CInn	0.17	0.04	0.10	0.03	0.07	0.159	0.77	No
H3a	IMG -> CInn	0.23	0.05	0.19	0.04	0.04	1.960	0.048**	Yes
H4a	SNS -> CInn	0.33	0.05	0.24	0.03	0.10	3.247	0.001*	Yes
H5a	CInn -> NPINT	0.28	0.05	0.25	0.04	0.03	3.176	0.001*	Yes

Notes: CInn: cognitive innovativeness; COL: colour; IMG: image; SNS: social networking services; WA: website accessibility; NPINT: new product purchase intention; UA: uncertainty avoidance; * Significant at 0.05 level; ** Significant at 0.01 level; *** Significant at 0.001 level

Figure 2. Path testing
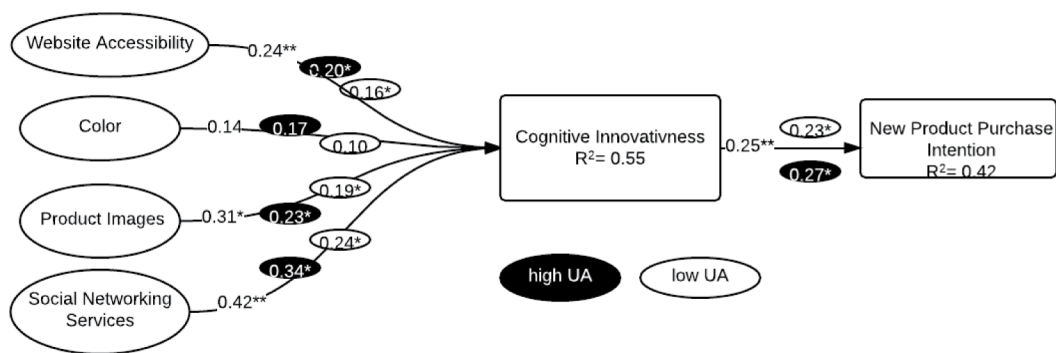
The Stone-Geisser criterion Q^2 is also measured using the blindfolding method to compute the construct cross-validated redundancy for assessing the predictive relevance (Jorg Henseler, Ringle, & Sinkovics, 2009). In our analysis, all Q^2 value range of the 'new product purchase intention' endogenous construct (i.e., 0.315) is above the threshold value of zero, thus indicating a strong predictive relevance.

As Table 2 shows, all hypotheses are supported except H2, which suggests there is an insignificant relationship between the individual level UA moderation between colour and consumer cognitive

innovativeness. This indicates website colour perception is not shaped by the consumer's uncertainty avoidance. However, previous research (such as Cyr et al., 2010) indicated that colour is an influencing factor in e-commerce across national cultures. Variance in consumers' cognitive innovativeness ($R^2 = 0.55$) and new product purchase intention for Australia sample ($R^2 = 0.42$) is significant, which shows that the Australian sample indicates a 42% variance in consumers' new product purchase intention.

Furthermore, to meet the second objective of the study we compared the differences in coefficients of the corresponding structural paths of the high UA and low UA subsamples. As shown in Table 3, colour still does not affect consumers' cognitive innovativeness, so H2a is not supported. However, the paths from website accessibility, product images and social networking services to cognitive innovativeness is significant.

Importance-Performance Map Analysis

We also performed importance-performance map analysis (IPMA) for two groups (low UA and high UA) to produce additional findings and conclusions for managerial actions (Christian and Sarstedt, 2016). Performing an IPMA requires determining a targeting construct, such as 'new product purchase intention,' in our PLS path model.

The performance of each factor was measured on a scale from 0 to 100. The closer the value is to 100, the higher the performance of the factor. All total effects (importance) larger than 0.10 are significant at the $p \leq 0.05$ level. Table 4 and Figure 3 show the IPMA result of the all the predecessors of the selected target construct (new product purchase intention).

Regarding the new product purchase intention, as presented in Table 4 and Figure 3 the highest performance construct is 'web accessibility' followed by 'social networking services.' This means an increase in web accessibility performance would increase the performance of the target construct 'new product purchase intention' by the size of the total effect. However, the direct consequence of the 'cognitive innovativeness' construct is higher in the high UA group than in the low UA group. This means an increase in cognitive innovativeness performance would increase the performance of the target construct new product purchase intention by the size of the total effect 0.28 in the high UA group more than the 0.23 total effects in the low UA group.

DISCUSSION AND CONCLUSION

This study highlights the effects of web cognitive landscape on consumer cognitive innovativeness towards new product purchase intention. In addition to this, it examined how the individual consumer level uncertainty avoidance cultural value moderated the relationship between B2C web cognitive landscape and consumer cognitive innovativeness towards new product purchase intention.

Table 4. IPMA result of new product purchase intention

Criterion: New Product Purchase Intention	Low UA		High UA	
	Importance	Performance	Importance	Performance
WA	0.15	68.73	0.20	66.93
COL	0.10	49.24	0.17	47.01
IMG	0.19	56.10	0.23	58.13
SNS	0.24	65.90	0.33	66.64
CInn	0.25	62.50	0.28	63.61
NPINT	0.23	69.96	0.27	72.78

UA: Uncertainty avoidance; CInn: cognitive innovativeness; COL: colour; IMG: image;
SNS: social networking services, WA: website accessibility; NPINT: new product purchase intention

Figure 3. IPMA of the target construct (new product purchase intention)
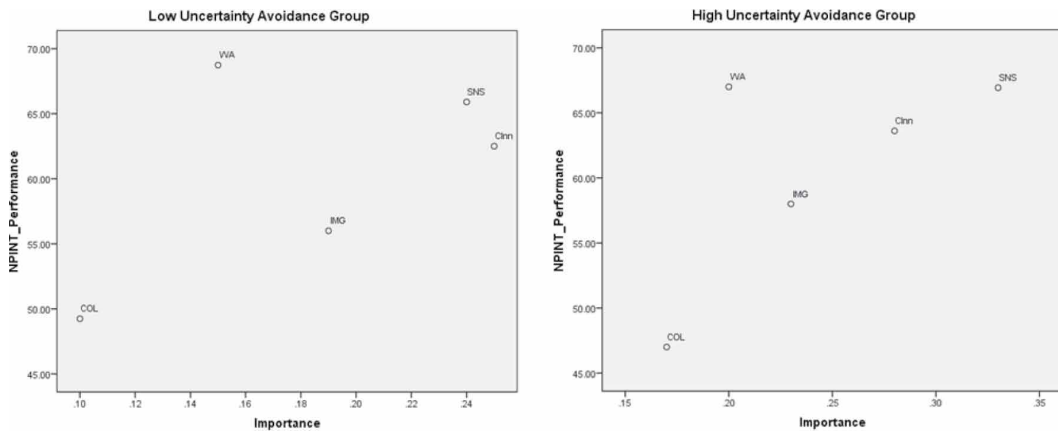
The findings of this study are as follows. First, cognitive innovativeness regarding the B2C website accessibility, colour and product images, and social networking services significantly influence consumers' new product purchase intentions. This argument is consistent with the findings of T.-L. Huang and Liao (2014), who have reported that cognitive innovativeness influences consumer behaviour towards using technology. Second, consumer cognitive innovativeness has a significant positive relationship with online purchase behaviour. This is in line with Y.-A. Huang (2003). Consumers with high cognitive innovativeness are more likely to accept an innovation (Venkatraman, 1991) such as a new product purchase. Third, cognitive innovative consumers usually trust other reliable information sources to ease the uncertainties inherent in a B2C website. For example, the findings of this study indicate that website accessibility, colour and product image, and social networking services positively affect consumer cognitive innovativeness towards new product purchase intention at the individual level. This view is consistent with Tellis et al. (2009). Fourth, consumers' level of the uncertainty avoidance cultural value is significantly connected to cognition and innovativeness in e-commerce. Consumers with low uncertainty avoidance are characterised by a higher cognitive innovativeness than high uncertainty avoidance consumers, who analyse information in a meaningful way. This is consistent with Dobre et al. (2009). Fifth, in cultures with a low degree of uncertainty avoidance (such as Australia), consumers are tolerant of uncertain situations and with innovations. We found that consumers in Australia tend to be as being highly innovative overall. Additionally, consumers' intention for purchasing new products differs considerably depending on their uncertainty avoidance. This is consistent with Tellis et al. (2009).

In conclusion, the web design factors (stimulus) of a B2C website towards which a reaction is made provides a signal regarding the consumer cognitive innovativeness (organism) influence new product purchase intention (response). Therefore, B2C websites should be designed according to consumers' level of cognitive innovativeness depending on the consumer's individual cultural orientations.

Theoretical Implications

Several theoretical implications resulting from this study. Firstly, the main theoretical contribution of the study is the development of a research model that can be used in further studies. Secondly, this study extended prior research on the effects of web cognition on innovativeness towards online purchasing intentions and provided necessary results. Additionally, this research addresses the shortcomings in the existing literature by applying individual cultural values (UA) as moderators to a proposed model to uncover new and improved methods for consumer uncertainty in a B2C website. Thirdly, this study provided an understanding of the new drivers of online consumer purchase intention. Specifically, a

consumer's cognitive innovativeness towards the key components on in a B2C e-commerce website, such as web design (website accessibility, visual appearance, and social networking services), which are viewed as the vital aspects of consumer trust in an online store. Fourth, this study examined how online consumer responses towards a B2C online store differ across two different cultural value systems (high uncertainty avoidance and low uncertainty avoidance). This is the first research that has investigated this phenomenon within the Australian context. Finally, the various hypotheses supported in this study all add to the literature for developing hypotheses for future studies. Additionally, this study contributes to validating the survey instrument of the various factors used in a proposed model. Researchers can now use the survey instrument with increased confidence in an e-commerce context.

Practical Implications

The findings provide some practical implications and guidelines for online vendors to include innovative approaches to B2C websites. The results of this study may help online shopping managers who could use the insights of this research to modify their web strategies, not only for considering a country's culture but also for culturally diverse countries such as Australia. Developers and website designers can use these results to increase desirable outcomes by focusing on the relationship between web cognitive evaluations and consumer innovativeness to increase the chances that an online business will succeed in countries with diverse degrees of uncertainty avoidance. The practical implications extend to business firms to make changes to their market strategies to improve their online sales across cultures; for example, e-businesses should specifically consider introducing new products first in highly innovative countries.

Limitations and Recommendations for Future Research

Like most survey research, this study has some limitations. Firstly, data were collected from Australia only. Therefore, caution is advised in making generalisations from the study findings. Secondly, a larger sample size would have been more useful for evaluating the constancy and dependability of the findings. Thirdly, although the sound judgment was used in the selection of factors for the research model, the study did not consider all possible factors that could impact cognitive influences towards purchase intention that have been used in prior studies. While the results of this study clearly indicate there are individual-based differences in online purchasing behaviour, it will be interesting to see if there is some evidence that consumer innovativeness could be a link between country level and individual level cultural analyses. More practical support at the individual consumer level cultural values using this study's research model could be included in future studies of e-commerce, such as including Hofstede's (1980) other cultural dimensions such as power distance index (PDI), masculinity versus femininity (MAS), long-term orientation versus short-term normative orientation (LTO) and indulgence versus restraint (IND). Finally, this research did not provide a complete view of all aspects of the web cognitive landscape and new product purchase intentions, such as privacy, security, brand, advertising, and price.

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APPENDIX

Table 5. Questionnaire items

Measures			Loadings	p-Value
Website Accessibility (Casaló, Flavián, & Guinalíu, 2011; Chen & Dibb, 2010; Chen & Barnes, 2007; Gefen, Karahanna, & Straub, 2003; Yoon, 2009)	WA1	The structure of this website is easy to understand.	0.89	0.00***
	WA2	Learning to operate this website is easy.	0.90	0.00***
	WA3	When I am navigating this website, I feel that I am in control of what I can do.	0.86	0.00***
	WA4	This website responds quickly.	0.93	0.00***
	WA5	This website helps me correct the errors I made.	0.87	0.00***
	WA6	My interaction with the website is understandable.	0.89	0.00***
Color (Chen & Dibb, 2010; Cyr, Head, & Larios 2010)	COL1	The colours used on the website are emotionally appealing.	0.73	0.00***
	COL2	The colour use on this website is attractive overall.	0.70	0.01*
	COL3	The brightness of pages on this website is adequate.	0.95	0.00***
Images (Chen & Dibb, 2010; Dianne Cyr, 2013; Kim & Forsythe, 2007)	IMG1	This website has eye-catching images on the home page.	0.87	0.00***
	IMG2	Zooming and 3D images are helpful in buying what I want through this website.	0.73	0.00**
	IMG3	Overall, the screen design (i.e. images, layout etc.) is attractive.	0.87	0.00**
Social Networking Services (Hasslinger, Hodzic, & Opazo, 2007; Huynh & Andrade, 2012; McKnight, Choudhury, & Kacmar, 2002)	SNS1	This website clearly shows how I can contact the company.	0.74 (Weight)	0.00***
	SNS2	I believe using social networks services (YouTube/Facebook/twitter/Google+) would help me in decision making to purchase online.	0.17 (Weight)	0.005*
	SNS3	I believe using the other support services (such as, FAQs, ranking, online help, and contact details) would help me to buy a product I really want.	0.52 (Weight)	0.00***
	SNS4	My friends or family tell me about the new products.	0.62 (Weight)	0.00**
Cognitive Innovativeness (Manning et al., 1995; Venkatraman & Price, 1990; Manning et al., 1995; Tellis et al., 2009)	CInn1	I am usually among the first to buy a new product.	0.88	0.00***
	CInn2	I am continually seeking new product experiences online.	0.93	0.00***
	CInn3	I usually find out the meaning of words I don't know.	0.92	0.00***
	CInn4	I am among the last in my circle of friends to buy a new product when it appears online.	0.74	0.01**
	CInn5	When I go shopping online, I find myself spending very little time checking out new products.	0.82	0.002**
	CInn6	Purchasing new products online takes too much time and effort.	0.92	0.005**

Table 5. Continued

Measures			Loadings	p-Value
New Purchase Intention (Tellis et al., 2009; Yoon, 2009)	NPINT1	I am likely to purchase the new product(s) from this retailer website.	0.87	0.00***
	NPINT2	I frequently look for new products online.	0.84	0.00***
	NPINT3	I am eager to buy new products as soon as they come out online.	0.88	0.00***
Uncertainty Avoidance (Hwang & Lee, 2012a; Srite & Karahanna, 2006; Yoon, 2009)	UA1	I prefer to avoid making changes during online shopping because things could get worse.	0.92	0.00***
	UA2	Rules and regulations of the online stores are important to me because they inform buyers what the online store does.	0.87	0.00***
	UA3	Standard operating procedures for an online store are helpful to me for the purchase decisions.	0.91	0.00***

*Significant at 0.05 level; ** Significant at 0.01 level; *** Significant at 0.001 level

Osama Sohaib is a lecturer at the University of Technology Sydney. His background is in software engineering and information systems. He received his PhD (Information system) from the University of Technology Sydney (UTS). His research interests include e-services, social media usage and impact, and decision-making.

Kyeong Kang is currently a lecturer at the University of Technology Sydney. She has professional experiences in Information Systems and multidisciplinary research projects. She is also actively involved in international research activities. Her research interests include culture and cognition in e-services design.

Iwona Miliszewska is currently the Head of School of Information, Systems and Modelling at the University of Technology Sydney. She has an extensive industry experience in Europe, Hong Kong, Malaysia, and Australia. She has served for four years as a Deputy President and President of the Australian Council of Deans of ICT (2012-2016) and was Director of the ACS ICT Educators Board, 2015-2016. Her research interests include the application of ICT in education, transnational computing education, and women in computing.