

## **A MODIFIED CONSUMER DECISION MAKING MODEL FOR ONLINE SHOPPING: A STRUCTURE EQUATION MODELLING APPROACH**

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### **Abstract**

*The conventional consumer decision making model (CDMM) claims a rich pedigree of academic development and has been guiding researchers and practitioners over the last forty years in understanding consumer decision making process. Although, sizeable theorizing and empirical research has focused on traditional consumer decision-making styles, little attention has been paid to online consumer decision-making styles. With increased proliferation of internet into consumer purchase domain and an onslaught of consumer online shopping, the sustainability of CDMM has become questionable. It has sparked renewed interest of researchers and hence there is a call to refine the CDMM to include measures that influence online shopping behaviour. This study has developed measures that are relevant for online shopping and also argues that the processes of information search and evaluation of alternatives are fused together in an online shopping environment. The study uses a dominantly quantitative approach and utilizes structural equation modelling to test the information technology measures that influence consumer decision making. As a result, this study proposes a modified model of consumer decision making for online shopping, which has key implications for researchers and practitioners.*

*Keywords: Consumer decision making, online shopping, information search, evaluation of alternatives, marketing strategies, payment channels, payment instruments*

## INTRODUCTION

The consumer decision making model (CDMM) also known as Nicosia Model was initially proposed by Francesco Nicosia (1976). The first criticism of the Nicosia CDMM is that it considers all customers and all purchase situations to be the same. According to Bray(2008) CDMM assumes that all customers go through all the stages of CDM to complete the purchase process. The CDMM shows that consumer purchase is a very complex process and involves five distinct stages which includes need recognition, information search, and evaluation of alternatives, purchase decision and post purchase behavior (Bhasin, 2010). The main strength of the CDMM is its ability to guide marketers to design marketing strategies for each of the stages of the consumer decision making process. It takes into account the fact that customers spend a lot of time in information search, evaluating from the different alternatives and then finally choosing the product that would satisfy their expectations.

However, in reality the CDMM is not applicable in all situations. In many situations customers would skip some stages and engage in impulse buying. At the same time consumer experiences and characteristics may not be the same (Glassock and Fee, 2015). Various researches have concluded that there are products for which the customer do not spend time on information search and choosing from various alternatives and hence do not go through all the stages of CDM process (Milner and Rosenstreich, 2013).

In situations of online shopping, the consumer search for information and evaluation of alternatives are different. Online shopping can satisfy multiple consumer needs more effectively and efficiently as consumers can not only easily compare product features, availability, and price, but also can browse the complete product portfolio with minimal effort, minimal inconvenience in a limited time (Chen and Leteney, 2000; Grewal, Iyer, and Levy, 2002). The depth of information and variety of choices made available online by marketers and comparative analysis platforms makes the process shorter and easier and hence it is suggested that these two processes are fused together in the context of online shopping. A number of factors can be found to be influencing online shopping process. These include technology and internet landscape, availability of payment channels and payment instruments. These factors are studied in detail in this study and the measures are included in the modified consumer decision making model of online shopping.

## LITERATURE REVIEW

There has been a gradual shift towards making the consumer decision making models, simpler with changes in the environment and consumer shopping patterns. Most of the models have the same theoretical perspective about consumption decision as a problem-solving task directed at

a consumption choice While different models of decision making exist in the literature, most are variations of the "grand models" (i.e. Nicosia, 1976; Engel et al., 1967; Howard and Sheth, 1969), make up the dominant framework for understanding consumer decision making. These cognitive models view individuals as "information processors" who obtain information from the environment and process, organise, and evaluate it in relation to a decision.

Past research has shown that the Internet represents a sufficiently different retail environment and a different atmosphere which can significantly influence the emotions and motivations of shoppers and thereby affect their buying behaviour (Menon & Kahn, 2002). In addition, many studies have argued that online shoppers and non-shoppers have different personal characteristics and that there is a significant difference between online shopping and offline shopping (Parsons, 2002; Vijayasathy, 2002; Card, Chen, and Cole, 2003, Kau, Tang, and Ghose, 2003).

Most of the models of consumers buyer behaviour are similar in its outcome, varies on the basis of consumers priorities and the intensity of need and wants of a particular product. According to Prasad and Jha (2014) and Oke et al. (2016) the buyer behaviour models discuss the actual outcome of a product purchase which is judged to be better than or equal to the expected, the buyer will feel satisfied and can plan for repeat purchase or become brand loyal. Bray (2008) sums up general criticisms of the model by noting it that it's mechanistic approach does not apply well to varied decision-making contexts. Further, he also notes that the environmental variables, particularly technology and its mechanisms in influencing consumer decision-making, have not been clearly specified (Bray, 2008). Proliferation of internet technology and online shopping has made information search easier and faster. Reviews are playing a major role in the consumer decision making model. They provide information about products and services and also helps to boost local search engine optimization (SEO) in the process. This also facilitates consumer's ability to evaluate between alternatives and take informed decision regarding their purchase decision. With the access of countless online reviews and commentary on social media networks consumers are now more informed, connected, and empowered than ever before (Ramirez, 2014). From the work of Wirtz and Mattila (2003) we know that when consumers have less objective knowledge relevant to a purchase decision, they tend to have a smaller evoked set because those with less knowledge of the product find it harder to distinguish between alternatives. Ready online services that provide evaluation services therefore provide both information and helps in evaluation leading to the proposition that the two distinct process of CDMM, which are information search and evaluation of alternatives are fused together.

## Measures of online shopping

Information and communication technologies (ICT) indicators are developed by United Nations Telecommunications union in order to develop benchmarks and compare ICT performance across societies (MIS Report, 2014). Used international Internet bandwidth refers to the average traffic load of international fibre-optic cables and radio links for carrying Internet traffic. This factor is very significant as it has considerable impact on online payment instruments. According to research, ICT use indicators include percentage of individuals using the Internet who used the Internet from any location and for any purpose, irrespective of the device and network. Such access can be via a computer, mobile phone, gaming console (networked), digital TV, etc. Access can be via a fixed or mobile network connected with World Wide Web (Battu, 2016).

ICT also considers Fixed-broadband subscriptions that refers to fixed subscriptions for high-speed access to the public Internet via cable modem, DSL, fibre-to-the-home/building, other fixed-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks (Pham, 2014). It includes fixed WiMAX and any other fixed wireless technologies, and both residential subscriptions and subscriptions for organizations. The last parameter includes active mobile-broadband subscriptions which refers to the sum of standard mobile-broadband subscriptions and dedicated mobile-broadband subscriptions (Ajjan et al. 2014). Standard mobile-broadband subscriptions refer to active mobile-cellular subscriptions with advertised data speeds that allow access to the greater Internet via HTTP and which have been used to set up an Internet data connection using Internet Protocol (IP). Standard SMS and MMS messaging do not count as active Internet data connection, even if messages are delivered via IP. International Internet bandwidth refers to the total used capacity of international Internet bandwidth, in megabits per second (Bauer and Latzer, 2016).

## Payment Channels and Payment Instruments

As e-commerce and business to consumer online shopping grows to new heights, e channels should be able to anticipate consume needs and provide customers with effective and efficient information search and information processing options (Anonymous 2009). However, the research on online channels and consumer decision making process is not well represented in the literature. Payment channels have also an impact on payment instruments. Payment instruments have witnessed innovations and has broadened the scope through the use of mobile/SMS payments and online banking (Hedman et al. 2017).

Figure1: ICT Index

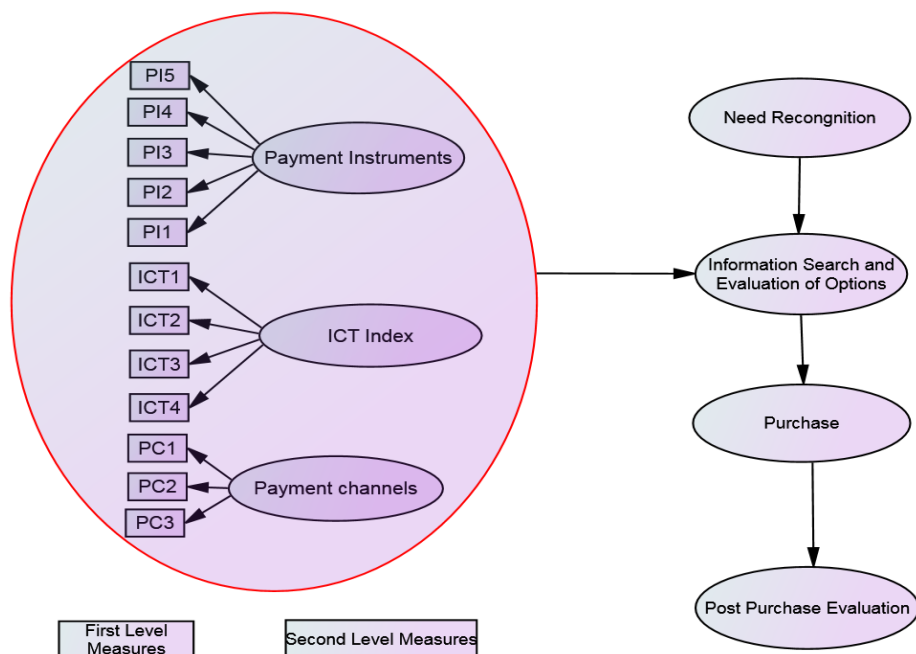


Source: <http://www.itu.int/en/ITUUD/Statistics/Documents/publications/misr2015/MISR2015-w5.pdf>

### Research Gap and Conceptual Framework

The review of literature showed that there are prominent gaps specifically the lack of consideration of information technology measures in relation to consumer decision making process. These information technology measures specifically relate to information search and information evaluation processes. Based on these research gaps, the following conceptual framework has been developed and related hypotheses were framed.

Figure 2: Conceptual framework



As per the recommendations of Diamantopoulos and Sigauw (2006) the hypothesized relationship between the measures have been clearly shown in the conceptual framework. There are five reflective measures of payments instruments, four reflective measures of ICD index and three reflective measures of payment channels. Further, the ICT index, payment channel (PC) and payment instruments (PI) are the formative measures of information search and evaluation of alternative processes, which have been hypothesized to be a single process for online shopping. According to these prepositions, the hypotheses have been framed.

## Hypotheses

*H1: Consumer decision making for online shopping is influenced by ICT Index, PC and PI particularly information search and evaluation of alternatives.*

*H2: Information Technology measures facilitate information search and evaluation of alternatives and hence is a single process in an online shopping environment.*

## METHODOLOGY

An epistemologically positivist and realist positioning is well suited for this research. Therefore, measurement, reliability and validity assumed importance and a quantitative research strategy was chosen (Bryman and Bell, 2015). When research involves and development and testing of models, structural modeling (SEM) approach is quite robust method to test the validity of exiting models or modified models (Gaskin, 2012). Hence SEM was employed to tests the validity of the proposed modified model. At the first level, the measures of the factors for online consumer shopping was tested as reflective measures. In other words, the objective was to test whether the measures are valid. Initially, exploratory factor analysis was conducted to test the validity of measures. To substantiate the findings further, a measurement model was developed using SEM. In order to test the causal effect of these factors on modified CDM model, a structural model was developed which included the reflective measures of the proposed factors at the first level and formative measures of the CDM at the second level. Although, a dominantly quantitative strategy was employed, a subjectivist ontology was also warranted at the initial stages of the research, since the measures for modified CDM model was largely exploratory in nature. Hence, the measures had to be qualitatively validated by experts, which included academics from the field and practitioners from the industry.

## Sampling

Sample for qualitative interviews were drawn from the Industry and higher education institutions in Oman and India. Since quantitative strategy was the dominant approach, a questionnaire

survey was conducted drawing from a sample of consumers engaged in online shopping. The sampling strategy was convenience, since only those consumers were chosen who shop online. Convenience sampling has been used in prior studies on online shopping by Ramayah et al. (2008). Another group of sample involved marketing professionals, who design marketing strategies for online companies. A total of 200 respondents participated in the study which were drawn from India and Oman.

### Measures

The measures of the traditional CDM model already exists in large part of the literature. However, the measures for the modified model was largely exploratory and is emerging, hence not much academic literature is available on these factors and their measures. Three main factors that have been identified for the modified CDM model are ICT index, Payment Instruments and Payment Channels.

### ANALYSIS AND RESULTS

Satisfactory levels of reliability with Cronbach Alpha scores  $>.7$  as recommended by Saunders (2010) was evident as shown in the table 1 below, indicating that the measures were internally consistent and reliable for further analysis.

Table 1: Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	N of Items
.788	11

In order to check the validity of measures, exploratory factor analysis involving Principal Components Analysis with Promax Rotation and Kaiser Normalization was used as suggested by Kline (2011). The KMO scores shown in table 2 below was quite good ( $>.70$ ) and showed that the data is fit enough to conduct factor analysis and structural equation modelling tests.

Table 2: KMO Scores

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.783
Bartlett's Test of Sphericity	Approx. Chi-Square	981.947
	Df	66
	Sig.	.000



The screen plot also showed that the three factor structure was appropriate. Further, the pattern matrix showed that the measures loaded onto their respective factors with satisfactory values (>.40) recommended by Tabachnik and Fidel (2007).

Figure 3: Screen Plot showing 3 valid factors

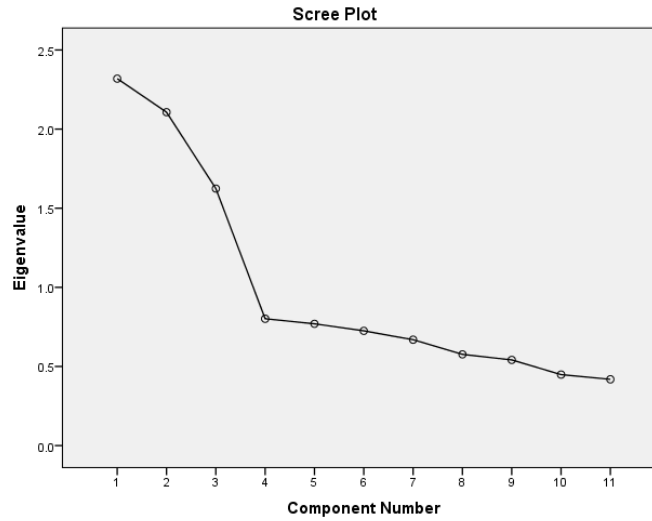


Table 3: Pattern Matrix

Pattern Matrix <sup>a</sup>			
	Component		
	1	2	3
ICT1	.733		
ICT2	.810		
ICT3	.732		
ICT4	.899		
PI1		.730	
PI2		.820	
PI3		.748	
PI4		.892	
PC1			.754
PC2			.861
PC3			.892

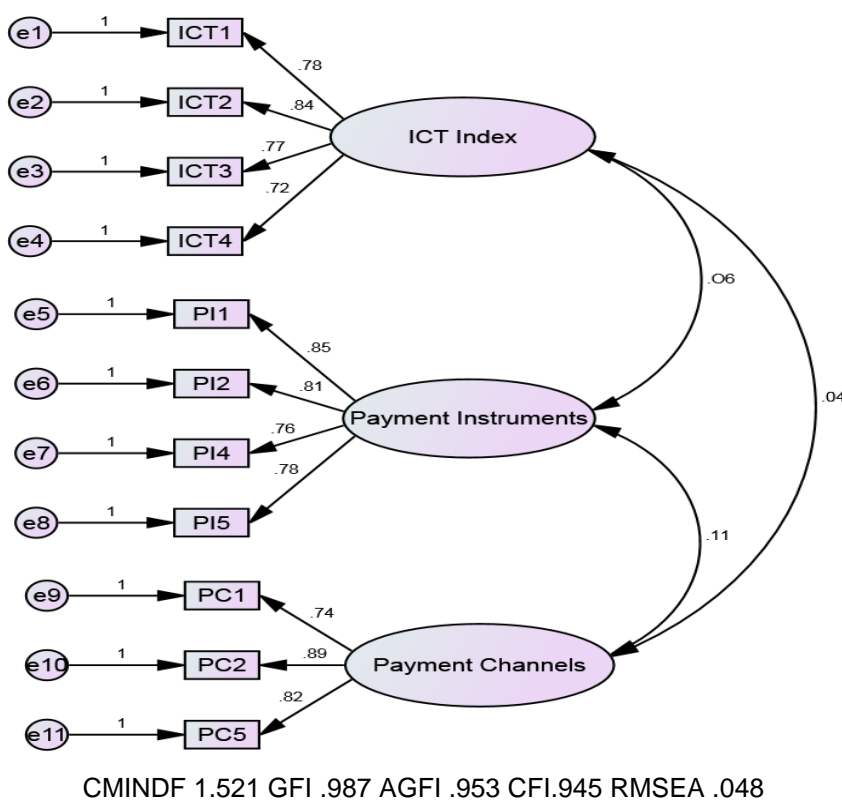
Extraction Method: Principal Component Analysis.  
 Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 4 iterations.



Further, structure equational modeling approach was used (AMOS version 22). Gaskin (2012) pointed out that modelling interactions, non-linearity, correlated independents, correlated errors and error terms are all accounted for in SEM analysis and hence provides a more advanced and robust analysis of data, particularly for testing of models. In order to confirm the factorial structure of the three technology factors, a measurement model was estimated using maximum likelihood method (ML). By following ML method, both S (the sample variance-covariance matrix) and  $\Sigma(\theta^*)$  (the sample estimated, model implied v-c), which are sample estimates of  $\Sigma$  (the population variance-covariance matrix), were treated differently. While S was unrestricted,  $\Sigma(\theta^*)$  was constrained by the specified SEM model. In this way, ML searched for the set of parameter estimates that maximizes the probability that S was drawn from  $\Sigma(\theta)$  (the population, model implied v-c matrix), assuming that is the best estimate of  $\Sigma(\theta^*)$  (Stevens, 2009) The measurement model and model fit indices are shown figure 4 below.

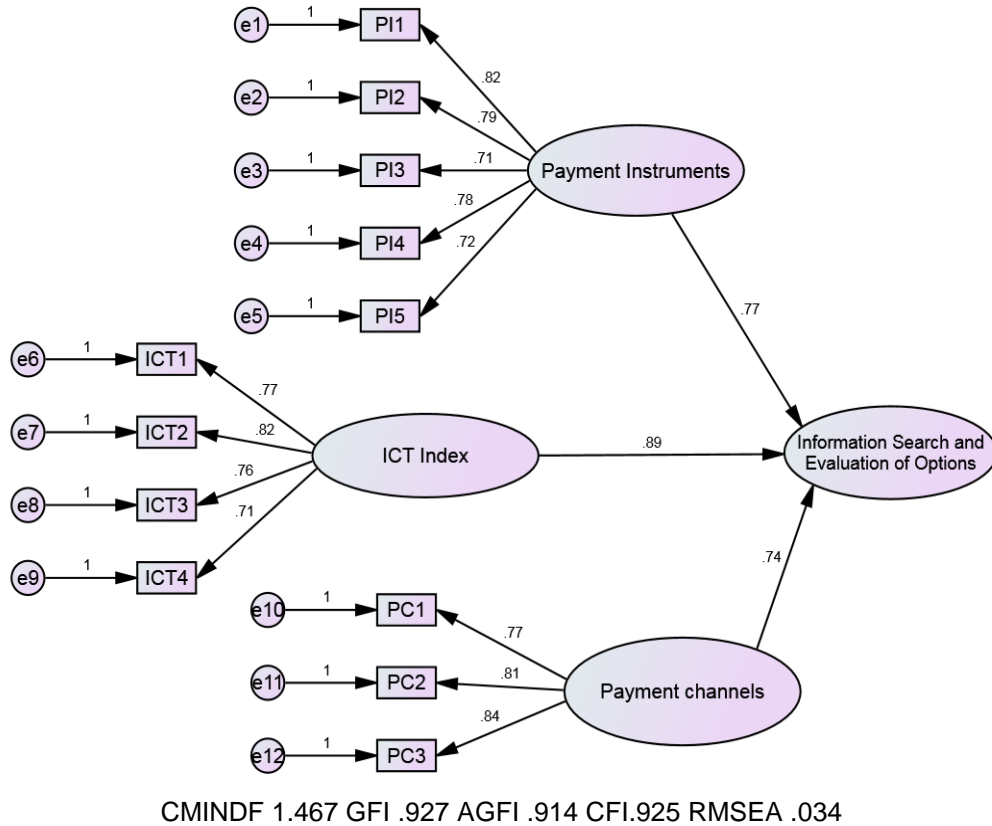
Figure 4: Measurement Model for Measures of Online Shopping



The results of the measurement model shows that measures loaded on to their respective factors with high coefficient values (>.60) which is indicative of convergent validity. Similarly discriminant validity was also indicated through the low covariance scores between the factors.

The fit indices were as per the recommended standards indicating good model fit as suggested by Tabachnick and Fidell (2007). The complete SEM model is shown in figure 5 below.

Figure 5: Complete SEM Model showing the modified model of CDM for online shopping



The complete SEM model showed that three information technology measures namely ICT index, PC and PI are formative measures and have a causal effect on information search and information evaluation process. The coefficient values of .77 for payment instruments, .89 for ICT index and .74 for payment channels led the researchers to accept H1 that consumer decision making for online shopping in influenced by ICT Index, PC and PI particularly information search and evaluation of alternatives. It also led to the acceptance of H2 that Information Technology measure facilitate information search and evaluation of alternatives and hence is a single process in relation to online shopping.

## DISCUSSION

The CDMM is a robust model that has guided researchers, academicians and practitioners to not only to understand consumer decision making process, but also design marketing strategies and influence consumer decision making. However, with disruptive technology and increased

interaction of customers with the internet and whole new generation of online shopper emerging in developing countries, the traditional CDM model is not sustainable. It needs refinement particularly in relation to information technology measures. Therefore, efforts to modify the model by researchers in an appropriate research endeavor. Many studies had highlighted the barriers of online shopping and highlighted the frustrations and hesitation of shoppers when they shop online (Karimi et al. 2015; Kohli et al. 2004). When consumers browse the online store, more for information, than for buying online, is due to the barriers such as purchase failures, security fears, service frustrations (Cho, Kang, and Cheon, 2006). These barriers can be attributed to unavailability of robust information technology infrastructure. The measure identified and develop in this study, reduces such negative outcomes and by increasing the robustness of the measures improves favourable and informed consumer decision making. Robust index secure payment channels and modern payment methods has advantages regarding the amount of product information, ease of use, speed and convenience. It also reduces the sensitive to issues of privacy and security when factors are favourable (Thom, 2000). Within given model ICT development index (IDI), directly affects information search in the consumer purchase behaviours. Considering faster lifestyle, the consumer search for information depends on the enhancement of mobile computing. While on the move – this phase of consumer decision making called 'Information Search' – is affected directly with respect to channels. One of the important association that can be observed within ICT use is evaluation of alternatives. Here the user choice depends on the type of computing system it has been using. At the same time, the payment instruments affect the ICT skills to be able to leverage the Information Communication Technology. Payment channels support the process of buying behaviour based on the IDI index. Lower IDI index will not allow adequate level of proliferation of online shopping in various strata of the society. It will certainly influence information search and marketing managers cannot design marketing strategies for online shoppers in the absence of satisfactorily levels of IDI index. Similarly, payment channels and payment instruments are key measures that will influence consumer decision making, particularly the process of consumer evaluation of alternatives. The findings of this study is in line with the findings of Frambach et al. (2007) that various aspects of online interaction enhances consumer shopping experience and hence has a bearing on consumer decision making. The online payment market has altered the value chain and has brought a radical shift in consumer preferences to make payments in favor of transparency, flexibility and ultimately influences the purchase decision. Prior to that, it affects information search and evaluation (Zhang et al. 2014). If secure and flexible options are not available, consumer may not move to the next stage of consumer decision making process and may abandon or defer the purchase decision. Therefore, all the

three factors namely availability of online infrastructure (IDI), payment channels and payments instruments are important for online shopping process and hence included in the modified CDM model in this study.

## CONCLUSION

The findings of this study has implications for academics, managers and researchers. Traditional CDMM is appropriate for offline shopping environments, but needed refinement in light of changes in technology landscape and consumers involvement with technology. The contributions of this study can be realized at two levels. Firstly, at the theoretical level, the modified CDMM has been refined to include information technology measures for online shopping, which is appropriate considering the changes in the technology landscape. Secondly, the study can guide marketing and brand managers in designing branding and advertising strategies for online shoppers. The findings have specific implications for marketing communications, as information search and evaluation is closely associated with how information is transmitted and processed. In an online shopping environment, it is not just about quantity or frequency of information that reaches the consumers, but it is also about the quality of information, since consumers are also evaluating the information at the same time. Marketing communications have to evolve to include information that is not just informative but facilitates evaluation. Information technology platforms provide the opportunity to make the communication more effective through real time interaction and feedback. Further, in an online shopping environment brand managers should focus on creating brand preference, rather than brand recognition. The modified CDMM provides the opportunity to brand managers to create brand recognition and brand identify at the same time. Positive brand evaluation will then lead to brand preference. The factors and measures developed and validated through this study will ultimately effect consumer purchase decision making and marketing managers must leverage the growth in technology to develop effective marketing strategies.

This study was however limited by a select sample in only two developing countries where the IDI index and payment channels and payment instruments are just emerging. The study has not included sample from developed nations where high IDI index is reported to be high or rural areas where the IDI index is usually low. The findings, therefore cannot be generalized to developed or rural markets where a large part of growth for online shopping resides. The study therefore, could be replicated in these economies to test the generalizability and transferability of the measures. Further, the behavioural measures of online shopping was not included in the refined CDMM, since it was beyond the scope of the study. Future research can include these measures to the model and a more comprehensive model for online shopping

can be developed. Finally, technology measures would keep evolving and hence the model of online shopping will see a further transformation with time. This study has contributed by not only including information technology measures into a consumer behavioural model, but also by increasing the awareness for future research do so.

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## APPENDIX 1: Measures used in Research Instrument

Labels	Description
ICT1	Fixed and Wireless broadband subscriptions
ICT2	Mobile-cellular telephone subscriptions
ICT3	Skills and digital literacy
ICT4	Percentage of households with a computer

PI1	Credit card to enable the cardholder to pay a merchant for goods and services.
PI2	Internet banking (also known as Net-banking /Online banking) is used to process the payment using bank gateway in real time.
PI3	Digital wallet helps people pay for stuff, but it will also store tickets, bus and passes and gift cards.
PI4	Debit card is another banking instrument that can be used around the globe and is accepted worldwide, including millions of retailers, ATMs, online or over the phone.
PI5	Prepaid Cards will help you pay for stuff, but it will also store concert tickets, bus and subway passes and gift cards.
PC1	Desktop/ Laptops uses special plugins to retain the credit/debit card information to be able to make online payments when required.
PC2	Smartphones (with USSD banking) / PDA (Personal Digital Assistants) Customized mobile applications (Such as Paypal) and QR codes based payment mechanism can be used to make payment
PC3	Smartwatches make use of embedded Near Field Communication Chips to make the payment