

## **Investigating the Role of Process Virtualization on Consumers' Online Advertising-to-Purchase Journey in Somalia**

Ismail Mohamed Ali<sup>1</sup>, Nadia Kamal<sup>2</sup>, Ayub Mohamud Hussein<sup>2</sup>

<sup>1</sup>Faculty of Computing, Simad University

<sup>2</sup>Faculty of Management Science, Simad University

*Ismail15@simad.eud.so, Wroood577@gmail.com, ayuubmx@simad.edu.so*

**Abstract.** This study investigates the advertising-to-purchase (ATP) process through the lens of process virtualization theory (PVT) to understand how requirements for virtualization shape perceptions of credibility and purchase intentions. An online survey was administered to 150 consumers with ATP experience in Somalia. The results reveal that informativeness and identification/control requirements positively influence credibility, while sensory and relationship requirements show no significant effects. Furthermore, customer satisfaction emerged as a key driver of purchase intention, while credibility had insignificant impact. The findings imply that providing useful information and assurances around security are more critical for establishing credibility than replicating sensory experiences. Additionally, fostering customer satisfaction appears vital for driving virtual purchases. This research pioneers PVT application in examining online ATP processes and Shopping behavior in developing countries. It provides practical insights for businesses on leveraging virtualization, enhancing credibility and satisfaction to increase online purchases.

**Keywords:** Online advertising, credibility, online purchase intention, process virtualization theory, conversion

## **1. Introduction**

In recent years, customer engagement has gained prominence in scholarly and professional discourse (Ángeles Oviedo-García et al., 2014; Hollebeek et al., 2019; Kumar et al., 2019; Rossmann et al., 2016). The spread of social media platforms has facilitated a more rigorous and nuanced academic and professional discourse on social media engagement, elucidating its theoretical underpinnings and developing more robust measurement methods (Trunfio & Rossi, 2021). These platforms evolved from a niche technology to a ubiquitous tool that is now an integral part of everyday life for billions of consumers worldwide (J. Kim et al., 2021), and transformed how we interact, communicate and engage, and widened the scope of coverage and influence of individuals and businesses at large (Arora et al., 2019). Costs decreased, and unprecedented opportunities were made available, be it the easy-to-access-and-use platforms that allowed customers to freely and flexibly express their thoughts on products and brands using comments, shares, or likes (Buzeta et al., 2020; Hennessy, 2018), representing an indispensable source of information and contents and means of promotional activities (Jiménez-Castillo & Sánchez-Fernández, 2019), and providing organizations with unique opportunities of improved brand awareness and increased sales (Dwivedi et al., 2021). These examples suggest marketers should find new ways to reach customers online, especially on social media platforms, as customer engagement becomes increasingly inevitable (Lim & Rasul, 2022).

Social media ads are a form of interactive internet advertising that can lead to different customer perceptions and experiences due to customers' ability to create content with the ads in terms of liking, re-sharing, commenting, posting, and learning (Alalwan, 2018; Laroche et al., 2013; Tuten & Solomon, 2017). Similar content is generated through prior search and user browsing behavior (Schumann et al., 2014). Such consumer-generated content attracts other consumers to online brands and products (Campbell et al., 2011). For instance, online ads, product reviews, price comparisons, and promotions entice online purchasers to perform impulse buying and hyperlinks direct buyers to online shops (Akram et al., 2021). Consumers' perceptions of online ads can vary widely, from positive emotions like humor and truth to negative emotions like mockery and offensiveness, even though these parodies have the most minor effect on consumers' brand perceptions (Knoll, 2016).

Online purchase intention measures how likely a consumer is to purchase a product online. It is a dichotomous variable, meaning that the Consumer can purchase the product or not (Dewi et al., 2019; Lee & Lee, 2015). For example, limited purchase intention was one of the challenges of e-commerce development (He et al., 2008). Therefore, researchers admit the necessity of discovering more about online purchase intention and purchase behavior (He et al., 2008). The increased importance of perceived relevance in driving consumers' purchase intention aligns with the findings obtained by Alalwan (2018). Alalwan's work elucidates that consumers buy the products promoted by social media ads as long as they feel that those ads are relevant to their personal preferences and interests. According to Zhu & Chang (2016), a key innovation of social media platforms is their ability to facilitate the creation of personalized marketing campaigns based on granular customer data (lifestyle, characteristics, needs, and interests). Customers, in their turn, from a family business perspective, are influenced by firms' characteristics, like product and service quality, corporate social responsibility, and emotional appeal. These characteristics determine consumers' purchase intention (Bargoni et al., 2023).

According to the existing literature on online advertising, the success of Online purchasing depends on consumers' willingness to buy (de Haan et al., 2016). The value earned from online advertisement, be it hedonic or utilitarian value, positively correlates with customers' purchase intention (W. Zhang et al., 2023), and their motives to leave a shopping website are more activity-based than for recreational purposes (Patharia & Jain, 2023). Managers must know that effective advertising depends on several factors, including online users' characteristics and online activities (Zanjani et al., 2016). Customers' perceived behavioral control over the online purchase process significantly impacts their purchase decisions (Patharia & Jain, 2023). The intermediary conversion model, which links visits to

purchases, determines customer decisions (Moe & Fader, 2004). The path-to-purchase sequence suggests that consumers undergo a series of stages before purchasing (Srinivasan et al., 2016).

This may indicate the need for virtualization in this conversion process. In addition, an investigation has yet to be made on how this process is amenable in the post-conflict community like Somalia, except for a handful of subject-specific topics, like mobile money payment (Elmi & Ngwenyama, 2019; Mohamed, 2023), and electronic banking (Yousuf & Shanyu, 2021). The idea could be examined via process virtualization theory (PVT) (E. Overby, 2012). According to Overby (2012), the characteristics of online process are sensory requirements, relationship requirements, synchronism requirements, and identification and control requirements. The objective of this study is to investigate how process virtualization effects the credibility of ATP. In the light of that, the study answers the following questions:

- Do online consumers perceive online advertising as credible enough to embark on purchasing?
- How do the characteristics of the ATP influence the perceived credibility of online advertising?
- What is the role of customer satisfaction in influencing purchase intention?

The present study on online advertising and purchasing is timely and relevant, as customers have had sufficient experience to form strong opinions on whether to continue engaging. It also coincides with increased interest in online advertising in Somalia (Hassan & Hassan, 2022) amid concerns about customer trust and payment choices (Yasin & Bin Ahmad, 2022) in the conversion process. Such concerns are evident in the research findings pertaining to online payment in the East African region (Singh & Sahu, 2022). The study applies PVT concepts to the online advertising-to-purchase (ATP) process in a post-conflict community, and it is the first known study. Online businesses often come and disappear without clear reasons, with entrepreneurs deceived by flashy social media ads into opening online shops that inevitably fail. This setback can be devastating, as capital and energy are lost. Entrepreneurs often blame their lack of experience and high running costs, but little is known about the process characteristics that substantially impact online purchase success. Our work addresses this gap by applying PVT variables plus informativeness, credibility, and customer satisfaction as an additional contribution. Existing studies on PVT are compiled from the SCOPUS database and presented in **Appendix A**.

## **2. Literature Review**

### **2.1. Theoretical framework**

The PVT is a new theory in IS research, which primarily focuses on the extent to which a process that takes place in the real world can be replicated in a virtual process. PVT, presented in Figure 1, involves going from a physical process as the interaction between people, or people and physical objects, to a virtual process, in which face-to-face interactions between people are eliminated (E. Overby, 2012; Tomás et al., 2018). It is important to note that virtual processes involve physical interactions through devices, unlike physical processes that have direct physical interactions between humans (E. Overby, 2012). According to (E. Overby, 2012), the applicability of PVT extends across various fields, from business and medicine to education and political science. The virtualizability of processes is driven by four requirements: sensory requirement, relationship requirements, synchronism relationship, identification, and control requirements (Alarabiat, Hujran, Soares, et al., 2023).

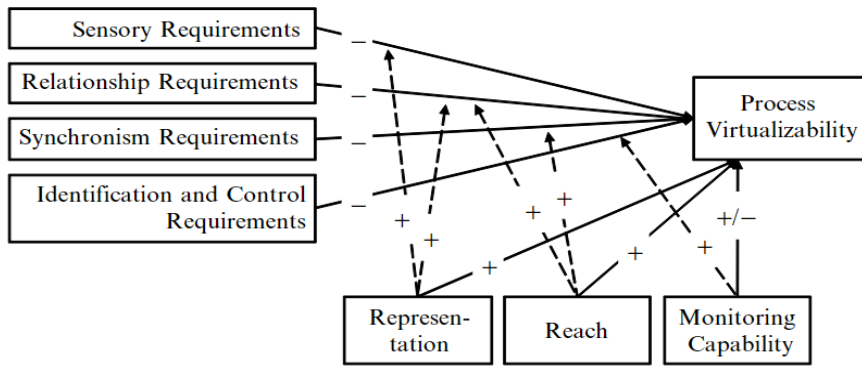


Fig.1. Process virtualization theory

Figure 2 shows the research model that shows the main characteristics of the PVT advertising-to-purchase process (ATP), with four additional variables: informativeness, customer satisfaction, credibility, and purchase intention. The model presents the dependent and independent variables, illustrating their relationships. The operational definitions of these variables and their acronyms are presented in Table 2.

PVT applies to different disciplines, and the advertising process is no exception. It works best for some processes, such as different educational and shopping processes, some more suitable for virtualization than others (E. Overby, 2008). Online purchasers value the prior information, like orientation and experience, they have before making an intention to purchase online (Thamizhvanan & Xavier, 2013), and targeted online advertisement definitely informs customers' purchase decision. Attracting attention is used to encourage people to buy a product or, more broadly, to establish a brand image (Rejón-Guardia & Martínez-López, 2014). Online advertising also strongly influences customer satisfaction with online purchase (Nwokah & Ngirika, 2018).

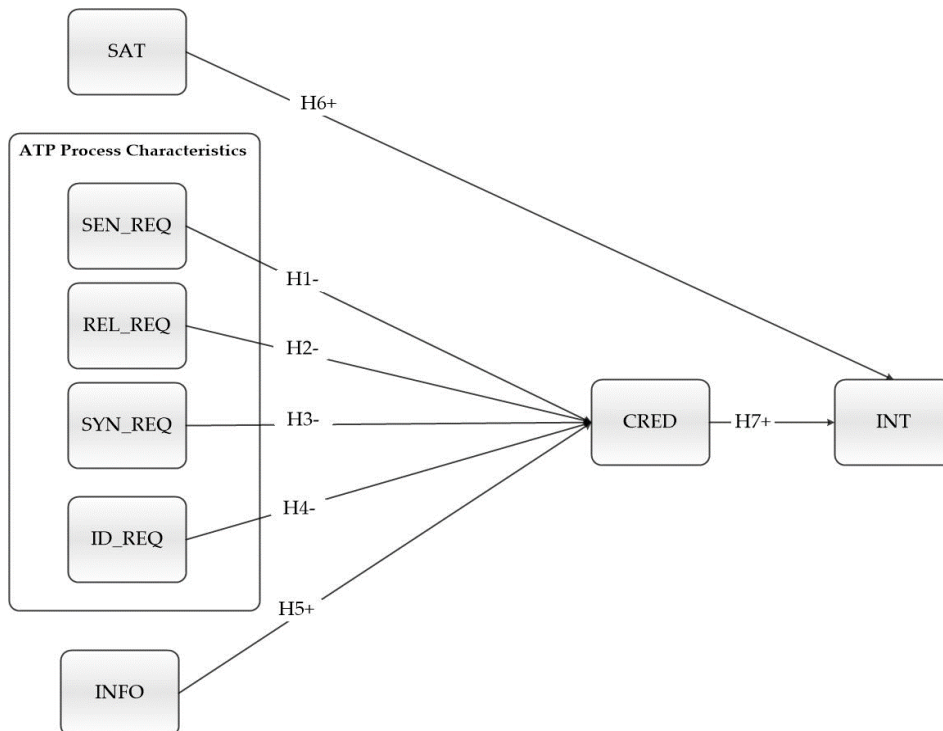


Fig.2: The research Model

Table 1. Operational Definition of Variables

Variable	Operational definition	Adapted from
Sensory Requirements (SEN_REQ)	Customers' participation in a process should engage all their senses in the interaction with people and objects	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
Relationship Requirements (REL_REQ)	The necessary interactions among process participants within social or professional settings.	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
Synchronism Requirements (SYN_REQ)	Process steps must be executed quickly and efficiently to minimize delays.	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
Identification and Control Requirements (ID_REQ)	Customers should be able to identify the process owner or manager and have control over their actions.	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
Informativeness (INFO)	The Source, relevance, timeliness, ease of use, and information of the items of products and services advertised on the Website.	(Wang & Sun, 2010a)
Credibility (CRED)	The sincerity, plausibility, and reliability of the presented content of promotion as recognized by customers.	(Bueno & Gallego, 2021; Liu et al., 2012)
Customer Satisfaction (SAT)	Customer satisfaction derives from the profound joy and fulfillment experienced when a product or service seamlessly aligns with their wants and expectations.	(Fang et al., 2011, 2014)
Purchase Intention (INT)	The likelihood that a consumer will make a future purchase of a particular brand, regardless of whether or not they intend to do so.	(Tien et al., 2019; Yen, 2014)

## 2.2. Hypothesis development

A need for full sensory engagement ensures that participants actively interact with the process through sight, sound, touch, and more, deeply connecting with the environment and all its elements (E. Overby, 2012). Virtual processes can mimic the sensory feelings that come with physical processes, but they may not be able to capture them fully. Research has shown that sounds, touch, and smells can influence consumers' decisions and attitudes (Krishna et al., 2016). Similarly, feeling a virtual presence, or sense of being there increases the consumers' attitude products (Kinzinger et al., 2022). Online ads can capture consumers' attention more effectively through visual appeal, audio, and interactivity. Sensory attributes include sensory factors that represent key characteristics that customers can differentiate between brands in influential marketing (Ahn et al., 2020). Sensory advertising experience positively influences a customer's behavioral response (B. Li et al., 2023). In experimental marketing settings, the study proposes a couple of variables serving as antecedents of credibility: relational advertising, sensory advertising, and behavioral advertising (Rajaobelina et al., 2019). Their findings indicate that sensory marketing exerts a positive influence on advertising credibility. Therefore, this study posits the following hypothesis:

**H1.** The higher the customers' SEN\_REQ for ATP process is, the more negative the impact on their credibility with online advertising will be

Relationship requirements refer to the necessary interactions among process participants within social or professional settings (E. Overby, 2012). Virtual environments' ability to mimic face-to-face interactions through diverse communication channels empowers users to engage in rich, interactive experiences that transcend traditional communication limitations (Thomas et al., 2016). Building

enduring customer relationships through long-term interactions yields greater rewards in relationship marketing than focusing on isolated, short-term transactions (Zinkhan, 2002). Indeed, relational advertisements, a crucial aspect of experiential advertising, significantly impact advertising credibility (Rajaobelina et al., 2019). This explanation is also closely linked with social exchange theory, which underscores reward and cost elements for establishing a sustained relationship (Cook et al., 2013; Stafford & Kuiper, 2021). Self-interested motives drive this relationship, as individuals assess the potential benefits of interacting with others before engaging (Yin, 2018). Nevertheless, interaction often leads to knowledge acquisition, friendship development, and trust (E. Overby, 2008). A firm's credibility could be critical when the only interaction is with the organization by name (Schoenbachler & Gordon, 2002), as it only involves direct interactions with the organization rather than relying on a salesperson. This suggests that processes with high relationship requirements must be better suited to virtual environments (E. Overby, 2012). Accordingly, the following hypothesis is proposed:

**H2.** The higher the customers' REL\_REQ for ATP process is, the more negative the impact on their credibility with online advertising will be

Synchronism requirements are the temporal constraints that govern executing actions within a process, ensuring they occur quickly with a minimum delay (E. Overby, 2012; Thomas et al., 2016). It is often an inherent feature of physical processes because participants and objects are all in the same place (E. Overby, 2008). Synchronism requirements are crucial for achieving efficient and effective process execution, particularly in complex systems where multiple actions must be coordinated. Synchronization between payment and delivery can instill significant trust in online transactions (F. Li et al., 2012), because of the lack of familiarity and uncertainty that govern such transactions. The unbridged space between customer expectations and company operations, for sure, breeds inefficiencies and missed opportunities, a problem that synchronization effectively addresses (Choi & Rifon, 2002). This time gap between advertising and purchasing can create a trust gap for customers. If they're bombarded with persuasive advertising but then encounter delays or hurdles when trying to make a purchase, they may start to question the credibility of the advertised claims. On the basis of this, the following hypothesis is proposed:

**H3.** The higher the customers' SYN\_REQ for ATP process is, the more negative the impact on their credibility with online advertising will be

The identification and control requirements of a process are determined by the degree to which the participants need clear identification and the ability to exert control over their behavior (E. Overby, 2008; E. M. Overby & Konsynski, 2010). "Identification and control requirements are seen to have a negative relation to process virtualizability" (Ofoeda et al., 2018). Concerns about identification and control have impeded the virtualization of various processes, raising the risk of spoofing (Alarabiat, Hujran, Soares, et al., 2023; E. Overby, 2012). These concerns are intricately linked to credibility, which hinges on the believability and trustworthiness of information (Clewley et al., 2009). In line with this notion, privacy concerns have been identified as a significant factor influencing credibility (Ho Nguyen et al., 2022). Establishing a balance in the identification and control requirements is crucial as it plays a pivotal role in fostering trust and confidence throughout the advertising-to-purchasing journey. Accordingly, it is hypothesized that:

**H4.** The higher the customers' ID\_REQ for ATP process is, the more negative the impact on their credibility with online advertising will be

Informativeness refers to the ability of an advertisement to provide consumers with information about different product and service alternatives so that they can make the best purchase decision for

their needs (Chetioui et al., 2021; Gaber et al., 2019). Advertisements can inform consumers about relevant product options and increase purchase satisfaction (Ducoffe, 1996). Indeed, the most essential value of advertising is its ability to inform consumers about products (Gangadharbatla & Daugherty, 2013) promptly [68]. Ducoffe (1996) suggested that informativeness characteristics include Source, relevancy, timing, ease of use, and completeness. These characteristics foster consumer trust. For instance, informativeness value has a significant influence on trust in the advertised content of influencer marketing (Lou & Yuan, 2019). Hanaysha (2022) also found that informativeness strongly impacts brand trust and purchase decisions. In fact, advertising message reflects the credibility of information (Luo et al., 2013). Similarly, consumers' attitudes towards social media advertising are influenced by the credibility of the product reviews they read (Chen et al., 2023). It is also common sense that informative advertisements are more likely to be perceived as credible because they provide consumers with the information they need to evaluate the product or service objectively. Advertising credibility is crucial to consumer persuasion, but its antecedents still need to be studied, with most recent research focusing on message presenters or celebrity endorsers (Rajaobelina et al., 2019). This elaboration brings us to the following hypothesis:

**H5.** The more informed the customers with ATP process, the more credible the online advertising will be

Advertisement credibility is how much consumers believe the claims made about a brand in an advertisement (Gaber et al., 2019). It is vital to increasing purchase intention (Chen et al., 2023). Elsewhere, a study indicates that credibility positively impacts advertising value in online settings (Chetioui et al., 2021). Findings also revealed that advertiser credibility significantly impacted consumer responses to banner ads (S. Kim & Choi, 2012). Consumers find mobile advertising (via Facebook, Instagram, YouTube, and SMS) more valuable when it is credible. However, their perceptions of credibility vary; for example, Japanese consumers are more irritated by mobile ads than Australian consumers (Liu et al., 2012). Similarly, research emphasizes the importance of considering consumers' cultural differences (Chetioui et al., 2021), especially between individualism and collectivism (Banerjee & Chai, 2019). In Africa, a predominantly collectivist society, where humanistic values are prioritized over individualistic values (Murove, 2020), credibility could be subject to one's social standing assessment. The variability in research findings, encompassing both negative impacts (Choi & Rifon, 2002) and positive influences (Ho Nguyen et al., 2022; Tien et al., 2019), underscores the need for further investigation into this area. This is particularly relevant in the context of social media advertising in Somalia, a nascent market with promising potential (Warsame et al., 2021). On the basis of the above discussion, the study posits the following hypothesis:

**H6.** The more credible the ATP process is, the more intention there is to purchase online.

Research shows that satisfaction with an online platform like e-commerce dramatically influences the customer's intention to purchase (Bueno & Gallego, 2021). Customer satisfaction is a critical factor in customer loyalty (Pham & Ahammad, 2017), and it is a crucial factor that influences the customer's purchasing behavior (Armstrong et al., 2014). Customer satisfaction is the result of customer experiences during the purchase process, and it significantly impacts customer behavior in the future (Kotler & Keller, 2006), such as online repurchase and loyalty (Pereira et al., 2016). Customer satisfaction is a positive reaction to a particular purchase, and understanding its causes and effects is a crucial goal in consumer marketing (Oriangi et al., 2020). A significant correlation exists between customer satisfaction with e-commerce websites and intention to purchase from them (Chu & Zhang, 2016; C.-L. Hsu et al., 2012); this is even though customer satisfaction with online shopping is not static but rather changes over time depending on factors like design and ease of use (Ha, 2012). Nevertheless, customer satisfaction governs where the customer will frequently buy from the shop in the future (Fang et al., 2011; García-Salirrosas et al., 2022). The elaboration illustrated above illustrates

that customer satisfaction strongly influences online purchase intention, which is an enduring willingness of customers to buy from an online shop (García-Salirrosas et al., 2022). Building upon the preceding discussion, the study formulates the following hypothesis:

**H7.** The higher the customers are, the more positive their intention to purchase online will be

### 3. Methodology

The study used a purposive sampling approach, a form of non-probability sampling, to decide on the respondents. Researchers employing purposive sampling intentionally select participants who meet specific criteria for inclusion and exclusion in the study (Daniel, 2011). Data was distributed through an online questionnaire, and follow-up messages were sent to respondents as a gentle reminder to complete the survey. Consequently, 156 responded to the questionnaire. After accurate checking, 150 responses were selected for analysis, and 6 were removed for not satisfying inclusion criteria. The study considered G\*Power version 3.1.9.7 to examine the adequacy of the sample size. Accordingly, 150 samples meet the criteria proposed by (Cohen, 1992) for effect size ( $f^2$ ) = 0.50 with significance level ( $\alpha$ ) = 0.05 and power = 0.8. To test the research model, a questionnaire was developed based on the existing literature and modifications were made according to the study's objectives. The questionnaire commenced with a section gathering respondents' demographics, including age, gender, marital status, education level, and experience. The subsequent section delved into participants' perceptions based on the research constructs. Data was gathered from consumers with prior online purchasing experience from small businesses and startups in Mogadishu. Table 2 shows the respondent's demographics.

The constructs involved in this study are sensory requirements, relationship requirements, synchronism requirements, identification and control requirements, informativeness, credibility, customer satisfaction, and purchase intention. The constructs and their items are shown in **Appendix B**. The first four constructed are based on process virtualization theory (PVT), and sourced from (Ofoeda et al., 2018; E. Overby, 2008, 2012). Informativeness was adapted from (Mustafi & Hosain, 2020; Wang & Sun, 2010a), with timeliness, relevancy, completeness, and convenience features. Informativeness and its features also originate from Ducoffe's advertising value model (Ducoffe, 1996). Credibility, along with its measures of convincing, believable, credible, and trustworthy, was drawn from (Liu et al., 2012; Mustafi & Hosain, 2020; Wang & Sun, 2010b). Purchase intention were assessed using three items which were sourced from (Hong & Cho, 2011; Tien et al., 2019; Yen, 2014). Customer satisfaction was adapted from (Fang et al., 2011, 2014; Nisar & Prabhakar, 2017) comprised of 3 items.

Table 2. Respondents' Characteristics

Characteristics		Number of Respondents (n=150)	Percentage (%)
GENDER	Male	91	61
	Female	59	39
AGE	18 – 30	127	85
	31 – 43	21	14
	44 – 55	1	1
	Above 55	1	1
	Divorced	1	1
Marital status	Marriage	35	23
	Single	114	76
	Bachelor	110	73
Educational level	Diploma	8	5
	Master	27	18
	PHD	1	1



Experience level	Secondary	4	3
	1 – 2 years	45	30
	3 – 5 years	30	20
	6 years & more	14	9
	Less than one year	61	41
Job title	Consumer / User	35	23
	Employee	70	47
	Freelancer	45	30

## 4. Data Analysis and Results

Partial least squares structural equation modeling (PLS-SEM) is widely used in various areas of social science (Hair et al., 2019). For the present study, the measurement and structural models were developed accordingly using SmartPLS 4.0.

### 4.1. Measurement Model

The adequacy of the measurement model, portrayed in Figure 4, was evaluated based on convergent validity, reliability testing, and discriminant validity (Hair Jr et al., 2021). The criterion is depicted in Figure 3. Convergent validity is typically assessed by examining each construct's average variance extracted (AVE). To ensure convergent validity, the AVE for each construct should be greater than or equal to 0.5 (Fornell & Larcker, 1981; Hair et al., 2019). Reliability was conducted based on composite reliability (M.-H. Hsu et al., 2015).

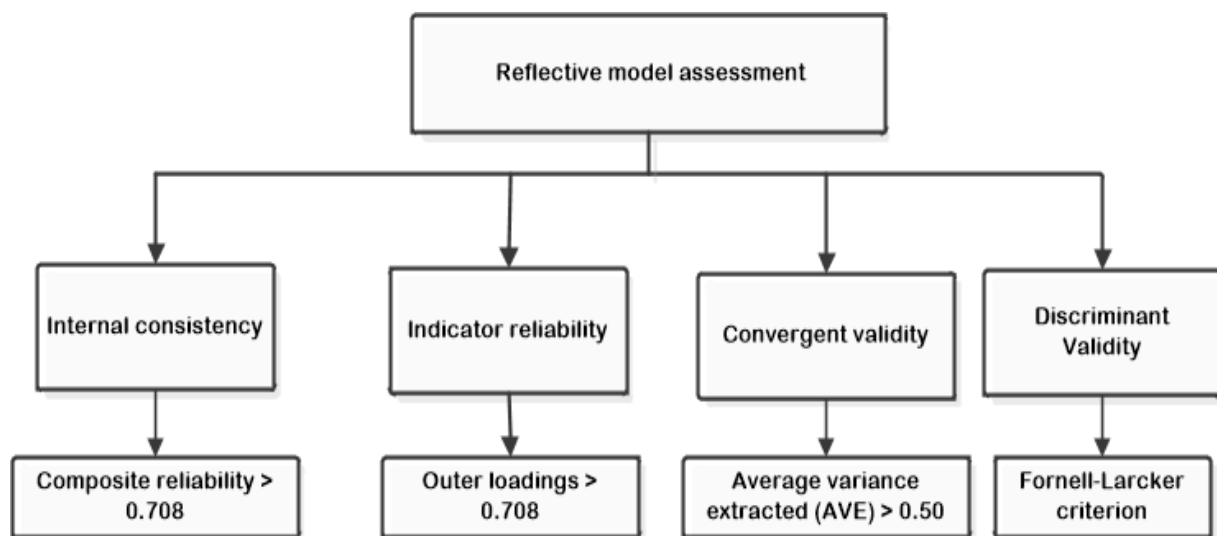


Fig.3: Reflective Measurement Evaluation Criteria (Dalvi-Esfahani et al., 2020)

The results, presented in Table 3, signify that each item's loading on its corresponding construct was more significant than 0.70, except for the loadings of 5 items. Lower loadings could be retained if removing them does not increase internal consistency or convergent validity (Hair et al., 2011; Hair Jr et al., 2021). Composite reliability for each construct exceeded the recommended threshold of 0.70, except for one construct, which is a sensory requirement (SEN\_REQ). This construct has observably the item with the least loadings, even though supported by a higher mean value. For the average variance extracted (AVE), the results are higher than the recommended threshold of 0.5, thereby establishing convergent validity.

Table 3. Construct Validity and Reliability Test

Constructs	Indicators	Loadings	Means	Composite Reliability	AVE
CRED	CRED1	0.735	3.99	0.862	0.610
	CRED2	0.795	3.69		
	CRED3	0.816	3.83		
	CRED4	0.775	3.62		
ID_REQ	ID_REQ1	0.718	3.41	0.770	0.528
	ID_REQ2	0.779	3.81		
	ID_REQ3	0.678	3.88		
INFO	INFO1	0.666	4.10	0.804	0.506
	INFO2	0.703	3.84		
	INFO3	0.781	4.02		
	INFO4	0.691	3.97		
INT	INT1	0.876	3.80	0.892	0.735
	INT2	0.868	3.89		
	INT3	0.826	3.70		
REL_REQ	REL_REQ1	0.499	4.01	0.743	0.615
	REL_REQ2	0.991	3.71		
SAT	SAT1	0.928	3.83	0.930	0.869
	SAT2	0.936	3.89		
SEN_REQ	SEN_REQ1	1.000	4.08	0.516	0.500
	SEN_REQ2	0.033	4.13		
SYN_REQ	SYN_REQ1	0.646	4.08	0.710	0.554
	SYN_REQ2	0.831	4.11		

#### 4.2. Discriminant validity

The discriminant validity was evaluated based on the Fornell-Larcker criterion, which requires a construct's square root of the AVE to be more significant than its correlation with other dimensions (Fornell & Larcker, 1981). The results, as shown in Table 4, demonstrate the discriminant validity of the survey instrument, as the square root of each construct's AVE is more significant than its correlation with any other construct. This means that each construct is being measured distinctly from the others.

Table 4. Fornell-Larcker's Results

Constructs	CRED	ID_REQ	INFO	INT	REL_RE	SAT	SEN_REQ	SYN_REQ
CRED	<b>0.781</b>							
ID_REQ	0.394	<b>0.726</b>						
INFO	0.436	0.253	<b>0.712</b>					
INT	0.052	0.094	-0.071	<b>0.857</b>				
REL_REQ	0.255	0.173	0.344	-0.018	<b>0.785</b>			
SAT	0.021	0.131	-0.128	0.772	-0.086	<b>0.932</b>		
SEN_REQ	0.099	0.267	0.144	0.100	0.310	0.107	<b>0.707</b>	
SYN_REQ	0.350	0.296	0.303	-0.119	0.405	-0.120	0.172	<b>0.744</b>

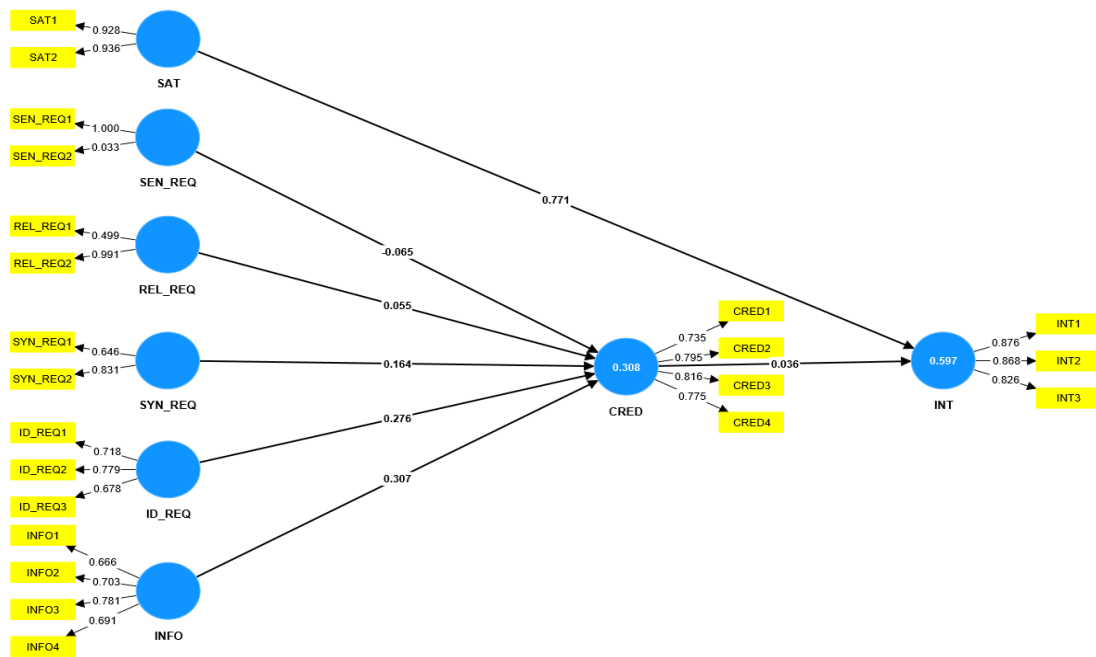


Fig.4: Measurement model

### 4.3. Structural model

The authors evaluated the structural model based on path coefficient, Coefficient of Determination (R-square) and effect size (F-square) (Hair et al., 2017). Table 5 and Figure 5 present a statistical analysis of the relationships between the research constructs. Firstly, there was no significant relationship observed between credibility (CRED) and intention (INT) ( $\beta = 0.036$ ,  $t$ -value = 0.648, and  $p$ -value = 0.517), implying that credibility alone may not substantially affect consumers' purchase intentions. However, the analysis revealed a positive association between identification requirement (ID\_REQ) and CRED ( $\beta = 0.276$ ,  $t$ -value = 2.889,  $p$ -value = 0.004), indicating that when consumers are sure about the identity of whom they interact with, their perception of a source's credibility tends to be enhanced. Similarly, informativeness (INFO) exhibited a substantial positive relationship with CRED ( $\beta = 0.307$ ,  $t$ -value = 3.441,  $p$ -value = 0.001), emphasizing the pivotal role of information in shaping credibility perceptions. On the other hand, relationship requirement (REL\_REQ) showed no statistically significant impact on CRED ( $\beta = 0.055$ ,  $t$ -value = 0.637,  $p$ -value = 0.524). Moreover, the analysis revealed a robust positive connection between satisfaction (SAT) and INT ( $\beta = 0.771$ ,  $t$ -value = 13.507,  $p$ -value < 0.001), underscoring the significance of consumer satisfaction in driving purchase intentions. In contrast, the sensory requirement (SEN\_REQ) exhibited no significant influence on CRED ( $\beta = -0.065$ ,  $t$ -value = 0.748,  $p$ -value = 0.455). Lastly, synchronism requirement (SYN\_REQ) displayed a significant positive relationship with CRED ( $\beta = 0.164$ ,  $t$ -value = 2.114,  $p$ -value = 0.035), suggesting that concurrence of events contributes to strengthening perceptions of source credibility.

Table 5. Structural Model

	$\beta$	T-value	P value	Result
CRED -> INT	0.036	0.648	0.517	Not supported
ID_REQ -> CRED	0.276	2.889**	0.004	Supported
INFO -> CRED	0.307	3.441***	0.001	Supported
REL_REQ -> CRED	0.055	0.637	0.524	Not supported
SAT -> INT	0.771	13.507***	0.000	Supported
SEN_REQ -> CRED	-0.065	0.748	0.455	Not supported
SYN_REQ -> CRED	0.164	2.114**	0.035	Supported

Adjusted R<sup>2</sup> for CRED = 0.285 and adjusted R<sup>2</sup> for INT = 0.597

Significance: \*\*  $p \leq 0.05$ ; \*\*\*  $p \leq 0.01$

R-square which is a measure of a model's explanatory power for the dependent variable, ranges from 0 to 1. In this range, higher values indicate the model better explains the variance in the dependent variable (Urbach & Ahlemann, 2010). (Chin, 1998) suggested interpreting R-square values as substantial at 0.670 or higher, average around 0.33, and weak at 0.190 or below. The analysis results indicate that R-squared values of 0.285 and 0.597 explain the variance in intention to purchase (INTENT) and consumer trust (CRED), respectively. This means that 28.5% of the variance in INTENT is explained by CRED and SAT, while 59.7% of the variance in CRED is explained by ID\_REQ, INFO, REL\_REQ, SEN\_REQ, and SYN\_REQ.

F-square measures the level of effect of an independent variable on a dependent variable in a structural model. According to (Cohen, 1988) , values of 0.020, 0.150, and 0.350 indicate small, medium, and large effect sizes, respectively. The analysis results signify that CRED has a small effect (0.003) on INT, while ID\_REQ has a small effect (0.091) on CRED. INFO exerts a medium effect (0.130) on CRED. There is a small effect of REL\_REQ (0.004) on CRED, and SEN\_REQ (0.045) and SYN\_REQ (0.028) also have small effects on CRED. Notably, the effect of SAT on INT is considerably larger, with an F-square value of 1.473.

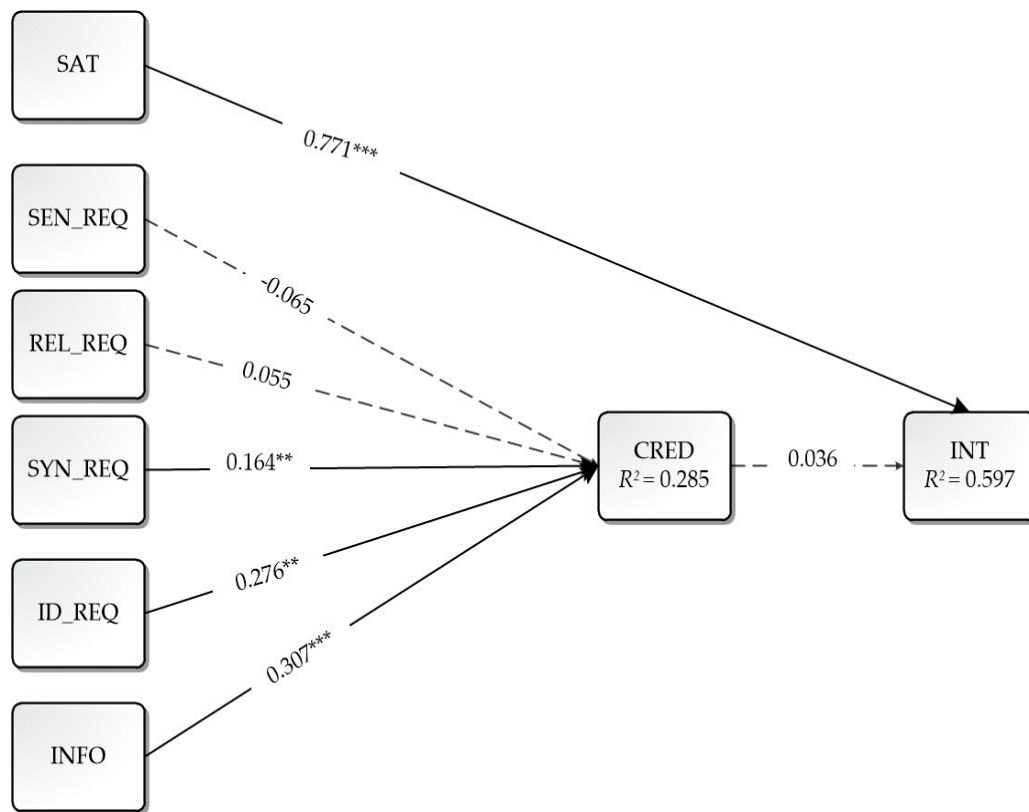


Fig.5: Structural Model  
Significance: \*\* p ≤ 0.05; \*\*\*p ≤ 0.01; insignificant paths marked with dashed lines

## 5. Discussion

In process virtualization theory, the dependent variable indicates how a process can be effectively carried out without physical contact between individuals, or between individuals and objects (E. Overby, 2008). The research examined the relationship between informativeness and credibility, both of which contribute to the perceived value of online advertisements (Cuesta-Valiño et al., 2020). Informativeness is the ability to inform customers of the product's qualities (Hosseinihah Choshaly &

Mirabolghasemi, 2022), and credibility focuses on the consumer's perception of the truthfulness and trustworthiness of product information delivered in the advisement content (Cuesta-Valiño et al., 2020; Gaber et al., 2019). The advertising message reflects the credibility of information (Luo et al., 2013), and source expertise had an essential effect on website credibility perceptions among those with low prior knowledge (Jung et al., 2016), suggesting that when information is effectively communicated and integrated into the virtual environment, it enhances the source's credibility. Similarly, informational support is positively correlated with trust in sellers (Zhao et al., 2019).

The significant relationship between satisfaction and purchase intention in the existing literature (Maharsi et al., 2021) is in line with the findings of this study. According to (Kuo et al., 2009), higher satisfaction fosters repurchase and recommendation intent. Consistent with our findings, previous research also found the insignificant effect of influencers' credibility on consumers' intentions to purchase online (Martiningsih & Setyawan, 2022). Similarly, website credibility didn't influence purchase intention (Choi & Rifon, 2002). This suggests that, in virtual settings, establishing credibility may not be the sole determinant of purchase intention.

The virtualization of various processes has faced impediments, primarily due to concerns surrounding identification and control. These concerns pose potential risks, including the threat of predation and fraudulent transactions. However, it is essential to recognize that identification and control play a pivotal role in enhancing credibility. As highlighted by Clewley et al. (2009), credibility demands reliable and trustworthy information. Therefore, the relationship between identification and control, and credibility is significant. Synchronism in virtual processes refers to speed and timeliness (E. Overby, 2008), and it is not surprising to instill confidence and trust in online purchases. This is why active control, two-way communication, and synchronizations foster trust and user intention (M. Zhang et al., 2022). The immediate feedback and transparent interaction, enabled by synchronism, for sure, build perceived credibility of online advertising.

Sensory barriers hinder the virtualization of shopping, especially for food and other agricultural products that require touch, smell, and taste evaluation (E. Overby, 2012). However, based on the present study, their impact on consumer credibility still needs to be conclusive. One possibility is that sensory requirements may be more critical for certain products than others. For example, food and agricultural products that require touch, smell, and taste evaluation may be more challenging to virtualize and require additional strategies to establish credibility. Study participants may not have considered this when evaluating the impact of sensory requirements on credibility

## **6. Conclusion**

This study endeavor to address gaps in understanding online advertising-to-purchase (ATP) processes through the novel application of process virtualization theory (PVT) in a developing country context. Analysis of survey data from 150 Somali online shoppers revealed that informativeness and identification/control requirements positively shape credibility beliefs, while sensory aspects were insignificant. Furthermore, customer satisfaction, not credibility, emerged as the key driver of purchase conversions.

These insights imply that virtual retailers should focus efforts on useful information provision, security assurances, website transparency and customer satisfaction to increase online purchases. Replicating sensory engagement may be secondary. The research also demonstrates the viability of applying PVT in examining evolving virtual consumption in understudied regions like sub-Saharan Africa.

As online shopping gains traction globally, further research should validate findings across diverse cultures. Comparative studies between developing and advanced economies can elucidate nuances. Additionally, incorporating technology adoption frameworks like UTAUT with PVT may offer richer perspectives. Overall, this research helps advance theoretical discourse on online ATP pathways and

provides practical learnings for enhancing virtual commerce success.

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**Appendix A.** Compilation of PVT Literature

Study Area	Study Purpose	Reference
Education	This study examined how the virtualization of the learning process affects student satisfaction and their likelihood of continuing online learning.	(Alarabiat, Hujran, Soares, et al., 2023)
Education	To explore the factors that deter students from continuing online learning by proposing a novel model	(Alarabiat, Hujran, Al-Fraihat, et al., 2023)
Government	to examine the factors that influence processes of virtualization in government-citizen interactions	(Ofoeda et al., 2018)
Workplace	To investigate how crisis prompts digital transformation and virtualization	(Zeuge et al., 2023)
Workplace	To examine the implementation and normalization of technology-enabled remote working practices, considering the effects of work context.	(Prasad Agrawal et al., 2023)
Government	To explore factors that influence e-government process virtualization by evaluating citizens' resistance	(Ackom et al., 2022)
Software outsourcing	To evaluate the factors influencing SaaS adoption by integrating a comprehensive model that considers both the characteristics of SaaS virtualization and the organizational context	(Tomás et al., 2018)
Business process	To examine the barriers to virtualizing business processes based on Process Virtualization Theory (PVT)	(Feng et al., 2023)
Telecommunication	To propose a conceptual framework that assists telecommunication companies in setting parties for the implementation of process virtualization	(Czarnecki et al., 2010)
Green Information Technology	To evaluate how IT-enabled virtualization affects Green IT implementation in European organizations	(Thomas et al., 2016)

**Appendix B.** Constructs and Measurement Items

Constructs	Code	Item	Reference
Sensory Requirements	SEN_REQ1	1. Before I believed in online advertising, I preferred to have the ability of seeing and handling pertinent documents.	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
	SEN_REQ2	2. Before I believe in online advertising, I'd like to see and speak with the person in charge of the service.	
	SEN_REQ3	3. Before I believe in online advertising, I need to touch and verify relevant documents	
Relationship Requirements	REL_REQ1	1. It is important to me to personally contact and informally interact with responsible employees	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
	REL_REQ2	2. I appreciate that I receive personal advice from the responsible personnel	
	REL_REQ3	3. I go to the local branch offices because I enjoy speaking with the responsible employees after seeing ads for purchasing	
	REL_REQ4	4. I would rather consult with responsible employees when I see Online ads	
Synchronism Requirements	SYN_REQ1	1. I really value that my services will be performed as quick as possible	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
	SYN_REQ2	2. I believe that my services are performed quicker when using online advertising	

	SYN_REQ3	3. I don't mind if it takes a few days between when I order a service and when I receive it.	
Identification and Control Requirements	ID_REQ1	1. I have no control over my personal information and data while conducting online advertising	(Ofoeda et al., 2018; E. Overby, 2008, 2012)
	ID_REQ2	2. The personal identification mechanisms that are used in online advertising are not safe]	
	ID_REQ3	3. I pay attention to who else is bidding on a service	
	ID_REQ4	4. My bidding strategy changes depending on who the other bidders are	
	ID_REQ5	5. I'm curious about who else besides me is bidding on a service	
Informativeness	INFO1	1. Online advertising provides timely information on products or services	(Mustafi & Hosain, 2020; Wang & Sun, 2010a),
	INFO2	2. Online advertising provides relevant information on products or services	
	INFO3	3. Online advertising is a good source of information about new products or services	
	INFO4	4. I believe that features information is a necessary part for online advertising	
Credibility	CRED1	1. I agree that online advertising is convincing	(Liu et al., 2012; Mustafi & Hosain, 2020; Wang & Sun, 2010b).
	CRED2	2. I feel that online advertising is believable	
	CRED3	3. It seems to me that online advertising is credible	
	CRED4	4. It seems to me that online advertising is trustworthy	
Customer Satisfaction	SAT1	1. I am really very satisfied with my experience with online advertising	(Fang et al., 2011, 2014; Nisar & Prabhakar, 2017)
	SAT2	2. I am very pleased with the services provided by online advertising	
	SAT3	3. Customer Satisfaction [Online advertisement services surpassed my expectations	
Purchase Intention	INT1	1. If possible, I would opt to buy services or products through online advertisements	(Tien et al., 2019; Yen, 2014)
	INT2	2. In the future, I tend to use online advertisements for purchasing products or services.	
	INT3	3. I intend to use the online advertisement in the future to purchase services.	