



A Grounded Theory Model of IT's Role in Consumer Awareness in E-Commerce: A Study of Khuzestan's Customs Borders

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Abstract: This study aims to develop a model for utilizing information technology to enhance consumer awareness in e-commerce at the customs borders of Khuzestan and to examine the interrelationships among the model's factors, along with practical solutions for leveraging information technology in this context. Adopting a mixed-methods approach, the qualitative phase employed the grounded theory method and conducted in-depth interviews with 18 experts, including academic professionals in information technology, e-commerce company managers, and internet marketing officials to develop the proposed model. In the quantitative phase, the study conducted correlation analysis and calculated effect sizes using structural equation modeling (SEM) for each factor in explaining the role of information technology in increasing consumer awareness of e-commerce. Data collection involved semi-structured, face-to-face interviews in the qualitative phase and a researcher-designed questionnaire in the quantitative phase. Confirmatory factor analysis assessed construct validity, while structural equation modeling (SEM) using SPSS and AMOS software tested relationships between variables. Profit-seeking, which involves selecting the best product at an optimal cost; social motives, which relate to engaging with and obtaining opinions from other consumers; and hedonic motives, which involve virtual browsing to explore available products. Additionally, the study found that the profit-seeking motive aligns with the goal of benefiting from e-commerce, while social and hedonic motives are associated with the exploration of cross-border e-commerce.

Keywords: Information Technology, Consumer Awareness, E-Commerce, Grounded Theory.

I. Introduction

E-commerce can be defined as the conduct of any business online through the Internet. This field has grown significantly in recent years and is expected to expand even further. E-commerce refers to any transaction involving the purchase and sale of goods or services through the Internet, leading to the import or export of these goods or services. E-commerce generally has a broader scope, encompassing not only buying and selling online but also other aspects of business activities, such as procurement, inventory management, production, distribution, logistics, and after-sales services. Of course, the broader concept of e-commerce is electronic business. Information technology and e-commerce have introduced new solutions for businesses in today's world. In e-commerce, buying, selling, customer support, and logistics are conducted digitally. Customers, suppliers, and investors can connect online and pursue their business objectives through digital platforms (Kordnaji & Heydari, 2019).

The use of e-commerce has expanded across the globe, largely due to the advantages provided by computer networks and, in particular, the Internet in business and commerce. In today's rapidly evolving economy, which is increasingly driven by knowledge and information, traditional manual and paper-based methods are no longer effective. With growing competition among large organizations and changes in service delivery methods, intelligent interactive systems have been developed to offer virtual services in the field of knowledge. These systems automatically determine the most suitable options and solutions to present to users (Santobli et al., 2018).

Companies, as large economic enterprises, cannot ignore these changes. The more they engage in e-commerce and enhance the quality of their electronic services, the better they can attract customers and provide more tailored services. Compared to competitors, businesses that prioritize high-quality e-commerce services can foster greater customer loyalty and attract more consumers. This is because the quality of e-commerce services is one of the most important factors consumers consider when evaluating electronic services. With advancements in information technology, businesses now have the opportunity to reach a wider audience. Given the crucial role of customers in the success of modern companies, they should be regarded as valuable intangible assets and should be attracted and retained with careful strategy and thoughtful engagement, Moon (2019) and Han & Kim (2019).

Traditional commerce has relied on intermediaries, but digital platforms have transformed mediation by enabling direct consumer access to sellers. However, over time, the nature of this mediation has evolved. The conditions of modern life, with all their unique characteristics,

have led to an increasing number of users opting to purchase from online stores. Buying and selling goods through the global Internet network is a key branch of e-commerce, where the Internet serves as a bridge between sellers and buyers, effectively eliminating time and geographical constraints. In this branch of e-commerce, the buyer must first visit the website of a “code system provider company” that hosts the online store to place an order. After browsing and reviewing the desired products, the buyer selects the items and finalizes the purchase by entering their personal information and shipping address.

However, information technology now enables consumers to pool their knowledge and make informed decisions to maximize their value from international online markets. The Internet provides new ways for consumers to interact with one another, with companies, and with the electronic environment itself. As a result, information technology has evolved into a network of interconnected global systems that serve as a medium for gathering information worldwide (Han & Kim, 2019). Despite this, little research has been conducted on the processes related to IT-driven awareness development in e-commerce. In particular, an integrated understanding of why and how consumers use information technology to enhance their awareness remains unexplored. Without a clear answer to this question, marketers cannot fully evaluate how their e-marketing strategies align with the consumer’s purchasing decision process. Consumer understanding and awareness of e-commerce provide significant opportunities for developing marketing strategies that encourage consumers to engage with, explore, and utilize e-commerce platforms more effectively. Therefore, this study aims to answer the question: What is the role of information technology in increasing consumer awareness in e-commerce?

2. Research Goals and Questions

Research Objectives:

1. Identify the factors and dimensions influencing the role of information technology in increasing consumer awareness in e-commerce.
2. Explain the impact of key dimensions on the role of information technology in enhancing consumer awareness in e-commerce.
3. Identify intervening and mediating variables that affect the role of information technology in increasing consumer awareness in e-commerce.

4. Determine effective strategies for leveraging information technology to enhance consumer awareness in e-commerce.
5. Analyze the consequences and outcomes of using information technology to improve consumer awareness in e-commerce.

Research Questions:

1. What are the factors and dimensions affecting the role of information technology in increasing consumer awareness in e-commerce?
2. How do the variables influencing the role of information technology in increasing consumer awareness in e-commerce interact with each other?
3. What are the intervening and mediating variables in the role of information technology in increasing consumer awareness in e-commerce?
4. What strategies can be used to identify the role of information technology in increasing consumer awareness in e-commerce?
5. What consequences and results can be derived from the use of information technology in increasing consumer awareness in e-commerce?

3. Theoretical Framework and Research Background

3.1. Electronic Commerce

In recent decades, business transactions have undergone significant advancements, with a large portion of exchanges no longer taking place face-to-face but instead being conducted via phone, mail, and credit card payments. Modern forms of money and payment methods, such as electronic checks and smart credit cards, have not only revolutionized the purchasing process but have also opened the possibility for companies to enter the financial sector, a domain traditionally controlled by governments. E-commerce refers to electronic business operations. For companies, it is more than just buying and selling products online; it is reshaping competition, business models, transaction speed, product flows, and payment methods between customers and companies as well as between suppliers and businesses. E-commerce is at the

forefront of transformations that are redefining commercial activities and is often referred to as the industrial revolution of the 21st century, which continues to grow rapidly with the expansion of the Internet.

In electronic commerce, information, goods, and services are bought, sold, or exchanged through computer networks. Transactions may involve wholesale or retail trade, physical or digital goods (such as books or software), various services (such as medical or legal consultations), and commercial activities such as tenders, auctions, and the exchange of information between organizations, businesses, and individuals. Several definitions have been proposed for e-commerce, most of which are based on prior experiences with its implementation. The European Commission defines electronic commerce as the electronic processing and transmission of data, including text, sound, and images. E-commerce encompasses a range of activities, including the electronic exchange of goods and services, instant delivery of digital content, electronic fund transfers, stock trading, electronic bills of lading, business planning, collaborative design and engineering, procurement, government purchases, direct marketing, and after-sales services (Gol Seher Nodehi, 2017).

3-2. Consumer Behavior Models in the E-Commerce Environment

In this field, numerous models illustrate decision-making processes, purchasing behavior, and consumer perception. The purpose of these models is to organize and integrate the vast components of existing knowledge about consumer behavior. Below, some of these models are briefly described (Saidnia & Bani Asadi, 2014):

1. Kotler's Buying Behavior Model: This model consists of four components: marketing stimuli, macro stimuli, the buyer's black box, and the buyer's reactions. The buyer's black box is divided into two parts: the first part consists of the buyer's personal characteristics, which influence their perception and response to stimuli, while the second part represents the buyer's decision-making process, which affects their purchasing behavior.

2. Howard-Sheth Model of Purchase Behavior: This model attempts to explain how, through learning, certain data—received in response to marketing stimuli—are transformed into responses such as purchasing decisions or other behavioral reactions. This model is a refined and systematic attempt to develop a comprehensive theory of the consumer decision-making process.

3. Engel-Kollat-Blackwell Purchase Behavior Model: This model is primarily used to structure knowledge related to consumer behavior. It consists of several interconnected components aimed at optimizing and clarifying relationships between key and secondary elements. As depicted in the model, before a consumer acts on a message, they must: 1. Become aware of it. 2. Allocate cognitive resources to process the received message. 3. Interpret the stimulus and motivation. 4. Be encouraged by this motivation. 5. Retain the message by converting and storing the received information in long-term memory (Saidnia & Bani Asadi, 2014).

3-3. Perceived Enjoyment and Consumer Behavioral Intention

Perceived enjoyment refers to “the extent to which the activity of using a particular system is perceived as enjoyable, independent of any performance-related outcomes” (Wong et al., 2015). It is a dimension of intrinsic motivation, associated with the pleasure and satisfaction derived from engaging in an activity. According to motivation theory, perceived enjoyment is an intrinsic factor that significantly predicts behavioral intention to use information technology. Previous research has demonstrated that the acceptance of information technology is influenced by the level of enjoyment and positive experiences users derive from it. Ghafoor (2013), in a study aimed at identifying and prioritizing factors affecting the adoption of mobile banking technology, concluded that perceived security, perceived enjoyment, and communication quality are the three most significant factors influencing mobile banking acceptance.

Similarly, Merikivi et al. (2016) conducted a study titled “Understanding Perceived Pleasure in Mobile Gaming” to examine the relationship between continued usage intentions and the enjoyment derived from mobile games. Their findings indicate that perceived enjoyment has a direct impact on users’ intention to continue using mobile games. Furthermore, Sun et al. (2013), in a study titled “Understanding Users’ Persistence Intention Toward Online Social Networks: An Integrated Theoretical Model,” analyzed survey data from 320 social network users in China. Their results show that perceived enjoyment has a significant and positive influence on users’ intention to continue using online social networks (Khadami et al., 2016).

3-4. Social Motivation and Consumer Behavioral Intention

According to Venkatesh et al. (2003), social influence is defined as “the degree to which a person perceives that others believe they should use a new system.” Social influence can help explain behavioral intentions regarding the adoption of information technology (Wong et al.,

2015). Lou et al. (2003) described social influence as an individual's desire to shape how others perceive a particular action. For example, friends, family members, communities, or media can encourage a person to adopt mobile advertising, while the individual, in turn, assesses others' opinions on the ease and usefulness of such a method.

Bahreinizadeh and Khalkhali (2013), in a study titled "Investigation of the Factors Affecting the Acceptance of Mobile Marketing and Its Effect on Consumer Purchase," examined the key elements influencing mobile marketing adoption. Their findings indicate that social influence, along with demographic variables such as age, gender, and education level, have the greatest impact on the acceptance of mobile marketing. Similarly, Wu et al. (2008), using the UTAUT model, investigated the behavior of third-generation mobile communication users. Their research results demonstrate that social factors have a positive effect on behavioral intention and, consequently, on the adoption of third-generation telecommunication services. A person's friends and family influence their decision to use these services because some individuals believe that not using them may result in being left behind (Khadami et al., 2016).

3-5. Review of Research Conducted in Iran and Abroad

Empirical studies conducted in this field provide valuable insights for further research. Therefore, a number of relevant studies have been briefly reviewed, and their findings are summarized. It is important to note that the selected studies have been chosen based on their relevance to the subject of this research. In this regard, research conducted both inside and outside Iran is summarized in Table (1).

Table 1 - The results of the research done in connection with the topic

Writers	Title	Results
Hamid Sabrian (1401)	The effect of the use of information technology on the promotion of consumer awareness and its effect on the purchase intention in the context of electronic commerce in online chain stores.	In order to increase sales promotion and purchase motivation and strengthen or repeat online shopping behavior, they should strengthen their relationships with buyers in the first purchase period. Focusing on increasing the feeling of shopping satisfaction for online customers in the first period of shopping can also be achieved in various ways such as: perceived quality, reasonable price, discounts, after-sales services, money back guarantee in case of canceling the purchase.
Kurdnaji and Heydari (2019)	The role of information technology in increasing	The motives of using the Internet (e-commerce) to buy goods from abroad make customers use information technology to know the suppliers of goods and also how to buy online. Also, the use of information technology by

	consumer awareness in cross-border e-commerce	increasing customers' awareness of cross-border e-commerce increases their intention to buy through the Internet.
Ramezani Qutbabadi and colleagues (2019)	Identification and ranking of factors affecting the implementation of e-commerce (Study case: Tejarat Bank branches in Shiraz)	Among the main factors, the contextual factor has the most impact, followed by the organizational and individual factors that influence the e-commerce of Tejarat Bank branches. The technology factor also has the least impact on e-commerce in Tejarat Bank branches.
Shoja Kazemi	The role of information technology in increasing consumer awareness in e-commerce	The dimensions of information technology, i.e., individual factors, attitudinal factors, educational factors, technical factors, economic factors, environmental factors, and human and managerial factors have a positive and significant effect on consumer awareness of e-commerce.
Mojdam et al. (2018)	Analyzing the influencing factors on the behavior of consumers using internet shopping technology based on the integrated theory of technology acceptance and use; Case study: customers of Digikala store in Khuzestan province	Value, price and trust variables have a significant and positive effect on the intention to use internet shopping. The habit variable has a significant and positive effect on both the intention to use and the behavior of use. Also, trust variable has a significant and positive effect on word-of-mouth advertising. Also, word-of-mouth advertising and intention to use have a significant and positive effect on usage behavior.
Shukri et al. (2017)	Presenting a model for online shopping among women using the qualitative method of grounded data theory	The results of the current research led to the identification of 28 sub-categories and 9 main categories, which in the form of a paradigm model include the intention to use online shopping as a central category and causal conditions (perception of the purchase system and customer characteristics), background factors (facilities and facilities)), intervening conditions (buying success and compatibility and social acceptance), strategies (web features and product and promotion mix) and consequences (online shopping) were placed.
Ferreira et al. (2023)	Consumer intention to use and develop smart home technology: the role of environmental awareness	Among people with a high level of environmental awareness, facilitating conditions have a greater influence on the behavior of using technologies, while habit has a lower influence. Moreover, for that particular segment of people, usage behavior is less important in explaining the recommended intention. Interestingly, even though usage behavior is not directly explained by environmental awareness, this relationship is significant when mediated by behavioral intention.
Wen et al. (2022)	Blockchain digital technology enables sustainable value creation decision-making and coordination of the e-commerce supply chain, taking into account online consumer reviews.	In the e-commerce supply chain of BOCR technology, members can optimize costs and increase profits by extracting more valuable information. Optimal selling price and service level show different magnitude relationships with production cost changes. When investment costs meet certain conditions, the use of BOCR technology can make members more profitable. Cost-

		sharing and profit-sharing contracts enable e-commerce coordination.
Santosa et al. (2020)	Increasing Consumers Towards E-Commerce in Central Java, Indonesia	Purchase decisions are influenced by trust. If the quality of the products offered by the website is suitable, the consumer's trust will increase, thus forming the customer's trust.
Zhao et al. (2020)	Electronic word-of-mouth advertising and consumer purchase intention in social e-commerce	Information quality has a positive relationship with social psychological distance and trust. Social psychological distance has a positive relationship with trust. Social psychological distance mediates the relationship between information quality and trust, and trust is positively related to purchase intention.
Han and Kim (2019)	The role of using information technology to increase consumer awareness in cross-border e-commerce: an empirical study	have created a research model specific to cross-border e-commerce, which theorizes the relationship between different types of cross-border e-commerce motives (utilitarian, social and hedonistic), patterns of information technology use (productivity and discovery), awareness of the consumer's purchase intention processes The experimental test results support the research framework. Thus, they have obtained a clear and fundamental mechanism for developing cross-border e-commerce awareness among international consumers.
Sana'i and Movahedi (2018)	Application of information technology and marketing strategies in e-commerce	Different e-commerce success factors may suit different marketing strategies as well. In particular, the results show that risk management has no significant relationship with any of the marketing strategies studied in this research, while compliance only affects the focus strategy. On the contrary, IT control has a negative effect on the focus strategy and a positive effect on both the differentiation strategy and the leadership marketing strategy. Finally, IT governance is positively related to both the price leadership strategy and differentiation is negatively related to the focus strategy. Also, information technology governance has a positive relationship with both differentiation and price leadership strategies. Also, information technology leadership plays an important role in formulating and implementing e-marketing strategy of e-business.
Hahn et al. (2018)	Investigating consumer attitudes and purchase intentions in cross-border online shopping in South Korea	Attitudes about e-service quality and consumers' need for exclusivity positively influence attitudes toward online shopping from international sites, which in turn influence purchase intention. Also, self-efficacy and normative structure related to cross-border online shopping positively affect behavioral intentions.

4. Research methodology

The design of the present study follows a sequential-exploratory mixed-method approach, meaning that the qualitative approach was employed first, followed by the quantitative approach. Based on this, in the current research, the researcher initially moved toward the development of a theory using an inductive approach and then evaluated the explained theory through a comparative approach.

4-1. Population and statistical sample

The statistical population of this research consists of two parts: qualitative and quantitative. In the qualitative part, the statistical population includes academic experts in the field of information technology, managers of companies operating in e-commerce, and internet marketing officials who possess characteristics such as experience, relevance to the field of study, employment in university teaching, and research or publishing experience in this area. In the qualitative phase of the study, purposeful sampling was used, and the adequacy of the sample was determined based on the theoretical saturation criterion. The selected sample included eight university professors and ten managers of companies active in e-commerce.

The statistical population of the quantitative part consists of individuals who have made at least one online purchase from foreign markets, and a questionnaire was distributed among them. A sample size of 110 was selected following SEM guidelines, ensuring at least 10 respondents per estimated parameter (Hair et al., 2019)."

4-2. Information gathering tool

In the present research, semi-structured and in-depth face-to-face interviews were used as the data collection tool in the qualitative phase. In the quantitative phase, a researcher-made questionnaire was used to collect data. The final questionnaire was structured in two parts: descriptive information about respondents and main questions presented on a five-point Likert scale. In this study, the grounded theory method was applied to analyze qualitative data using MAXQDA software. The qualitative phase followed Strauss and Corbin's grounded theory approach, using open, axial, and selective coding with MAXQDA software, while structural equation modeling (SEM) was conducted to test the relationships between variables. Data analysis was carried out using SPSS and AMOS software.

4-3. Validity and reliability of research tools

In qualitative research, validity addresses whether the methods and techniques used in the study are appropriately related to the research objectives and effectively measure what they were designed to assess. In the present study, to enhance credibility, after conducting the interviews, written transcripts were sent to the interviewees for verification whenever possible, and their approval was obtained. Additionally, the final conceptual model derived from the interview analysis was shared with the participants to confirm its alignment with reality.

In the quantitative section, content validity and construct validity methods were used to assess the validity of the questionnaires. To measure content validity, the research questionnaire was reviewed by five experts and university professors, who confirmed its validity. Confirmatory factor analysis was applied to assess construct validity.

Regarding reliability, Cronbach's alpha test was conducted to evaluate the internal consistency of the questionnaires. As a pre-test, the questionnaire was distributed among a sample of 30 participants, and Cronbach's alpha coefficients were calculated. A coefficient above $\alpha = 0.7$ indicates a high level of reliability, confirming the strong consistency of the measurement tool. The results of Cronbach's alpha demonstrated the high reliability of the research questionnaire.

5. Research findings

At this stage, the qualitative section presents a detailed report on the process of collecting, classifying, and analyzing the information obtained from the interviews. In the quantitative section, the data gathered from the questionnaire distribution among the research population has been analyzed.

5-1. Analysis of research data

This section outlines the classification and analysis of information in three stages: open coding, selective coding, and axial (central) coding. Each main and sub-theme of the research is then explained, supported by documented evidence from the interview transcripts.

5-1-1. First step: Open coding

In this stage, after transcribing the interviews, open coding was performed, highlighting key sentences from the interview texts and generating initial codes.

5-1-2. Second step: Selective coding

After identifying the primary codes, similar codes were grouped and categorized as secondary codes. Additionally, related secondary codes were classified into sub-themes for further analysis.

Table 2. An example of an open coding process

Extracted badges	Extracted themes
Saving product cost and search cost; obtaining products at a lower price; lack of time, place and atmosphere limitations; Buying foreign products in a more convenient way (at any place, with access to different markets at any time); providing a more convenient and easy shopping environment; In e-commerce there are more products to choose from; Choosing a more diverse hub with a lower cost; increasing the variety of selected products; obtaining information related to product specifications, stores, sales promotion, etc.; E-commerce provides complete and extensive information about every product to buyers and sellers; Internet consumers prefer not to be disturbed during the shopping process. Online consumers have the possibility to search for products as they want without disturbing the sales personnel. Discounts and discounts; seasonal auctions; To save time in buying products; looking for quality products; quality of products and services; Access to different types of products and brands that do not exist in the country.	cost savings; convenience value; diversity in choice; availability of information; lack of social interaction; discount; saving time; quality of products and services; Access to different types of products and brands that do not exist in the country
Accompanying friends, relatives, sales representatives or other consumers when shopping; creating a space for dialogue and interaction among consumers; share your experiences and opinions about products, services and brands with other people; Advise others to buy or not to buy a particular product or service; Electronic word-of-mouth communication is a process of dynamic and continuous exchange of information between consumers; Consumers can post their opinions, comments, or product reviews on blogs, discussion forums, product review websites, retail websites, newsgroups, and social networking sites.	development and expansion of personal relationships with others; Sharing experiences and information with others
the experience of curiosity; Experiencing emotional states; A sense of excitement and enthusiasm in shopping; Enjoy shopping; Recreational shopping; A pleasant way to spend leisure time; Getting pleasure and comfort; looking for new products; discover and try different products; International online shopping provides an opportunity to deviate from everyday life; Familiarity with modern fashion; Interest in different products, new items, tastes and up-to-date fashions	adventure and exploration; A pleasant way to spend leisure time; Not seeking to deviate from everyday life; Familiarity with modern fashion
The possibility of searching information related to the price, product using the dedicated program (websites) of border e-commerce; Increasing purchasing efficiency by using cross-border e-commerce specific operating systems or programs; The ability to search for price comparison information; Purchase review and evaluation, automatic	Search for information about price, product; Increasing purchasing efficiency using operating systems or dedicated programs; Convenience and

recommendations; Reducing search costs for customers; Simplifying exchange processes; speeding up the transaction processing process; Economies of scale; increase transfer speed; Faster delivery, ease of purchase and lower price; ease of use of technology; Understanding the ease and usefulness of information technology	ease of buying and facilitating payment; ease of communicating and using the experiences of others; Optimal use of time
Using new and diverse methods to search for information; use of social network services; Review cross-border e-commerce information on discounts, payment process, customs and delivery process, product quality, delivery reliability, seller information; acquiring new information and knowledge using online forums, social network services, instant messengers; Having new cross-border e-commerce skills using online forums, social networking services and instant messengers about new shopping trends, new product news, new product shopping experiences; Using new apps, new payment methods, new forums, new social networking services and instant messengers	Using new and diverse methods to search for information; Review cross-border e-commerce information on discounts, payment process, customs and delivery process, product quality, delivery reliability, seller information; Gaining new information and knowledge using online forums, social networking services, instant messengers
Consumers shop with the aim of learning about new events and trends; Obtaining sufficient information about the price of the product (reasonable price, price in local currency, etc.); Obtaining sufficient information about product characteristics (quality, design, usability, usefulness); Sufficient information about the shipping method and the ability to choose how to deliver the goods; Adequate information on how personal information will be used; Obtaining sufficient information about international purchasing processes (delivery processes, lead times, refund procedures, customs clearance, duties, etc.); obtaining sufficient information about sellers (seller's location, reputation, reliability, credibility); Information related to the service or sales process	awareness of trends; obtaining sufficient information about the price of the product; Obtaining sufficient information about product specifications; obtaining sufficient information about international procurement processes; Get enough information about sellers

5-1-3. The third step: theoretical coding

Theoretical codes conceptualize the possible relationship between real codes. In fact, theoretical codes provide a model of the possible relationship between the categories resulting from the integration of codes and concepts around the central category. In the following, the main themes, sub-themes and main concepts identified are presented.

Table (3). Main concepts and subcategories

General category	Subcategories	Main concepts
Causal conditions	The hedonic motivation of cross-border e-commerce	<ul style="list-style-type: none"> ●Saving costs ●Convenience value ●Diversity in choice ●Availability of information ●Lack of social interaction ●Save time

		<ul style="list-style-type: none"> ● Quality of products and services ● Access to different types of products and brands that do not exist in the country
	The social motivation of cross-border e-commerce	<ul style="list-style-type: none"> ● Development and expansion of personal relationships with others ● Sharing experiences and information with others
	The hedonic motivation of cross-border e-commerce	<ul style="list-style-type: none"> ● Adventure and exploration ● A pleasant way to spend leisure time ● Innovation ● To deviate from everyday life ● Familiarity with modern fashion
Background conditions	Application of information technology in cross-border e-commerce with the purpose of benefit	<ul style="list-style-type: none"> ● Search for information about the price, product ● Increasing purchasing efficiency by using operating systems or dedicated programs ● Convenience and ease of purchase and facilitating payment ● Ease of communicating and using the experiences of others ● Optimum use of time
Intervening conditions	Application of information technology in border e-commerce with the purpose of tourism	<ul style="list-style-type: none"> ● Using new and diverse methods to search for information ● Review cross-border e-commerce information on discount, payment process, customs and delivery process, product quality, delivery reliability, seller information ● Obtain new information and knowledge using online forums, social networking services, instant messengers
The central category	Consumer awareness	<ul style="list-style-type: none"> ● Awareness of trends ● Obtaining sufficient information about the price of the product ● Obtaining sufficient information about product specifications ● Obtaining sufficient information about international purchasing processes ● Obtaining sufficient information about sellers
Strategies	Intention to buy	<ul style="list-style-type: none"> ● Buying required products from foreign virtual markets ● Recommend cross-border e-commerce to peers, friends and family ● Quick and timely response to consumers ● Brand credibility and reputation ● Providing attractive services and reward schemes to established and reliable consumers ● Appropriate and fair pricing for consumers

		<ul style="list-style-type: none"> • Advertising messages • Effectiveness of site information content • Website design
consequences	Implications for consumers	<ul style="list-style-type: none"> • Encourage others to shop online • Repeat purchase behavior • Increasing consumer confidence • Increasing consumer satisfaction • Eliminating middlemen, which will reduce prices • The possibility of buying customized and desirable products for consumers • Save time and time • More diverse hub selection with lower cost • Quick and easy product and price comparison

In the form of 46 main concepts, the researcher has categorized 10 categories using the Strauss and Corbin paradigm, and by conducting interviews and data analysis, he has gained a deeper understanding of the issues raised. Then, between the categories and known characteristics in the first stage of open coding, back and forth movement has been done. The interviews continued until the categories reached theoretical saturation.

5-1-4. Research paradigm model

The paradigm model of this research was designed based on the paradigm model of Strauss and Corbin according to figure (1). In this model, causal conditions, binding factors of e-commerce are shown. Despite these factors and conditions, the e-commerce model was designed. Background conditions are the foundation of e-commerce. Conditions that should be considered more for better success in implementing this process. Intervening conditions have a positive or negative effect on e-commerce and can disrupt or facilitate or accelerate e-commerce. In this process, the most important factor in creating the e-commerce process based on consumer awareness is considered as a central category. The strategic factor of the model is purchase intention strategies, and in the consequences dimension, the expected results from the consequences of consumers were considered. The consequences of which their manifestation means the emergence of the phenomenon of e-commerce due to the increase in the awareness of consumers. Figure 1 illustrates the causal conditions (consumer motives), intervening

variables (IT accessibility), and strategic outcomes (purchase decisions), forming the foundation of the e-commerce awareness model.

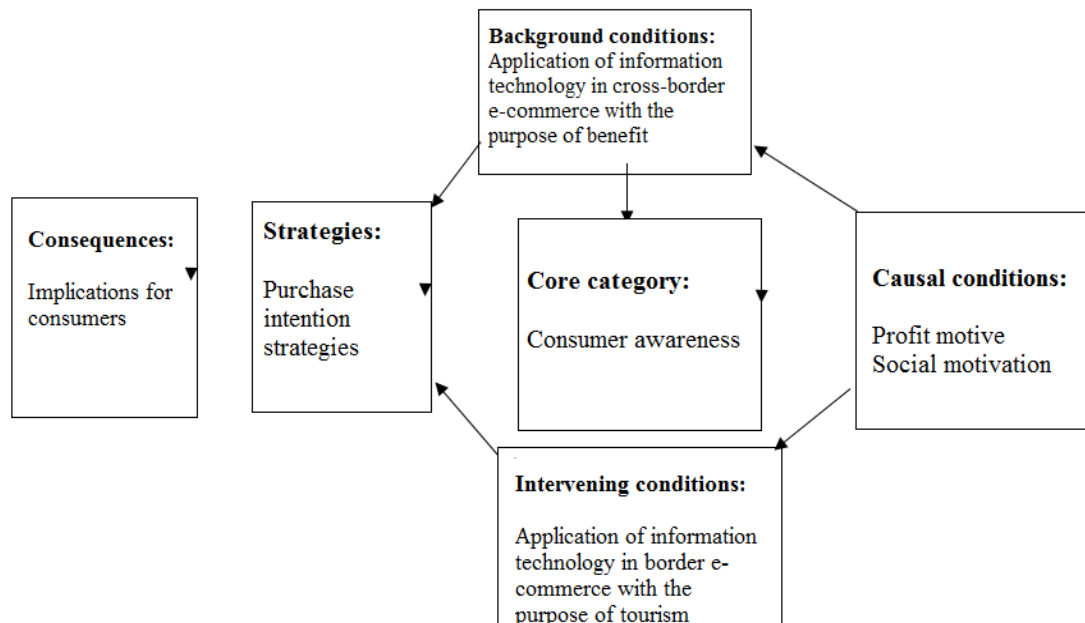


Figure (1) research paradigm model

5-2. Quantitative Segment Analysis

To analyze the collected data, statistical analyses are presented in two forms: descriptive and inferential statistics.

5-2-1. Descriptive Statistics

Demographic statistics related to this research are briefly presented in Table 4.

Subsequently, based on 46 identified concepts and 8 main categories from the qualitative section, a Likert-scale questionnaire (with a 5-point scale) was designed and implemented in this section. The sample size was calculated using the structural equation modeling (SEM) method, which is determined by the number of main indicators. The sample size selection follows the range $q < n < 155$. In this study, 10 main categories were identified. To calculate the required sample size, the average of each factor was considered for structural equation modeling. As a result, the sample size should be between 80 (10×8) and 120 (15×8). Based on this, a sample size of 110 participants—which falls within this range—was selected. After

the questionnaires were randomly distributed among the selected sample, the descriptive statistics were analyzed, as presented in the following section.

Table (4). Demographic variables

Demographic variables		Abundance	Frequency
Gender	Man	84	76.4
	Female	26	23.6
Education	Diploma	10	9.1
	Bachelor's degree	27	23.6
	Master's degree	67	60.9
	P.H.D	7	6.4

5-3. Inferential statistics

Before analyzing the research hypotheses, the reliability and validity indicators of the measurement model have been examined. The tests for each research hypothesis are then presented.

5-3-2. Reliability and Validity of Indicators

Before assessing the relationships within the model, the reliability and validity indicators of the measurement model were examined. The tests for each research relationship have been presented accordingly. Below, the composite reliability index and convergent validity are discussed. To evaluate construct validity, the measurement model and factor loadings are analyzed.

A. Narrative

Based on the confirmatory factor analysis model and the calculation of path coefficients (as shown in the table below), all paths are statistically significant. This indicates that the structural model for “The Use of Information Technology in Increasing Consumer Awareness in E-Commerce Based on Grounded Theory” has the necessary validity within the customs borders of Khuzestan.

Table (5). Values of path coefficients

Variable	Dimensions	path coefficient (β)	P VALUE	C. R (test statistics)	Multiple correlation squared (R-squared)	Variance of errors
	Values of standardized weights					
Causal conditions	Profit motive 0.89 Social motivation 0.69 Hedonic motivation 0.54	0.88	0.000	4.833	0.77	0.078
Background conditions	Application of information technology in cross-border e-commerce with the purpose of benefit 0.45	0.67	0.000	7.487	0.45	0.07
Intervening conditions	Application of information technology in border e-commerce with the purpose of tourism 0.47	0.61	0.000	6.547	0.37	0.09
The central category	Consumer awareness 0.44	0.59	0.000	6.222	0.34	0.07
Strategies	Purchase intention strategies 0.56	0.75	0.000	8.627	0.56	0.05
consequences	Implications for consumers 0.76	0.87	0.000	10.874	0.76	0.06

A coefficient of 0.42 for profit-seeking motives suggests a moderate positive effect on consumer awareness, while social and hedonic motives show slightly lower influences. In the first column of the above table, the values of the standardized weights that show the importance of the factors, and the minimum standard value is 0.40, and as it is known, all the values are greater than the minimum standard value, and in the second column of the table, all the coefficients of the path are greater than the value of 0.40. Also, according to the value of P, which are all zero and less than the level of 05. and the values of the test statistic (C.R) are more than the critical value of 1.96, as a result, all the paths are significant. , central, strategies and consequences on the main variable of the research, which are the development of a model for the purpose of using information technology to increase consumer awareness in e-commerce based on the foundation's data theory in the customs borders of Khuzestan has a positive and significant effect, the positive effect on It is based on the positivity of the path coefficients.

B. Composite reliability

The combined reliability of the proposed model (structure) is calculated from the combined reliability equation which is as follows. (Kalantari, 2018):

$$P_C = \frac{(\sum \alpha)^2}{(\sum \alpha)^2 + (\sum \theta)}$$

where alpha(α) is the factor loadings related to the indices and theta(θ) is the variance of the errors of the indices and the combined reliability PC and the result of placing the numbers is as follows:

$$P_C = \frac{^2(87.+75.+59.+67.+88.)}{^2(87.+75.+59.+67.+88.) + (06.+05.+09. + 0.07.+ 0.07.)} = 0.967$$

The result of rounding the number is 0.967 This number is more than 60. As a result, the model (structure) is stable.

5-4. Research conceptual model test

5-4-1. Path analysis based on the ground theory model related to the qualitative part

In this section, after validating the structure in the previous section, the final model is presented based on the premise of Grounded theory and confirmatory factor analysis, and we examine the significance of direct and indirect paths, and the hypotheses have been answered.

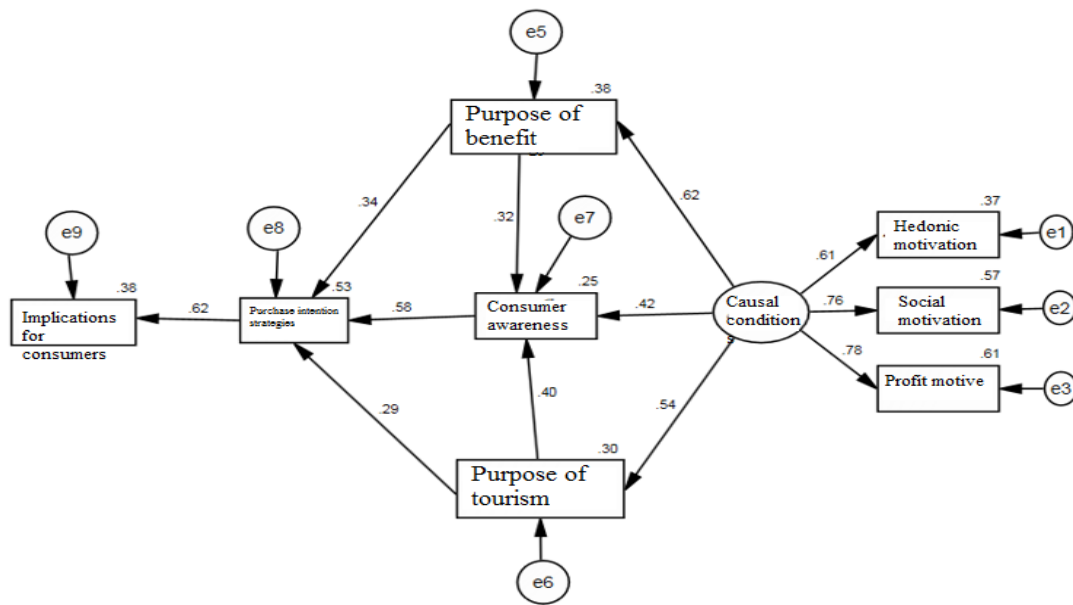


Figure (2): research model, path analysis based on ground theory model, output of AMOS software

--	RMSE	IFI	GFI	Cmin/df
Standard limit	Less than 0.08	More than 0.9	More than 0.9	Less than 5
Model values	0.076	0.904	0.992	2.778

Table (6): Goodness of fit indicators, path analysis

5-4-2. Examining Research Hypotheses

The table above presents four goodness-of-fit indices, which have been adjusted based on the fit of different models and the correlation between error values in the graph. These indices fall within the standard range. Additionally, the maximum likelihood method was used for model estimation.

Hypothesis Testing

- Hypothesis (1): Causal conditions (profit motive, social motive, and hedonistic motive from cross-border e-commerce) have a positive and significant effect on the central category (consumer awareness).
- Hypothesis (2): Background conditions (use of information technology in cross-border e-commerce for usefulness) have a positive and significant effect on the central category (consumer awareness).
- Hypothesis (3): Intervening conditions (use of information technology in cross-border e-commerce for tourism) have a positive and significant effect on the central category (consumer awareness).
- Hypothesis (4): The central category (consumer awareness) has a positive and significant effect on strategies.
- Hypothesis (5): Background conditions (application of information technology in cross-border e-commerce for usefulness) have a positive and significant effect on the adoption of strategies.
- Hypothesis (6): Intervening conditions (use of information technology in cross-border e-commerce for tourism) have a positive and significant effect on the adoption of strategies.
- Hypothesis (7): Strategies have a positive and significant effect on the consequences of their implementation.
- Hypothesis (8): Causal conditions have a positive and significant effect on strategies through intervening conditions.
- Hypothesis (9): Causal conditions have a positive and significant effect on strategies through background conditions.

The Main Hypothesis	Direct Impact	Test Result (CR)	P Value	Total Effect	Test Result
Causal conditions on the central category	0.42	5.192	0.000	0.42	hypothesis confirmed

Background conditions on the central category	0.32	3.937	0.000	0.32	hypothesis confirmed
Intervening conditions on the central category	0.40	4.028	0.000	0.40	hypothesis confirmed
A central category on strategies	0.58	5.146	0.000	0.58	hypothesis confirmed
Background conditions on strategies	0.34	3.476	0.000	0.34	hypothesis confirmed
Intervening conditions on strategies	0.29	3.276	0.000	0.29	hypothesis confirmed
Strategies over consequences	0.62	8.278	0.000	0.62	hypothesis confirmed

The profit path coefficient between the causal conditions (motivational, social, and hedonistic motivation from cross-border e-commerce) and the central category (consumer awareness) includes a direct effect, the value of which is 0.42. In total, the overall effect is also 0.42. The effect is positive due to the positive multiplication of the path coefficient. Additionally, the p-value is zero, which is less than the critical level of 0.05, and the test statistic is 5.192, which exceeds the critical level of 1.96. As a result, this effect is significant, indicating that the causal conditions (profit-seeking motivation, social motivation, and hedonistic motivation in cross-border e-commerce) have a significant impact on the central category (consumer awareness).

The path coefficient between the background conditions (use of information technology in cross-border e-commerce for the purpose of benefit) and the central category (consumer awareness) includes a direct effect, the value of which is 0.32. In total, the overall effect is also 0.32, and this effect is positive, as indicated by the positive path coefficient. Furthermore, the p-value is zero, which is less than the critical level of 0.05, and the test statistic is 3.937, which exceeds the critical number of 1.96. Consequently, this effect is significant, meaning that the background conditions (use of information technology in cross-border e-commerce for the purpose of usefulness) have a significant impact on the central category (consumer awareness).

The path coefficient between the intervening conditions (use of information technology in cross-border e-commerce for the purpose of tourism) and the central category (consumer awareness) includes a direct effect, the value of which is 0.04. In total, the overall effect is also 0.04, and this effect is positive, as indicated by the positive path coefficient. Additionally, the

p-value is zero, which is less than the critical level of 0.05, and the test statistic is 4.028, which exceeds the critical number of 1.96. As a result, this effect is significant, indicating that the intervening conditions (use of information technology in cross-border e-commerce for the purpose of tourism) have a significant impact on the central category (consumer awareness).

The path coefficient between the central category (consumer awareness) and strategies includes a direct effect, the value of which is 0.58. In total, the overall effect is also 0.58, and this effect is positive, as indicated by the positive path coefficient. Moreover, the p-value is zero, which is less than the critical level of 0.05, and the test statistic is 4.028, which exceeds the critical number of 1.96. Consequently, this effect is significant, meaning that the central category (consumer awareness) has a significant impact on strategies.

The path coefficient of background conditions (the use of information technology in cross-border e-commerce for the purpose of benefit) in the adoption of strategies includes a direct effect, the value of which is 0.34, and the total effect is also 0.34. This effect is positive, as indicated by the positive path coefficient. Additionally, the p-value is zero, which is less than the critical level of 0.05, and the test statistic is 3.476, which exceeds the critical value of 1.96. As a result, this effect is significant, meaning that background conditions (use of information technology in cross-border e-commerce for the purpose of usefulness) have a significant effect on the adoption of strategies.

The path coefficient of the intervening conditions (application of information technology in cross-border e-commerce for the purpose of tourism) in adopting strategies includes a direct effect, the value of which is 0.29. The path coefficient is positive. Furthermore, the p-value is zero, which is less than the critical level of 0.05, and the test statistic is 3.276, which is greater than the critical value of 1.96. As a result, this effect is significant, indicating that the intervening conditions (use of information technology in cross-border e-commerce for the purpose of tourism) have a significant effect on the adoption of strategies.

The path coefficient of strategies in the results includes a direct effect, the value of which is 0.62, with a total effect of 0.62. This effect is positive due to the positive value of the path coefficient. Additionally, the p-value is zero, which is less than the critical level of 0.05, and the test statistic is 3.276, which exceeds the critical value of 1.96. As a result, this effect is significant, indicating that strategies have a significant effect on the results.

Examining the Mediation Hypothesis:

The Sobel test is used to determine the significance of the mediating effect of a variable in the relationship between two other variables. One of the limitations of this test is that it requires a large amount of data for accurate and valid results. In this test, a Z-value is obtained using the following formula. If this value exceeds 1.96, the mediation effect can be tested for significance at a 95% confidence level.

$$Z - value = \frac{a \times b}{\sqrt{(b^2 \times s_a^2) + (a^2 \times s_b^2) + (s_a^2 \times s_b^2)}}$$

a: Path coefficient value between the independent variable and the mediator

b: Path coefficient value between mediator and dependent variable

S_a: is the standard error of the path between the independent variable and the mediator

S_b: is the standard error of the path between the mediator and the dependent variable

Hypothesis (8): Causal conditions have a positive and significant effect on strategies through the conditions of the interveners.

$$Z - Value = \frac{0.54 \times 0.29}{\sqrt{(0.29 \times 0.064) + (0.54 \times 0.057) + (0.064 \times 0.057)}} = 4.356$$

Based on the results obtained, the z-value is equal to 4.356, which is higher than 1.96, so it can be said that the causal conditions have a positive and significant effect on the strategies through the conditions of the interveners.

Hypothesis (9): Causal conditions have a positive and significant effect on strategies through background conditions.

$$Z - Value = \frac{0.62 \times 0.34}{\sqrt{(0.62 \times 0.021) + (0.34 \times 0.073) + (0.021 \times 0.073)}} = 4.60$$

Based on the results obtained, the z-value is equal to 4.60, which is higher than 1.96, so it can be said that causal conditions have a positive and significant effect on strategies through background conditions.

6. Conclusion

The purpose of this article is to develop a model for utilizing information technology to enhance consumer awareness in e-commerce, based on foundational data theory, within the customs borders of Khuzestan. The study examined the findings and results from the coding process and the analysis of extracted categories in the initial stage, ultimately leading to the design of the model. In the first stage of the research, interviewees were asked to identify and discuss in detail the factors that could influence the role of information technology in increasing consumer awareness in e-commerce.

In this model, causal conditions represent the binding factors of e-commerce, emphasizing the role of information technology in enhancing consumer awareness. The background conditions provide the foundational basis for e-commerce—factors that should be prioritized for the successful implementation of this process. Intervening conditions positively impact e-commerce by facilitating and accelerating its growth. The central category, identified as the most crucial element in establishing an e-commerce process based on consumer awareness, plays a pivotal role in shaping the model. The strategic factor in this model includes purchase intention strategies, while the consequences dimension reflects the expected outcomes for consumers. The manifestation of these consequences signifies the emergence of e-commerce, driven by the role of information technology in increasing consumer awareness.

After identifying key indicators in the qualitative section, a quantitative analysis was conducted. Through a correlational research method, relationships between the primary model variables were examined, and the influence coefficients of each factor in explaining the role of information technology in enhancing consumer awareness in e-commerce were determined. The statistical results revealed that causal conditions had an impact coefficient of 42%, intervening conditions had an impact coefficient of 40%, and background conditions had an impact coefficient of 32% on the central category. Among these, background conditions had the least influence, while causal conditions had the greatest effect on consumer awareness. Additionally, the impact of the central category on strategies was 58%, the impact of background conditions on strategies was 34%, and the impact of intervening conditions on strategies was 29%, with the central category having the highest influence. Finally, the influence of strategies on outcomes was 62%, indicating their significant role in shaping the final results of the model.

The results of this research indicate that consumers are driven by three primary motivations when using information technology to enhance their awareness. These motivations include profit-seeking, which involves selecting the most suitable product at a reasonable cost; social motivation, which entails engaging with others and gathering opinions; and pleasure-seeking motivation, which refers to virtual browsing of online stores to explore product collections. Additionally, the study found that the profit-seeking motive for utilizing information technology aligns with the goal of benefiting from e-commerce, while social and pleasure-seeking motives are associated with the purpose of tourism in cross-border e-commerce. The findings further demonstrate that among these motivations, profit-seeking, hedonistic, and social motives strongly encourage the use of e-commerce.

Enhancing consumer awareness—both for practical purposes and for tourism-related activities in cross-border e-commerce—increases consumers' intention to make online purchases. Therefore, it appears that the convenience of saving time and money, along with the availability of simplified methods for shopping in foreign markets, makes international e-commerce highly appealing to consumers. Informing customers about these advantages can be significantly beneficial.

One of the greatest advantages of e-commerce is the elimination of middlemen, leading to unprecedented price reductions and shorter transaction times. E-commerce also enables consumers to access a broad range of producers, allowing for greater bargaining power in trade transactions—a possibility that traditional commerce, limited by geographical constraints, does not offer. Furthermore, manufacturers can directly supply and sell their products to international markets, enabling globalization with minimal costs and broader marketing opportunities.

Another key benefit of e-commerce is the ability to purchase customized and personalized products. Consumers can specify their desired product features to the seller, who, if possible, manufactures the product accordingly. Initially, this level of customization was limited to simple products such as watches and books, but today it has expanded significantly, particularly in industrial goods.

The expansion of e-commerce fosters competition and market accessibility, benefiting both consumers and businesses by reducing costs and improving service efficiency. This shift in

business practices is expected to lead to a significant expansion in production scale, lower transaction and distribution costs, increased competition, and overall economic efficiency. Ultimately, these factors contribute to reduced production costs and increased social welfare, underscoring the transformative impact of e-commerce on global trade and consumer behavior.

5-3-1. Practical Suggestions

Providing quality and diverse products and services with reputable, well-known brand names and suitable prices for online sales to customers on the site; variety of ways to communicate with consumers (creating a sense of importance in consumers, having a consumer club, consulting with specific consumers, receiving feedback from consumers about support, maintaining communication after purchase, the possibility of tracking opinions, suggestions, and criticisms); e-stores should differentiate their brand name and brand from their competitors by creating appropriate commercial advertisements and strengthening consumers' attitudes with appropriate advertisements so that these attitudes evolve into consumer beliefs and finally become purchasing intentions; providing proper after-sales services and offering correct and sufficient comprehensive information about goods and services to customers on a regular basis; examining education and information in the expansion of electronic commerce; taking the necessary measures to facilitate the sending and receiving of goods across the country and abroad, increasing the security factor in cyberspace, and providing training for the purpose of culturalization in the field of activities related to electronic commerce; making the necessary investments to increase the level of security and reduce purchase risks in order to enhance user trust; using the experiences of leading countries in the field of customs and tax infrastructure and trade; optimizing the customs system, eliminating the monopoly of the customs system, and standardizing customs rules.

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