

## Article

# Investigating the Effects of E-Marketing Factors for Agricultural Products on the Emergence of Sustainable Consumer Behaviour

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**Abstract:** The digitalisation of services is a process that is gaining traction worldwide owing to the numerous benefits that it provides to sellers and consumers. This study aimed to explore the impact of e-marketing factors for agricultural products on the sustainable consumer behaviour. The technology acceptance model (TAM) and the extended unified theory of acceptance and use of technology (UTAUT2) model were used to investigate the factors that trigger long-term behavioural changes towards more sustainable consumer behaviour. Trust and continuance intention (CI) constitute sustainable consumer behaviours. The survey-based data were collected from 172 farmers in and around the Al-Baha province of Saudi Arabia. The findings reveal that, out of the six factors, social influence (SI), hedonic motives (HM), and perceived risk (PR) had a significant impact on trust whereas the perceived usefulness (PU), information quality (IQ), and the perceived ease of use (PEOU) had an insignificant impact on trust. Trust appears to have had a substantial positive impact on the development of CI. Furthermore, the significant moderation of age and the insignificant moderation of education are observed among trust–CI relationship. Therefore, policymakers should concentrate on the factors such as SI and decrease the factors that are related to the PR in order to achieve a higher level of trust. This study contributes to the literature on e-marketing of agricultural products resulting in the formation of CI that triggers long-term behavioural changes towards more sustainable consumer behaviour.

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**Keywords:** e-marketing; agricultural products; sustainable consumer behaviour; continuance intentions; perceived usefulness; information quality; perceived ease of use; social influence; hedonic motives; perceived risk; behavioural changes

## 1. Introduction

As the general awareness and concern for the environment has grown, so has the concept of sustainable consumer behaviour. The introduction of a diverse range of digital infrastructures, platforms, and technologies has revolutionised the way that people live and work, which has characterised the business environment [1,2]. The digitalisation that is occurring paves the way for the sustainable consumer behaviours. The global connected market was worth USD 212.1 billion in 2018, and it is expected to grow to USD 1,319.08 billion by 2026, with a compound annual growth rate of 25.68 % during this time period [3]. The fourth industrial revolution's current tendencies of services automation, innovative corporate methods, and improved technology all have contributed to this Industry 4.0 revolution. As a result, the term “digital transformation” is used to describe the disruptive and transformative effects of new digital technology on enterprises. This digital transformation paves the way for the adaption of e-marketing, which further enhances the users' experiences [4]. E-marketing is kind of holistic concept which encompasses a

greater spectrum of activities [5,6] when it is compared to other similar terms such as e-commerce, where the main focus of this is on the sales [7]. In order to accomplish this goal, several aspects that contribute to the e-marketing of agricultural products have been investigated. This research aims to investigate how to develop and maintain sustainable consumer behaviour. Further, this study contributes to the literature on e-marketing of agricultural products, thereby resulting in the formation of continuance intention (CI) that triggers long-term behavioural changes towards more sustainable consumer behaviour. It also looks at how farmers help their customers to cut their costs by implementing e-marketing.

Researchers have looked into the role of innovation and the “digital transformation” in a variety of sectors, including business models [8–11] and e-marketing. The role of technology is very visible in the food industry, where the technology is used to improve the user’s experiences and services. The global penetration of the internet is rapidly expanding, and as a result, the agriculture industry is gaining traction and making some efforts to take advantage of the internet’s benefits [12]. Consumers have also increased their online purchases due to the effects of profound digitalisation [13]. On the suppliers’ front, farmers have failed to adapt e-marketing for their agricultural products [14,15]. This failure may be associated with the cost of adapting to new technologies [16,17], and other technology-related factors [14,18]. In today’s world, no industry can thrive without adopting new internet-related technologies [19]. E-marketing channels in Saudi Arabia account for roughly ten billion dollars in revenue [20]. This demonstrates the enormous potential of e-marketing operations, and agricultural e-marketing sector should assume its portion of the e-business. It has been observed that persuading the users to buy a product or service is easier if they have a positive opinion of it [21,22]. Similarly, if the users have a negative opinion of it, then persuading them to buy that product or service will be a difficult task [23] both within and outside of the country [24]. Agriculture, which is largely an unorganised sector, is marketed through the traditional means of marketing [25]. Understanding the farmers’ perception is critical for overcoming agricultural e-marketing adaptation challenges. Because e-marketing is a new phenomenon, and adapting to it is difficult, social support from policymakers and managers is critical in this context.

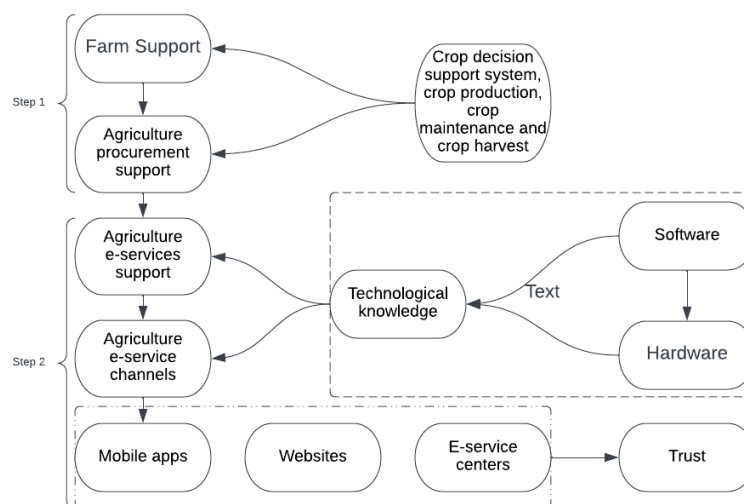
In order to be a profitable and sustainable venture, the agriculture industry must adopt some new technologies [26]. It has been observed that blockchain and artificial intelligence has helped many businesses to improve their profitability, similarly, the technology adaption in the agriculture sector can elevate its profits [27], thereby ensuring that sustainable consumer behaviour is practised. Although not many researchers have evaluated the impact of e-marketing on the profitability in the agriculture sector [28], it is believed that if the digital transformation is adapted and the e-marketing is employed, then the profitability would improve for agricultural products both in their production and in their sales [29]. CI is formed by the trust which is developed by the affective, cognitive, and personality-based factors. These factors impact e-marketing via the use of SMS, social media messaging, websites, banners, emails, posters, blogs, streamed, and recorded movies, and so on [30]. Some perceptions are built on others’ experiences, and some are based on self-realisations [31]. Both types of perception tend to have a strong impact on their users. Farmers have faced numerous challenges as a result of the digital transformation, and they face hurdles in incorporating cutting-edge technology into their operations [32]. The use of e-marketing tools and the approach to this is influenced not just by technology, but also by the age and education level of the users [32,33]. All of these measures can develop sustainable businesses and ensure that sustainable consumer behaviour is practised.

How will digital transformation and the adaption of e-marketing impact the formation of trust to ensure sustainable consumer behaviour? How trust will impact the formation of CI for agricultural e-marketing? Developing trust in e-marketing for farmers is a difficult task, and as a result, it is necessary to improve the trust in e-marketing channels. One of the most important theories of technology adaptation is the technology acceptance

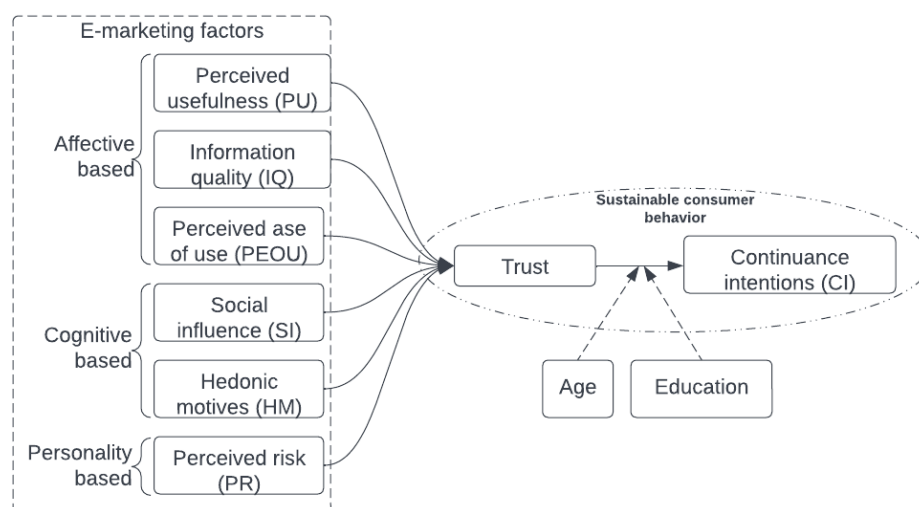
model (TAM) [15], which states that there are certain factors that influence the desire of an individual to use new technology. The extended unified theory of acceptance and use of technology (UTAUT2) [34] is another important theory for technology acceptance that was developed as a model to explain the effect of certain factors on the behavioural intentions. Further, this theory aims to describe how users want to use an information system and how they actually use it. These two theories (TAM and UTAUT2) aim to understand why people accept or reject certain technologies. Both of these theories have been widely used in disciplines that are related to digital transformation and e-marketing. The researchers suggest that there is still a lack of focus on the digital transformation of e-marketing in terms of encouraging CI. As a result, a thorough investigation of the factors of e-marketing that led to the formation of CI is required. Despite the fact that several researches have emphasised the impact of e-marketing on the agriculture industry, there have been relatively fewer uses of e-marketing in this context [35,36].

The present study investigates the relationship of e-marketing factors, namely, the affective (PU, IQ, and PEOU), cognitive (SI and HM), and personality-based (PR) variables and the trust–CI relationship. Further, this study aims to examine the moderating effects of age and education as the literature suggests that these are important for agricultural e-marketing. Therefore, this study adds to the literature by investigating the drivers of the digital transformation in an agricultural e-marketing context. Using TAM and UTAUT2, this study proposes a theoretical model of trust which explains the multi-step process that farmers utilise in determining their willingness to accept the use of e-marketing techniques. Further, this study validates and extends the applicability of the TAM and UTAUT2 in explaining the farmers’ affective, cognitive, and personality-based factors that affect the e-marketing of agricultural products.

The sustainable consumer behaviour includes the development of trust which leads to CI. In conclusion, this study represents a model that is related to trust and CI (Figures 1 and 2) to address the identified research gaps. Firstly, the contributions of this study are more important as they utilise the TAM and the UTAUT2 model, and this sheds light on how trust leads to CI for the adaption of agricultural e-marketing. Secondly, it adds to the growing field of agricultural e-marketing by looking at the moderating effects of age and education [23,37]. Finally, from the managerial standpoint, this research has practical consequences, such as emphasising the need to include a trust-building process to explain the CI.



**Figure 1.** General conceptual model. Source. Authors own.



**Figure 2.** Proposed integrated model of the study. Source. Authors own.

The following section is about the layout of this paper. The main text of the paper is divided into six sections, which are followed by Appendix A and the references. The introduction to the topic and the paper are given in Section 1. The review of the literature and the development of the hypotheses are covered in Section 2. Additionally, the conceptual foundation of the paper is included in this section. Section 3 discusses the data analysis and the methodology that are used in this paper, while Section 4 presents the empirical results. Section 5 is related to the discussions in which both of the theoretical and practical implications are presented, and this is followed by the conclusion in Section 6.

## 2. The Review of Literature and Hypothesis Development

In Saudi Arabia, the use of e-marketing is gaining popularity for products and services for a variety of reasons including them having lower transaction costs, faster information transmission, a larger scale of spread, the elimination of intermediaries, a greater degree of market access, an improved profitability, and so on [37,38]. All of these advantages accrue not only for the sellers (farmers), but also for the consumers. The consumers of agricultural products gain from using e-marketing because, among other things, it offers cheaper costs, a wider selection of items, a simple mode of access to them, and an increased accessibility to the goods [27,38]. With nearly 93.315% of the population having an online presence and there being 33.58 million active users, Saudi Arabia is one of the countries with the fastest internet penetration rates [39]. This demonstrates that there is a high level of internet acceptance among the general public. The low cost, high dispensability, wide coverage, and the fast and accurate flow of information makes e-marketing a leading choice for marketers. Despite the researchers' various viewpoints on the effects of e-marketing, there is a general agreement on its positive influence on boosting profitability, managing marketing initiatives, and on sales activities [22]. A successful supply chain management system can be developed by implementing e-marketing channels in farmlands. Farmers will profit from having a successful e-marketing system since it will help them get the best price for their produce and increase their revenues by cutting their expenditures. There is no estimated number of websites that are dedicated to agriculture e-marketing in Saudi Arabia, and these websites are the network platform to create e-marketing. Likewise, there is a need to have a variety of websites that are specialised for information integration, payment, and vendor registration, among other things. Agricultural e-marketing websites in Saudi Arabia are currently amateurish, and as a result, more

agricultural firms and intermediary organisations should build commercial websites, and the public and decision makers should evaluate these websites on a regular basis. One such example is “tayeabat.com,” which is one of the most well-known websites that offers vendors e-marketing services for them to sell their agricultural produce [40]. In Saudi Arabia, the farmers’ confidence in e-marketing channels can be built by developing an agricultural e-marketing support system. This agricultural e-marketing support system can include a hardware support system and a software support system. It has been seen in past research that agriculture farms with high asset values have chances to ensure their future sustenance [41], and the adaption of e-marketing enhances the value propositions [42]. To explain the above-mentioned structure, a conceptual model (Figure 1) has been developed for agricultural e-marketing in Saudi Arabia. Infrastructure to support the e-marketing operations may be available as a part of the hardware support system for agriculture, which includes computer systems, internet systems, and other technologies. Saudi Arabian decision makers have the ability to establish agriculture e-marketing channels such as dedicated websites, e-services centres, and mobile apps [35] which help their users to avail services electronically.

### 2.1. Theoretical Underpinning

The TAM and the UTAUT2 model have been widely constructed and experimentally verified in technology acceptance research to highlight the characteristics that influence their users’ desire to operate the technology. One of the most important theories of technology adaption is the TAM [15], which states that two key elements influence an individual’s desire to utilise new technology, namely, PU and PEOU. [34] developed UTAUT2 as a technology acceptance model in “User acceptance of information technology: Toward a unified vision.” Both of these theories have been widely used across the disciplines that are related to digital transformation. UTAUT2 seeks to describe how users want to use an information system and how they actually utilise it. Many researchers have applied and validated the UTAUT2 model in various settings [14,43–45]. Some researchers have studied the adaption of agricultural e-marketing, and in their studies, they have explored the role of PR, SI, and PEOU on CI from different perspectives [14,46]. Most of the studies have found that there is differential level of the significance and the impact of PU, IQ, PEOU, SI, HM, and PR on CI [14,43].

As in past research, several researchers have integrated TAM and UTAUT2 to suit the research setting [47,48]. Similarly, in this study, these theories have been integrated to measure the CI of agricultural e-marketing. For the application of the integrated model, the variables from TAM and UTAUT2 have been adapted to suit the context. In the integrated model, PU, IQ, PEOU, PR, HM, and SI are the independent variables for trust and further, they impact CI to guide the adaption of e-marketing. These CIs are moderated by age and education. The concepts of PU, IQ, and PEOU are considered to be cognition-based factors. The HM and the SI are considered to be affective-based factors whereas PR is a personality-based factor. The hypotheses that are developed in this study have a strong foundation that is based on previous research.

An integrated model has been presented to understand the impact of e-marketing on the CI (Figure 2). This model is based on the TAM and the UTAUT2 model in the context of agriculture in Saudi Arabia. An integrated model can be used to improve the degree of trust, and with its use, the CI can be comprehended. In this model, the CI is defined as a farmer’s willingness to use e-marketing applications. In terms of the causes of this persistence, previous research has looked at a variety of factors to see how trust affects CI, where PU and PEOU influence the CI in a TAM [49]. However, research on an integrated model of TAM and the UTAUT2 model to explain the determinants that influence the farmers’ intention to use e-marketing is insufficient. There are two steps that are connected to the farm activities in this proposed model (Figure 1). The first level involves traditional assistance, while the second involves technology assistance for farmers. The agricultural support and agriculture procurement support are the first two steps. Crop decision support,

crop production, crop maintenance, and crop harvest are all the part of farm support and agriculture procurement assistance parts. The second level is concerned with technological knowledge, which is linked to an understanding of the software and hardware. Providing adequate software and hardware knowledge helps to develop the technological knowledge. This is a stepping stone for the agriculture e-marketing support system. The second part of the model is concerned with the development of trust, which is essential for the adaptation of e-marketing. This agricultural e-marketing support system will pave the way for the creation of new agricultural channels. These channels could include mobile apps, websites, and e-service centres.

## 2.2. Hypothesis Development

### 2.2.1. PU

Every person has an opinion on the usefulness of a product or service. Many academics have described this concept as PU [50,51], which is associated with enhancing the performance of it. It also demonstrates the customers' perceived value for a technology and how that value influences their decision to adopt and use it. In this study, the term PU refers to the amount of benefit that the consumers will receive from using e-marketing. According to the TAM, a favourable relationship between the PU and intention has been discovered by various researchers. This favourable influence in customer environments has been confirmed in studies evaluating the relationship between the performance expectancy and the behavioural intention. Furthermore, in the case of e-marketing, the impact of PU on trust is unknown [23,51]. According to one study, PU improves the trust in e-marketing, and this trend is expected to continue in agricultural e-marketing as well. Farmers also believe that e-marketing will allow them to have direct contact with the consumers via electronic retail [52]. As a result, we believe that the PU, as one of the factors of e-marketing, will impact trust [53] among its users, therefore, the following hypothesis was proposed:

**Hypothesis 1 (H1):** *PU has a positive impact on trust.*

### 2.2.2. IQ

Although, in Saudi Arabia, the internet penetration is very high and the use of the latest technology is always welcomed [54], some people might not be comfortable using it. Everyone acquires information from a number of sources, some of which are more reputable than others. The system's IQ is determined by the relevance, accuracy, and degree to which sufficient information is given [55]. Many farmers in Saudi Arabia's Al-Baha region are not well versed in the use of technology, and they continue to farm in traditional ways because they are unaware of the various benefits of new technologies [56,57]. The availability of high-quality information that is related to the farm or the cultivation process has benefited farmers in many other parts of the world [58,59]. Therefore, to test the relationship of the IQ on trust for e-marketing, the following hypothesis was proposed:

**Hypothesis 2 (H2):** *IQ has a positive impact on trust.*

### 2.2.3. PEOU

It is a well-known fact that the consumers of technology are always drawn to a technology that reduces the amount of work that is required to complete a task. Various researchers have defined the PEOU as the act of adjusting a procedure in order to reduce the effort that is required to complete it [15]. Further, it is also understood that the adaption of the technology and the reduction of the efforts by the adaption of technology leads to ones' PEOU [50]. Because it is a cognitive concept, it has a favourable impact on technology adaptation, and comparable findings have been published by numerous researchers [53]. Therefore, to test this relationship in the context of farmers in Al-Baha region of Saudi Arabia, the following hypothesis has been formulated:

**Hypothesis 3 (H3):** *PEOU has a positive impact on trust.*

2.2.4. SI

The impact of one person's opinion on the other person's decision making is considered to be the SI [59]. The individuals who have a higher importance in one's life tend to be higher influencers than those who do not have as much value to them [60]. In general, it is observed that when adapting the new technology, the role of the SI is much higher. When deciding whether or not to buy things online, the customers give the opinions of previous customers [61], and digitalisation has benefited many businesses in enhancing their profitability [62]. Similarly, this is observed in Saudi Arabia where the technology adaption by the consumers is influenced by many factors [63–65]. The adaption of any new technology is majorly influenced by friends, family, relatives, or other influences [23,63,64,66]. Especially in agriculture, the role of the SI is a well-accepted truth where one farmer follows what the others are doing [67,68]. Therefore, to test the impact of the SI in the context of e-marketing, the following hypothesis has been framed:

**Hypothesis 4 (H4):** *SI has a positive impact on trust.*

2.2.5. HM

The use or adaption of any of these technologies has many apparent as well as hidden motives for an individual. These motives are very important for the application of a UTAUT2 model [66], and they can vary from individual to individual. Trust, satisfaction, loyalty [69], and fun [50] in the adaption and the use of technology are considered to be the most apparent HMs. Online websites or marketing channels may have some unique facilities such as product comparison and demonstrations that may motivate consumers to use the e-marketing applications [70,71]. These facilities may contribute to the HM, leading to the adaption of e-marketing. There may be HMs that are related to past practices that farmers may not be willing to quit [72]. These reasons for trusting or distrusting e-marketing may be obscure, yet they may be quite powerful [47]. Therefore, the HM is a major factor in the building of trust [73]. Hence, to test the relationship in the context of the farmers in the Al-Baha region of Saudi Arabia, the following hypothesis was formulated:

**Hypothesis 5 (H5):** *HM has a positive impact on trust.*

2.2.6. PR

People's distrust of e-marketing is well-documented, and this risk can be both affective and cognitive. Regardless of how competent they are at using online applications, every consumer has some amount of apprehension regarding security problems. The consumer's willingness to assume that their expectations will be met during an e-marketing activity is measured by their confidence in using e-marketing platforms [23]. The consumer's individual perception of the possibility of things going wrong when they are engaging in e-marketing activity is the risk factor [74,75]. Consumers are more inclined to trust e-marketing applications if they feel that it is governed by a set of obligatory norms and standards that protect them from shady online companies. This is useful since it relieves the customers' concerns about the transaction's potential risk. As a result, a reduced degree of PR in e-marketing activities is a key factor in fostering trust. People are afraid of technology [23,69], internet-based transactions [76], and the use of mobile phones when it is related to e-commerce. However, the agriculture sector is full of online opportunities [25], and no one can deny the fruitful contributions of online trade in the development of the agriculture sector. The users' evaluation of the risk and the benefits make them resistant towards the adaption of technology or sometimes vice versa [74]. In this context, the PR is associated with the users' belief that the use of e-marketing is going to impact them adversely. Both of the factors that are related to risk and trust inhibits the users to adapt e-marketing [18,76]. As a result, many farmers are hesitant to use e-marketing to

make transactions due to its perceived danger. We believe that a lack of trust in the current context has resulted in a higher PR of engaging in e-marketing transactions. Therefore, the following hypothesis has been framed:

**Hypothesis 6 (H6):** *PR has a negative impact on trust.*

#### 2.2.7. Trust

The farmers' trust in agricultural e-marketing is based on their belief that adopting this new technology will help them to expand their business. If this trust remains in e-marketing, the farmers will continue to use and adapt it to a greater extent. However, previous research has found that farmers have a low level of efficacy when it comes to adapting to agricultural e-marketing applications due to them having a lack of trust in them, among other factors [77]. Shopping continuance is highly influenced by the trust that a person has in the e-marketing [73,78]. The farmers should have developed favourable attitudes toward e-marketing and begun to favour the new technology. The users may be drawn to the adaptation of e-marketing in the future as the rate of internet usage and the awareness of e-marketing platforms grow. Therefore, to test the impact of trust in the context of the CI, the following hypothesis has been framed:

**Hypothesis 7 (H7):** *Trust has a positive impact on CI.*

#### 2.3. Moderating Role of Socio-demographic Variables

The individuals' ease of use of the new technology depends upon the age of an individual [5,73] and its adaptability for daily activities [23,79]. The consumers use technology for their ease of use [66], and if the age of the users is lower, then they might adapt to that change quickly in comparison to the people who are older do [49,80]. To test the moderating role of age as a factor for the trust–CI relationship, the following hypothesis has been framed:

**Hypothesis 8 (H8):** *Age has moderating effect on trust–CI relationship.*

Education level is one of the active components of learning any new technology [81]. Learning a new technology and the adaption to it becomes easy if the person is educated [15,59]. This also helps in developing trust [23], having loyal customers [82], and to have a continuance of the use of the technology. To test the moderating role of education as a factor for the trust–CI relationship, the following hypothesis has been framed:

**Hypothesis 9 (H9):** *Education has moderating effect on trust–CI relationship.*

### 3. Methodology

#### 3.1. Data Collection

This study uses a quantitative technique to investigate the hypotheses that are stated in our research model. The data were collected using a non-probability sampling technique from the farmers in and around the Al-Baha region of south Saudi Arabia by using a questionnaire. These farmers produce fruits and vegetables in and around the Al-Baha region of Saudi Arabia. The data were collected from 1<sup>st</sup> November 2021 to 15<sup>th</sup> February 2022. The farmers' data were collected for this study because they are the primary users of agricultural e-marketing applications, and because measuring their perceptions of the CI is the primary goal of this study. The farmers were first approached at the city centre farmers' market, where they gather weekly to sell their goods. These farmers were then asked to share the information about their fellow farmers in order to collect the data.

To ensure the common method bias (CMB) was minimised, firstly the Harman's single-factor test was performed. The maximum variance that was explained by one component using a principal component analysis (PCA) was 17%, and according to Harman's single-factor test, since the single component did not explain more than half of the variation, there was no CMB [83]. Secondly, the variance inflation factor (VIF) values were evaluated. If the VIF values were greater than 3.3, then it was assumed that there was



pathological collinearity and that the model was suffering from a common method bias [84]. In the present scenario, as all of the values were less than 3.3, it was assumed that the model did not have any CMB. A total of 250 questionnaires were sent to the participants, and 172 questionnaires were returned (68.8% response rate). The questions were constructed using a five-point Likert scale because of its relevance in social science research. According to the descriptive analysis (Table 1), the sample had more males (68.02%) than it did females (31.97%). In terms of the marital status, 60.46% of those who were surveyed were single, while 31.97% of them were married. The 20–30-year-old age group comprised the highest percentage of them (48.83%), which was followed by the 30–40-year-old age group (29.06%).

**Table 1.** Demographic characteristics of the sample.

Characteristics	Category	N	%
Gender	Male	117	68.02
	Female	55	31.97
Marital Status	Married	104	60.46
	Unmarried	69	40.11
Education	Below Graduation *	138	80.23
	Above Graduation **	34	19.76
Age	≤20	23	13.37
	>20 to ≤30	84	48.83
	>30 to ≤40	50	29.06
	>40 to ≤50	12	6.97
	>50	3	01.74

\* Those who have not entered the university level. \*\* Those who have entered the university level.

### 3.2. Variables and Measurement Scales

All of the variables were assessed using multi-item measures that have previously been validated and published. Because this population speak Arabic, the questionnaire (given in Appendix A) was translated from English to Arabic. The back-translation approach was used to ensure that the questionnaire was translated correctly and that the number of errors was minimised. This technique is a well-trusted and widely accepted technique to adapt cross-cultural and language-related research [85]. All of the responses were organised using a five-point Likert scale that ranged the responses from strongly disagree (1) to strongly agree (5). The questionnaire's items were derived from a previously developed questionnaire [86] for measuring the CI. Only the wording of few items of the questionnaire was altered to suit the theme of the research. As the model contained six latent variables, PU, IQ, PEOU, PR, HM, and SI, the SMART-PLS3 software was used to examine the influence of each element. According to the model, all of the zero-order constructions were reflective, and the significant level of these components were tested using bootstrapping.

## 4. Results

### 4.1. Measurement Model

To test the hypothesis and develop a relationship among the variables, a partial least square (PLS) method was applied using SmartPLS3 [87]. In comparison to the more widely used covariance-based SEM approaches, it also requires fewer assumptions about how the data are distributed [88]. The current study's sample size met the SmartPLS suggested criterion for relationship modelling [89]. In addition, because all of the six zero-order variables are formative models, the PLS algorithm was used [90]. The model's robustness was demonstrated by accessing the measurement model, reliability, as well as convergent and discriminant validity [91]. The convergent validity was assessed using a

range of indicators, including Cronbach's alpha, average variance extracted (AVE), loadings, and composite reliability (CR) (as shown in Table 2 and Table 3). The AVE, CR, and Cronbach alpha values were found to be above the acceptable levels of 0.50, 0.70, and 0.70, respectively [88,90].

**Table 2.** Construct reliability and validity.

Variables	Chronbach's Alpha	roh_A	Composite Reliability (CR)	Average Variance Extracted (AVE)
CI	0.918	0.922	0.961	0.924
T	0.947	0.958	0.969	0.888
HM	0.859	0.914	0.912	0.776
IQ	0.838	0.911	0.901	0.753
PEOU	0.907	0.938	0.942	0.845
PR	0.855	0.922	0.900	0.695
PU	0.943	0.979	0.983	0.949
SI	0.761	0.783	0.869	0.694

The beta values show the correlation between the indicator variables, and the latent variables. The AVE was more than 0.5, and the composite outer loadings for all of the indicators were within the permissible range of 0.6, suggesting that the model's assessments of all of the variables had a high level of convergent validity. The individual item reliability was determined to be acceptable for the structures and their items, which were followed by the loadings in the model. The AVE ranged from 0.694 to 0.949, the Cronbach's alpha was between 0.761 and 0.947, the Roh was between 0.783 and 0.979, and the composite reliability was between 0.869 and 0.983. The outer loading on all of the questionnaire's items was 0.60 or higher (Table 3).

**Table 3.** Outer loadings.

Items Code	CI	T	HM	IQ	PEOU	PR	PU	SI	VIF
CI1	0.958								3.211
CI2	0.964								3.117
T1		0.877							3.100
T2		0.970							2.721
T3		0.965							2.113
T4		0.954							2.215
HM1			0.911						1.713
HM2			0.856						2.089
HM3			0.875						2.148
IQ1				0.931					2.291
IQ2				0.849					2.433
IQ3				0.819					1.879
PEOU1					0.970				1.911
PEOU2					0.961				1.188
PEOU3					0.820				1.081
PR1						0.826			1.908
PR2						0.882			1.812
PR3						0.903			3.122
PR4						0.710			3.001
PU1							0.969		2.324
PU2							0.964		2.698
PU3							0.989		2.911

SI1	0.906	2.661
SI2	0.626	1.152
SI3	0.932	1.933

Note: Continuance intentions (CI), Trust (T), Hedonic motives (HM), Information quality (IQ), Perceived ease of use (PEOU), Perceived risk (PR), Perceived usefulness (PU), and Social influence (SI).

In SmartPLS3, the discriminant validity was checked using the cross-loading values, where the diagonal values for each dimension were the largest and where the Fornell–Larcker criteria and the AVE were greater than maximum shared variance (MSV) was [92]. For the evaluation of the discriminant validity, the cross-loadings were tested using the Fornell–Larcker criteria [92]. The diagonal elements show the square root of the average variance that was extracted. The off-diagonal components represent the correlations between the variables. The vertical and horizontal values were all higher than the construct's values were (Table 4). It possesses discriminant validity since all of the variables in the present model are inside the range. Second, the structural model was examined to see whether fit indices could be applied to it.

**Table 4.** Discriminant validity: Fornell–Larcker criteria.

Variables	CI	T	HM	IQ	PEOU	PR	PU	SI
CI	<b>0.961</b>							
T	0.649	<b>0.942</b>						
HM	0.283	0.403	<b>0.881</b>					
IQ	0.606	0.571	0.174	<b>0.868</b>				
PEOU	0.225	0.424	0.477	0.095	<b>0.919</b>			
PR	−0.562	−0.229	0.222	−0.464	0.251	<b>0.834</b>		
PU	−0.025	−0.300	0.044	0.122	−0.069	−0.066	<b>0.974</b>	
SI	0.559	0.580	0.311	0.520	0.306	−0.167	−0.367	<b>0.833</b>

Notes: Diagonals (in bold) represent the square root of AVE and other entries represent the correlations.

#### 4.2. Structural Model

The values of the path coefficients for the dependent and independent variables are shown in the PLS algorithm output (Table 5). The magnitude to which the independent factors predict the change in the dependent variable is indicated by the path coefficient values. The path coefficients illustrate the direct impact of a variable that is thought to have an impact on another variable. In this model, all six of the factors were examined for their impact on the farmers' willingness to adapt to agricultural e-marketing applications.

**Table 5.** Path coefficients and results of hypothesis testing.

Hyp.	Variables	Path Coefficient	Std. dev.	t-Statistics	P-Value	Results
H1	PU → T	−0.056	0.083	0.667	0.505	Rejected
H2	IQ → T	0.067	0.119	0.563	0.574	Rejected
H3	PEOU → T	0.236	0.156	1.520	0.130	Rejected
H4	SI → T	0.672	0.115	5.834	0.000	Accepted
H5	HM → T	0.011	0.158	0.068	0.000	Accepted
H6	PR → T	−0.151	0.077	1.9581	0.040	Accepted
H7	T → CI	0.658	0.088	7.415	0.000	Accepted
H8	Age * T → CI	0.193	0.077	2.498	0.013	Accepted
H9	Education * T → CI	−0.050	0.104	0.482	0.630	Rejected

\* Interaction variables.

The result of the path coefficients shows the individual variables' impact of trust on the CI. It is found that the SI ( $\beta = 0.672$ ,  $p < 0.000$ ) and the HM ( $\beta = 0.011$ ,  $p < 0.000$ ) both had a positive significant impact that resulted in trust ( $\beta = 0.658$ ,  $p < 0.000$ ) having a positive significant impact on the CI. The PU ( $\beta = -0.056$ ,  $p < 0.000$ ) and the PR ( $\beta = -0.151$ ,  $p < 0.040$ ) both had a negative significant impact on trust. The two factors (PEOU and IQ) were found to have positive but insignificant impact on trust (Table 5). The R-square value for trust is 0.754, which indicates that the 75.4% of variance in trust is explained by the six factors, while 44.8% of the variance in the CI is explained by trust (Figure 3).

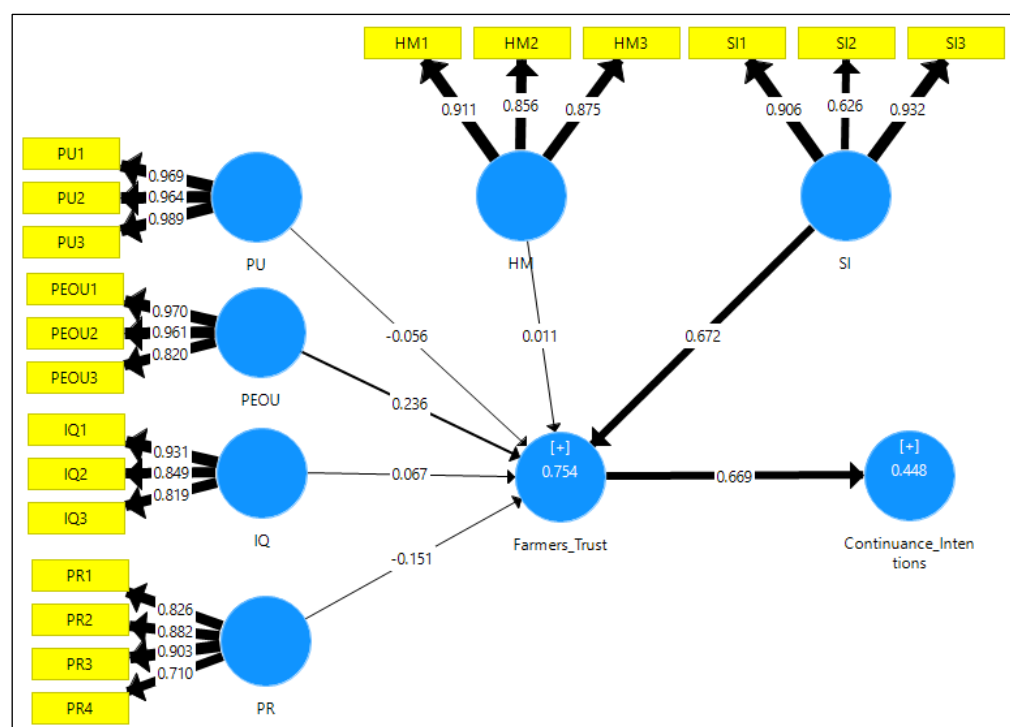


Figure 3. PLS algorithm output.

#### 4.3. Moderating Effect

The moderation effect of age and education was observed against the trust–CI relationship. To test this moderation effect, first the impact of trust on the CI was tested without the moderating variable, and the effect of it was found to be 66.9%. After including a moderating variable (age and education), again the impact of trust on the CI was observed, and it was found that the effect of it decreased to 65.8%. Hence, this shows that the moderating effects of age and education exist. Bootstrapping was used to determine the significance of the moderating variable. The results of the bootstrapping method show that the moderating effect of age for trust on the CI is significant, whereas the moderating effect of education for trust on the CI is insignificant. Hence, it can be concluded that age moderates trust positively for the CI (Figure 4).

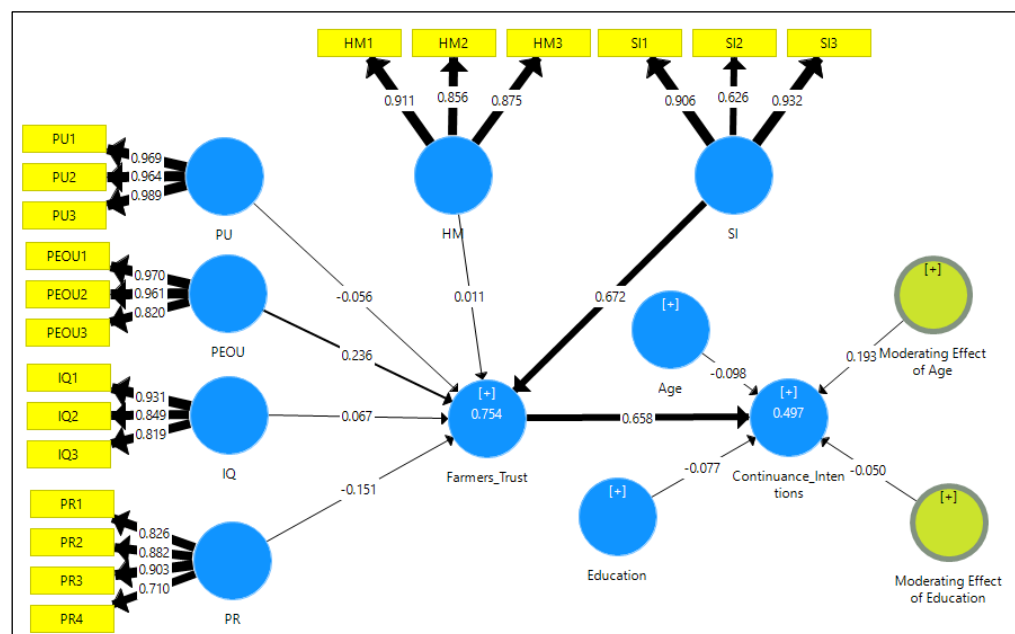


Figure 4. Moderating effect of age and education.

## 5. Discussions

The current study sought to examine how the factors that are related to agricultural e-marketing affected the emergence of sustainable consumer behaviours. A conceptual model was proposed that has never been used in the area of agricultural e-marketing, and this model divides the activities into two parts. The first step deals with the conventional support element, whereas the second step deals with the technology adaptation element. The integrated model was created to explain how trust is formed in order to form the CI. The integrated model intended to demonstrate how this model can be used to increase trust in order to form the CI. According to the integrated model, nine hypotheses were formed to find the CI values for agricultural e-marketing. Five hypotheses (H4, H5, H6, H7, and H8) were found to have a significant impact, while the four hypotheses (H1, H2, H3, and H9) were found to have insignificant impact. Therefore, four hypotheses were rejected, while the remaining five were accepted. It was found that the PU has a negative impact on trust, showing that farmers do not believe that e-marketing has a favourable influence on trust. Because the PU has a negative and insignificant impact on the trust variable, it is unlikely that it will lead to the CI for agricultural e-marketing. These findings contradict with the prior findings that the PU contributes to the establishment of trust [7,15,49,93]. The farmers in the Al-Baha region of Saudi Arabia have a negative PU, indicating that they do not understand the value of e-marketing applications and hence, do not trust them. The second variable is insignificant, indicating that the IQ has no impact on the formation of trust. These findings contradict the earlier research which claims that the IQ helps in the development of trust [15,23]. However, in this scenario, the IQ has a favourable effect on trust, but it is not significant. It is possible that a lack of IQ, or an insufficient quantity of IQ, causes an insufficient contribution to trust. The third variable is insignificant, indicating that the PEOU has a positive impact on trust, but it is not significant in this situation. These findings contradict with that of the earlier research which claims that the PEOU aids in the development of customer trust [23,50,65]. However, the PEOU has a positive impact on trust in this scenario. It is likely that a lack of understanding of e-marketing does not contribute to the trust factor leading to a lack of CI.

Further, it has been found that the SI, HM, and PR (H4, H5, and H6) have a significant impact on trust. The impact of the SI is significantly positive, thereby showing that it can significantly influence the formation of trust. Similarly, the influence of the HM is positive and significant which contributes positively for the development of trust. It is believed

that the SI develops trust in consumers [30,65], and trust assures the future purchase that leads to the formation of the CI [23,49,94]. Similarly, the findings of this study are consistent and have a positive impact on the trust factor and the CI. Previous researchers have found a positive significant impact of the SI and HM on trust, and similarly, our findings are in line with the previous findings [18,50]. The impact of the PR (H6) is found to be significant but negative. It may be because farmers resist the adaption of modern technology for e-marketing since they are not very familiar with it. Because it is human nature to resist change, it is likely that these farmers will use e-marketing applications after they have become accustomed with them in the future. Similar findings were obtained when the PR was studied in this context previously [30,95,96]. The two moderating variables have a varied impact of trust for the CI in different ways. Age (H8) significantly impact the formation of trust, while education (H9) impact it insignificantly. In other words, we can understand that education as a moderating variable has no influence on the CI. All of these findings are consistent with previous studies on trust and CI [18,53,93,97].

### 5.1. Theoretical Contributions

This research adds to the theoretical understanding in a number of ways. The integrated approach was first verified in a specific agricultural e-marketing scenario that was related to the development of sustainable consumer behaviours. The findings of the study have revealed that the majority of the integrated model assumptions are validated in e-marketing, indicating that the model is applicable. The integrated model, unlike the original TAM and UTAUT2 model, suggested that the HM had a direct influence on trust toward CI, thus leading to the emergence sustainable consumer behaviours. The empirical findings have confirmed that the suggested integrated model is appropriate for agricultural e-marketing, and it has a high level of explanatory power. As a result, this research presents a theoretical framework on sustainable consumer behaviour.

As demonstrated in this study, some of the most critical factors of e-marketing revealed in the TAM and the UTAUT2 model are not applicable to the agricultural e-marketing paradigm to develop sustainable consumer behaviours. Furthermore, certain essential characteristics that are unique to trust are not included in such models. As a result, the existing frameworks are unable to explain the complicated and multifaceted decision-making process that occurs in this setting. According to the suggested integrated model, trust develops as a result of affective, cognitive, and personality-based e-marketing factors, thus leading to the formation of sustainable consumer behaviours. In addition, the present study discovered that the PR factor decreased trust, which has a considerable favourable influence on the sustainable consumer behaviours. This study has revealed an alternative mechanism that is influenced by age. The research has mostly proven that the six factors that were generated from the TAM and the UTAUT2 model for the influence of trust on the CI had varied effects. The SI and PEOU factors had a positive impact on trust, with the SI being the most significant one, which was followed by the PR factor. Similarly, the SI is utilised for more than simply economic quantities; it can also represent social or other types of values [98]. Age had a positive significant impact, while the education had a negative insignificant impact on the CI. This shows that, as the age of the farmers' increases, the level of trust also increases. Therefore, it is anticipated that the sustainable consumer behaviour enhances with age, and this finding can be generalised further to similar research settings.

### 5.2. Practical Implications

This study offers implications for managers and policymakers in the context of the digital transformation of sustainable consumer behaviours. Using an integrated model, this study has investigated the impact of e-marketing on sustainable consumer behaviours. The results of this study offer some useful implications for policymakers who design e-marketing websites and implement tools to improve the utility of these websites. According to an examination of factors that are related to the SI, HM, and PR, utilising e-

marketing applications appeared to be the most essential criteria for generating trust and CI. As a result, mobile-friendly designs should be created that allow the farmers to use e-marketing applications successfully. Therefore, the policymakers should take steps to strengthen the SI by promoting the benefits of e-marketing. The farmers should also be given enough information on how to complete the various transactions on their e-marketing websites, and the websites can encourage farmers to share their experiences in addition to giving useful information. This can be helpful in building trust in e-marketing websites, which can benefit the development of sustainable consumer behaviours.

In addition, the findings suggest that the HM contributes to the trust in e-marketing. As a result, the marketers should have a variety of user-friendly interfaces that make it easier for farmers to visit their e-marketing websites. As a result, mobile-friendly designs that allow the farmers to interact with goods and services on e-marketing websites just as they would on a personal computers or laptops will be an added advantage. Finally, we recommend the use of innovative interface designs to make the e-marketing websites more enjoyable to use. Our findings demonstrate that such attempts increase the HM would be likely to lead to the development of trust.

The farmers will benefit from the establishment of e-marketing centres as assistance channels. These will assist them in locating the markets for their products and determining the price at which they can sell the product, which items can be marketed, and the cost of marketing the products. The policymakers want to reduce the cost of farming, as well as the cost of sales and distribution. If the decision makers want the farmers to employ more e-marketing applications, then they should work on all of the regions at once, remembering that the lack of education among farmers is not a factor. Decision makers should not assume that the farmers would utilise e-marketing applications if they are not well-educated. Rather, farmers, regardless of their level of education, feel similarly when it comes to their trust and CI in e-marketing. As a result, if farmers gain trust, then they will employ e-marketing techniques. As stated at the beginning of this study, various attempts have been made to improve the distribution network by integrating new technologies in them. Agricultural e-marketing has become one of the most popular techniques for strengthening a country's agricultural framework, and these may result in the emergence of sustainable consumer behaviours. However, according to the surveys, not all of the farmers are interested in using agricultural e-marketing [99,100]. Investing in e-marketing applications without first evaluating the farmers' willingness to trust these channels, which have a direct impact on the CI, is thus, a waste of money and resources. As a result, understanding trust is essential for the success of these applications. Furthermore, education has minimal impact on the emergence of trust, which leads to the emergence of CI. Therefore, instead of putting too much attention on education, the policymakers should concentrate on the SI and on decreasing the PR in order to achieve a higher level of trust. It is important to note that using agricultural e-marketing applications carries little or no risk, and this has to be communicated to the farmers. It does not matter how good the data are, or how thoroughly the benefits of e-marketing are promoted, it will not help farmers to gain trust in agricultural e-marketing applications. Investing alone in providing high-quality information and demonstrating the benefits will not persuade farmers to use them. The fact that education has little effect on the growth of trust is an intriguing finding, meaning that the farmers' education will have a minimal impact on the adaption of agricultural e-marketing. This shows that when it comes to implement of agricultural e-marketing, the farmers with a high level of education and those with a low education will behave similarly.

### *5.3. Limitations and Future Directions*

Despite the study's important results, it still has some flaws. To begin with, the data were collected from Saudi Arabia's southern region; in future, data from other locations and different farmers may provide more diverse views on trust and the CI. Second, the data on the farmers were difficult to obtain, thus, a more general and pan-Saudi Arabia

data collection procedure might provide a more comprehensive view of trust and the CI. Further, to give depth in the analysis and to understand the behavioural differences that are present, a segmentation of the data in terms of the production, size of land in which foods are planted, and the tons of product that are harvested can be performed in future studies. Finally, to better understand trust and the CI, more variables may be explored and included in the integrated model, and a more generalised model can be built in future studies. Finally, future study might work on adopting additional models for a more comprehensive understanding of trust and the CI.

## 6. Conclusions

This study developed and tested an integrated theoretical model for trust leading to the CI for e-marketing. It was assumed that the six factors of e-marketing predict the trust that leads to the emergence of CI for sustainable consumer behaviours. On the premise of the TAM and the UTAUT2 model, this study proposed an integrated model. For trust and the CI, the moderating impacts of education and age were also investigated. The responses from the farmers in and around the Al-Baha region of southern Saudi Arabia were used to develop the structural model. These findings reveal that the PR had a significant negative impact; however, the SI and HM had a significant positive impact on trust. Furthermore, trust appears to have had a positive impact on the CI. The moderating study finds that education is not a significant moderator, but age is a significant moderator for the trust–CI relationship. To summarise, it is seen that out of the nine hypotheses, four of the hypotheses were rejected and five of the hypotheses were accepted. Even though various research has looked at various agricultural e-marketing adaptations, as previously mentioned, there is currently no complete theoretical and conceptual framework that can be utilised to describe the farmers' attitudes toward the usage of e-marketing for the achievement of sustainable consumer behaviours. In other words, there is still a lack of knowledge on how sustainable consumer behaviours are created or curtailed in the e-marketing environment in relation to a variety of factors. The integrated model that is provided in this study may be utilised to explain why trust encourages or discourages CI for sustainable consumer behaviours.

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## Appendix A.

**Table A1.** Items of the questionnaire.

<i>Constructs</i>	<i>Items</i>	<i>Adapted from</i>
<i>Perceived Usefulness (PU)</i>		[15,101,102]
PU1	Using e-marketing increases my chances of achieving things that are important to me.	
PU2	Using e-marketing helps me accomplish things more quickly.	
PU3	I find e-marketing useful in daily life farm work.	
<i>Perceived Ease of Use (PEOU)</i>		[5,7,15,102,103]
PEOU1	Learning how to use e-marketing websites is easy for me.	
PEOU2	My interaction with e-marketing websites is clear and understandable.	
PEOU3	I find e-marketing websites easy to use.	
<i>Hedonic Motivation (HM)</i>		[18,47,101,104,105]
HM1	Using e-marketing website is fun.	
HM2	Using e-marketing website is enjoyable.	
HM3	Using e-marketing website is very entertaining.	
<i>Information Quality (IQ)</i>		[6,18,101,106–108]
IQ1	E-marketing platforms provide output that seems to be exactly what I need.	
IQ2	E-marketing platforms provide sufficient information to enable me to sell my products.	
IQ3	E-marketing platforms provide accurate information.	
<i>Social Influence (SI)</i>		[30,45,83,101,109–112]
SI1	People who are important to me think that I should use e-marketing websites.	
SI2	People who influence my behaviour think that I should use e-marketing websites.	
SI3	People whose opinions that I value prefer that I use e-marketing websites.	
<i>Trust (T)</i>		[30,54,73,95,113–115]
T1	I trust e-marketing websites are reliable.	
T2	I trust e-marketing websites are secure.	
T3	I trust e-marketing websites are trustworthy.	
T4	I trust in the quality of e-marketing websites.	
<i>Perceived risk (PR)</i>		[4,18,74,116]
PR1	Use of e-marketing websites may cause my personal information to be stolen.	
PR2	I will feel uneasy psychologically when I use e-marketing websites.	
PR3	I think it would be unsafe to use e-marketing websites because of privacy and security concerns.	
PR4	I believe that there could be negative consequences by using e-marketing websites.	
<i>Continuance Intention (CI)</i>		[43,44,46,47,102,117]
CI1	I intend to continue using e-marketing websites in the future.	
CI2	I plan to continue to use e-marketing websites frequently.	

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