BANGLADESHI CONSUMER'S ONLINE SHOPPING BEHAVIOR USING TAM EXTENSION

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APPROVAL

This Project titled "**Bangladeshi Consumers' Online Shopping Behavior using TAM extension**", submitted by **Md. Al-Amin**, ID No: **203-17-434** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of MS in Management Information System and approved as to its style and contents. The presentation has been held on January 11td, 2025.

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We hereby declare that, this project has been done by us under the supervision of **Dr. Sheak Rashed Haider Noori, Professor & Head, Department of CSE,** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The purpose was to study Bangladeshi customers' online shopping activities to create a model of their online purchasing behavior. The Technology Acceptance Model, which was especially utilized to evaluate and develop a model of Bangladeshi online purchase behavior, incorporated e-trust, security, and perceived risk as moderators. Both descriptive analysis and a quantitative methodology were used in this investigation. To distribute questionnaires and gather primary data, 385 respondents were chosen as samples for the online survey. The survey was examined to ascertain how the moderating effects of risk, security, and trust in the Technology Acceptance Model affected internet marketers' intentions to make purchases. Online shoppers in Bangladesh were the focus of this study. This study's population consisted of all consumers who used smartphones or other devices (such as PCs and laptops) to make online purchases from websites like Daraz.com, Ajkerdeal.com, or other product marketing sites. Purposive sampling and non-probability sampling were used to collect samples, and SEM was used for analysis. The results showed that consumer attitudes were positively influenced by perceived utility, perceived ease of use, and purchase intentions. They also showed that perceived ease of use was positively influenced by purchase intentions reinforced by perceived risk, and they were positively influenced by purchase intentions reinforced by security and e-trust.

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CHAPTER 1

Introduction

1.1 Introduction

The industrial revolution has had an impact on several kinds of sectors as well as the global community. The development of Industry 4.0, which suggests the application of big data, artificial intelligence, and/or IoTs in industrial processes, was one of those turning points in this advancement [1]. Organizational operations now require previously unheard-of levels of automation, intensity, and interconnectedness as a result of this structural shift.

Due to the COVID-19 pandemic, Industry 5.0 has developed alongside the digitalization movement in recent years. Developing and maintaining resilience and adaptability in conjunction with modern technology and people is the main goal of this next stage [2]. The epidemic has brought about change, particularly for the e-commerce sectors, which have expanded quickly as more people shop online [3].

1.2 Internet and E-commerce Growth in Bangladesh

Bangladesh has seen an increase in the use of the internet. In 2022 the country's internet penetration rate was 70.41% and in 2023 it increased to 73.34 and is expected to reach 132 million internet users in 2023 [4]. Such growth speaks of significant rise compared to the previous years, when the penetration rate was 57.24% in 2018 and 63.57% in 2019–2020 [5]. It implies that the internet usage demographics are balanced between men and women both in Bangladesh. Actively used internet in 35–54 age group and the 19–34 age group very close together. Here too, this shift is offline to previous years in which younger individuals constituted the highest percentage of internet users [6].

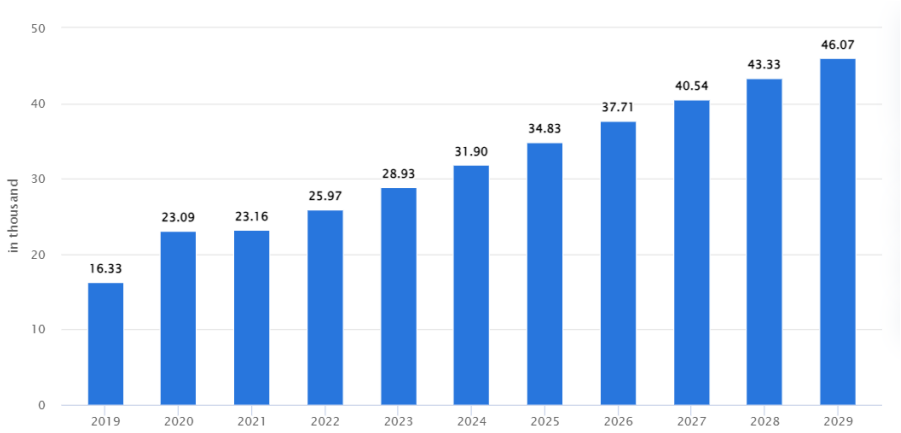

Figure 1.1 Bangladesh Internet User Penetration 2019-2029

In official statistics, we see that internet usage has climbed noticeably in urban as well as rural areas, with 84.42% of people in metropolitan areas and 68.25% people in rural areas using it [7]. We can witness the internet becoming more and more part of our lives, influencing our behavior, and in turn how we consume. From this, it's obvious how digital platforms are hugely used everywhere.

1.3 Factors Influencing Online Buying Behavior

Mobile marketing is gaining popularity in Bangladesh as more and more people opt to use their phones for all kinds of purchases and information. This development means businesses are responding with mobile marketing strategies to better engage consumers. Mobile marketing is becoming more and more effective due to increasing sophistication of ways businesses can apply technical advancements to advertise products, services or businesses to the relevant clients [8]. From 16.33 million in 2019 to 31.30 million in 2024 and to 46.07 million by 2029, there has been a substantial growth in e-commerce in Bangladesh with dedicated user base [9]. It reflects the rising trend in online shopping and how digital marketing impacts customer behavior.

1.4 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), first published by Fred Davis in 1986, suggests a basic model of technology use. As per TAM, the two primary factors on influences users' preference for technology are perceived utility (PU) and perceived ease of use (PEOU) [10]. The model derives from the Theory of Reasoned Action (TRA) and partly from the Theory of Planned Behavior, an extension of TRA [11].

Perceived utility, behavioral intention, perceived ease of use and actual usage behavior make up the key elements in TAM. As a TAM, perception of ease of use increases the use technology intention, and actual use behavior will increase [12]. The wide use of TAM has been applied in looking at several technologies such as e-commerce and provide helpful insights of what customers are doing and liking.

On top of TAM, e security, e-trust and perceived risk are important influential factors in online purchasing behavior. As the phrase for consumers' trust in online retailers' ability to deliver products and protecting personal information [13]. To permit the push of the online transactions, the establishment of e-trust is important because the lack of trust may repel consumers to do e commerce.

The methods to ensure the safety and integrity of transactions online is called E-security [14]. This is because e-commerce platforms attract less confidence due to e-security concerns about which strong security protocols are needed to protect user information and transactions.

1.5 Strategic Implications for Businesses

Consumer perceived risk has been defined as a consumer's awareness of potential disadvantages of online shopping that effects the behavior of consumers [15]. This can encompass basic risks as far as product categories are concerned, as well as risk in relation to specific brands or platforms. It's important to address these risks well enough to encourage online trade, and to build customer trust.

This thesis aims to provide a comprehensive model of Bangladeshi Internet purchasing behavior based on TAM with perceived risk, e-security and e-trust variables. The objective of the study is to explain the buyer behavior and describe the marketing strategies that can be employed for better use of online marketing strategies. To launch effective online marketing plans, companies have to understand these factors as moderators of the risks of online shopping and relieve customers' worries. Projected numbers of people using e-commerce in Bangladesh in 2019 to 2029 across various segments in millions of people.

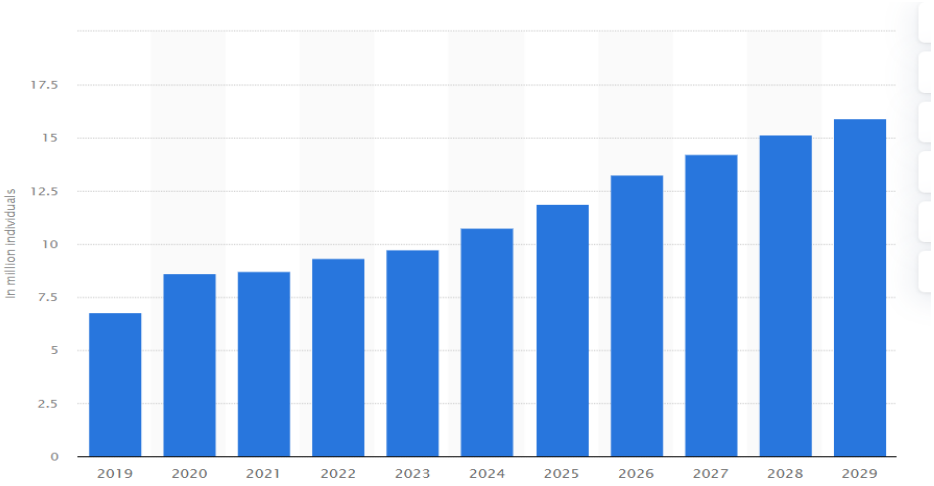

Figure 1.2 Data Bangladesh E-Commerce Users 2019-2029 Source: [9]

The thesis is composed of multiple chapters which each delve into a key part of the research. Chapter 2 provides thorough literature analysis which focuses on Technology Acceptance Model (TAM) extension and its extensions like perceived risk; e-security and e-trust. Chapter 3 explains the research methodology and data gathering techniques used in the study to enable a good framework for the analysis. Chapter 4 presents analysis and conclusions drawn from the collected data to present insights. Having described these findings, Chapter 5 discusses their implications and provides useful suggestions for legislators and companies. Finally, the thesis concludes with Chapter 6 that also outlines future research topics, and provides a summary of the main findings.

CHAPTER 2

Literature review

2.1 Introduction

The rapid expansion of internet infrastructure in Bangladesh, coupled with increasing use of smartphones by consumers has driven online purchasing to pristine levels. The Technology Acceptance Model (TAM) was put out to one of the most important theoretical frameworks to explain these behavioral changes. This chapter provides a comprehensive review of the studies on TAM and the relation with e-security, e-purchase, and perceived risk elements moderation. This chapter also examines how these factors influence Bangladeshi consumers' views on and intentions to purchase.

2.2 Technology Acceptance Model (TAM)

Fred Davis invented the Technology Adoption Model (TAM) in 1986 to predict and explain user adoption of new technologies. ever since [17], where it's been widely used in many different fields. TAM is mostly created to understand the adoption of information systems, based on the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen [18]. TAM's fundamental thesis is that a person's intention to use a new technology is a function of perceived utility (PU) and ease of use (PEOU) [19]. These are determinants of their actual usage behavior.

2.2.1 Perceived Usefulness and Perceived Ease of Use

The amount people perceive that a use of the system would increase their performance on their current job at work [20]. Perceived utility in an e-commerce transaction is often correlated with how fast and how well customers can complete their online purchase tasks

[21]. Perceived ease of use is a concept that describes the degree to which someone thinks that using a system would be simple [22]. This [23] looks at customers' ease of identifying products, navigating e-commerce web sites, and making purchases online; ease of our customers and ease of companies.

Both PEOU and PU studies have consistently shown that how consumers perceive online shopping platform is heavily influenced by PEOU and PU. It was tested through survey on its intent to use e-commerce platforms finding that perceived usefulness had a greater influence than perceived ease of use, i.e. the customers from Bangladesh prefer usability (user friendliness) over functionality (functional benefits) [25].

2.2.2 Extension of TAM in E-Commerce Research

While Technology Acceptance Models (TAM) are useful in understanding how individuals adopt technology, research has extended the model with additional factors that are critical for e-commerce success. TAM2 was extended Venkatesh and Davis (2000). [26] Both social influence processes (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, output quality and outcome demonstrability) are included.

In this study, we extend TAM in the case of Bangladesh by adding perceived risk, e security, e-trust in order to obtain a better sense of on-line shopping behavior in developing economies [27]. These expansions enabled us to understand what factors enable or impede Bangladesh's adoption of e-commerce.

2.3 E-Trust and E-Security in Online Shopping

Electronic transactions of all kinds have major effects in e-commerce, more particularly, because e-trust influences transactions that are done electronically [28]. Several factors

influent trust in e-commerce platforms: eCommerce growth in Bangladesh depends on the development of e-trust due to complaints of online fraud and data breaches [30].

2.3.1 E-Trust

This paper defines e-trust as the level of trust that customers have for the online merchants that sell goods and services and those protected their personal information [31], e-Trust in that it reduces perceived uncertainty which fosters customers propensities for online transactions. As, argued, e-trust acts more powerfully predicting consumers' online buying behavior than perceived usefulness or ease of use, in particular, for first-time online buyers, Rahman and Islam [33] (2021).

2.3.2 E-Security

The term E security denotes technical measures put in place to secure data availability, confidentiality and integrity during the online business transactions [34]. The security category [35] covers comprehensive authentication protocols, encryption technology, and secure payment gateways. E-commerce adoption in Bangladesh was hindered by the lack of e-security measures. On the other hand, customers find online shopping controversial because of fraud, identity theft, and data theft [37].

There have been quite a lot of studies on the relationship of e-security and e-trust. Strong e-security features have been shown to increase e-trust by ensuring customers the transaction and private information are secure [38]. According to Alam and Sultana (2020), Bangladesh consumers tend to more trust and utilize the e-commerce platforms that show its security certification and various layers of security provided while online transaction [39].

2.4 Perceived Risk and Online Shopping Behavior

In the context of online shopping, perceived risk is defined as the potential negative outcome that the consumer can experience [40]. Overall, these risks can fall under several categories — such as financial risk (the risk of losing money), product risk (the risk of getting poor or defective products) and privacy risk (the risk of having its personal information compromised) [41]. Perceived risk is a major hindrance to internet purchasing adoption in Bangladesh, especially amongst older and less tech savvy consumers [42].

2.4.1 Inherent Risk and Addressed Risk

Address risk is [42] the specific risk inherent in a specific brand or product, total concern inherent risk is the sum of concerned associated with a specific product category or transaction type. Because at such contexts the risk of the overall security of e-commerce transactions is naturally perceived to be present, while the risk of the performance of a particular e-commerce platform and the quality of the sold products at this platform are thought to be controlled.

From research we know that different client categories perceive risk differently. For instance, more familiar, experienced Bangladeshi internet shoppers would be more comfortable with the protocol and security protocol related to online transacting [45]. Additionally, certain high value transactions or purchases related to brands or commodities not familiar to the consumer are strongly correlated with a high perceived risk [46].

2.4.2 Mitigating Perceived Risk

In Bangladesh, e-commerce platforms aim to minimize perceived risk of using e-commerce through offering money back guarantee [47], or detailed product descriptions and user review and rating [48, 49]. They can lower the perceived online purchase risk and increase the number of consumers who reach the point of purchase, e- commerce [48]. Secondly,

secure payment options as well as unambiguous return policies also help lessen customers' concerns and increase customer confidence when they start shopping online [49].

2.5 Integration of Perceived Risk, E-Security, E-Trust and into TAM

This present study has also proposed to include three more constructs like perceived risk, e-security and e-trust to the TAM model that will undoubtedly help to better explain the consumer behavior in the online buying environment, more specifically in developing countries like Bangladesh [50]. According to Integrated model [51], attributes could act as moderator between the extent of core TAM dimensions (PEOU and PU) and customer attitudes and purchasing intentions.

2.5.1 Moderating Role of E-Trust and E-Security

It is supposed that perceived utility and the purchase intention are influenced by E-trust and e-security and perceived ease of use and the consumer feelings [52]. For instance, the impact of perceived usefulness on purchase intention was stronger when consumers had high trust on the e-commerce platform [53]. Moreover, e-security also strengthened the link between perceived ease of use and consumers' views, since consumers are more inclined to deem an e-commerce platform easy to use, if they considered it e-safe [54].

2.5.2 Moderating Role of Perceived Risk

The studies have shown that customer attitudes positively impact their acquisition intention but only in the presence of perceived risk. Let’s take a scenario where a buyer has a positive attitude towards online shopping; even then a higher perceived risk may reduce their intention to shop online [55]. Ferdous and Alam [56] have found that perceived risk reduces

the positive association between consumer attitudes and purchase intentions significantly, especially when it comes to higher value goods.

2.6 Hypotheses Development

The literature review led to the growth of hypotheses as follows:

- H1: Customer sentiments are influenced in a good way by perceived usefulness.
- H2: Customer view of our product likes was influenced by perceived ease of use.
- H3: Perceived usefulness is found to be positively related to purchase intention.
- H4: The perceived risk reinforces the perceived usefulness which in turn leads to buying intentions.
- H5: Consumer views positively affect purchase intentions.
- H6: And e-security reinforces attitudes that in turn influence intentions to buy.
- H7: Attitudes are reinforced by e-trust on purchase intentions.

2.7 Conclusion

This chapter discussed the depiction of the Technology Acceptance Model (TAM) and its application to online purchasing behavior in Bangladesh. However, the TAM is a good framework, but the TAM could be used to predict consumers more effectively if the TAM were widened to include such elements as perceived risk, e security, and e-trust. This is especially important in developing countries such as Bangladesh where security and trust is a major hindrance to the development of e commerce. What this has revealed about it.

CHAPTER 3

Outlines the Research Methodology

3.1 Methodology

In this study, a promising framework for developing a new model for the Technology Acceptance Model (TAM) is suggested. The focus of this study is to explore and enrich the behavior of online shopping in Indonesia through merging the TAM framework with the moderating variables, e-trust, e-security and perceived risk. The variables presented here are critical for organizations to design advanced marketing strategies on the online side and counter the concerns associated with online shopping, due to risks. Said: 'Such risks are often associated with doubts around product quality and safety of digital payment transactions.' The study formulates several hypotheses to guide the research: Consumer attitudes and purchase intend are positively influenced by perceived usefulness, whose impact on purchase intentions is further buttressed by perceived risk. In addition, purchase intentions are positively affected by consumer attitudes and such relationship is moderated by e security and e trust. This integrated approach not only brings theoretical clarity of what it truly means to shop community both offline and online, it also provides practical insights about how reasons motivate consumers to favor one more than another shopping platform.

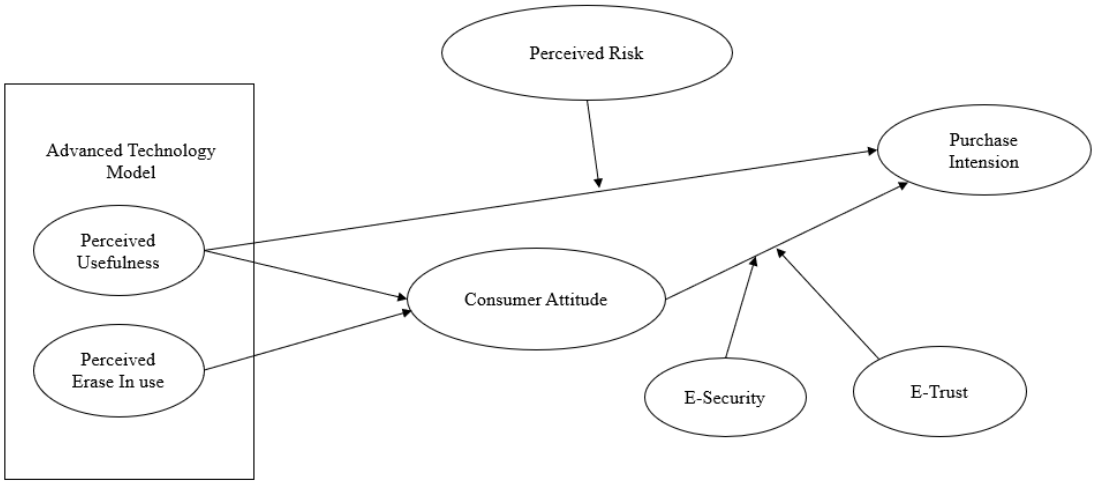

Figure 3.1.1 Research Model.

This phase of study is founded on multiple hypotheses that are integrated to create a research framework:

Figure 3.1.2 Research Stage.

3.2. Prefix

Consumers are unfamiliar with the terms and conditions on the product however they often have irrational expectations about what the product will do and are unhappy. The product must live up to these expectations, or frustration and the loss of brand loyalty begin. In order to overcome this, companies must have a clear declaration of what it is about, what it's good for, what it does well and what it isn't good for. This can drastically cut down on misconceptions and ultimately improve customer satisfaction, as long as your customers really know exactly what they are buying.

Trust is one of the biggest deciding factors for purchasing online is. This is where the idea of e-trust come into picture according to Technology Acceptance Model (TAM).

Customers have to believe that the platform, the goods, are trustworthy for their purchases. What they mean is to provide reasonable expectations and also deliver specific and clear product descriptions. Also, establishing safe payment methods and strong data security protocols will help make a secure shopping environment. [57]

They also have to maintain their client satisfaction through effective communication. This will also take away the burden of making customers understand how to use the product as well. Educational materials such as user manuals, thorough frequently asked questions and attentive customer service sends out a message to their customers that they stand to benefit from them. Putting emphasis on openness, the security and unambiguous communication can increase consumer happiness, loyalty and maintain a reliable online presence [58].

3.3. Process

The use of goods based on the Technology Acceptance Model is important in promising consumer satisfaction when purchasing online. In this approach, customers' decisions to interact with online marketing platforms are directly affected by enabling them to assess the accuracy and effectiveness of their purchasing experiences. According to the TAM framework, perceived utility and ease of use are the only two factors that drive customers towards the adoption of online purchasing [59-60].

3.4. Output

When trust acts as a moderator, customers would have unhindered access to all information about the product and were supposed to understand their part in the TAM model, while making online purchases [61]. Companies can facilitate open communication and thereby gain confidence among users to motivate buyers to purchase more and display brand loyalty [62].

Perceived usefulness refers to customers' perceptions of how much an online shopping platform would enhance and add value to their shopping experience. The consumers are more likely to engage with a platform where they can observe that the platform can speed up their buying process or provide goods that efficiently satisfy their wants.

On the other hand, ease of use is the ease and intuitiveness of the buying process. When ease of use is experienced within a platform, customers will generally spend more time browsing and purchasing on a site. By focusing their efforts on these TAM-based components, businesses can offer a more satisfying online purchasing experience that meets not just the demands of the consumers but also fosters enduring devotion to the brand.

3.5. Location

The current research is carried out in Bangladesh using a quantitative approach with a qualitative analytical tool to provide accurate and systematic interpretations of the relationships between significant variables. This was for investigating the influence of TAM on the intentions to purchase. This is accomplished by utilizing risk, security, and trust as moderation variables through an online survey to select a sample size of 385 respondents. This method has therefore allowed a deep investigation into how these variables interact and lead to changes in consumer behavior in the context of online shopping, thus enhancing our understanding of the elements that determine purchase intentions in the Bangladeshi market. The research focuses on Bangladeshi online shoppers [63], [64] since local customer choice is reflected in platforms such as Daraz, AjkerDeal, and Evaly.

3.6. Indicators

In this research, intentions of consumers to continue with the online purchasing platforms are assessed using the TAM-based indicators such as the Perceived Usefulness, PU, and the Perceived Ease of Use, PEOU, as well as additional moderators including the perceived risk, trust, and security. These elements support the sources of foreign exchange that emanate from the ecommerce operations and guide the applications of marketing strategies important at the creation of the model called the Online Shopping Behavior Model [65][66].

3.7. Population and Samples

Respondents in this study are online shoppers from Bangladesh who use the Internet. The samples are selected through a purposive sampling technique, which is a non-probability sampling technique, from the sets of those who have made purchases from renowned local e-commerce sites such as Daraz.com, AjkerDeal.com, and Evaly.com [64]. The sample size is determined to be 385 respondents, as required for the sample in the SEM model [66].

3.8. Model Analysis and Variable Measurements

The relationships among variables were tested by the analysis model of Structural Equation Modeling (SEM). SEM is useful for testing new models and complex structures with tools such as Lisrel [57]. The methodology applied in this research is two-stage: Model Fit Measurement and Model Specification Measurement for Testing Hypotheses [58]. To ensure the validity and reliability of the results, the variables are measured by scales developed in previous studies in similar settings [59], [60].

CHAPTER 4

Results and Discussions

4.1. Data Collection

The study's data collecting was done over a predetermined time frame. Three months were spent gathering data for the whole pilot instrument testing, from early July to late November 2023. Despite the fact that the data has been validated and proven to be accurate, a comprehensive pilot instrument test is required to assess the empirical model put out in this study. Two methods were used to acquire the data: online and offline surveys.

Online surveys required using a network to distribute questionnaires to respondents. This network included posting on websites, contacting members of mailing lists, and interacting with respondents on social media sites like Facebook. With offline surveys, on the other hand, respondents who fit the criteria were contacted immediately and given the opportunity to complete the questions if needed. In order to verify questions pertaining to the respondent's profile and to elucidate any answers scoring a question value of four (4), which denoted a neutral position, an interview was also carried out. A total of 385 questionnaires were gathered, comprising 385 from online surveys.

4.2. Respondent Characteristics

Research was done on all 385 Bangladeshi consumers who used online purchasing apps. The results showed that women made up 24.94% of the respondents, while men made up 75.06 percent, indicating that men are more likely than women to utilize online shopping apps. This result somewhat deviates from the widely held belief that women go online to purchase more than men do. According to the findings of previous studies, women are more susceptible to commercials and make decisions regarding online purchases more rapidly as a result of the influence of feminine emotions. According to reports, women shop online roughly 26 times year, while males do it only 14 times.

In this study, married respondents made up the majority (78.45%), with unmarried respondents making up the remaining 21.55%. Millennials are the primary users of online shopping applications, as evidenced by the largest percentage of respondents (49.72%) being between the ages of 23 and 28. In line with research, the majority of internet users in Bangladesh in 2022 were between the ages of 19 and 34, and a sizable portion of them used the internet for more than seven hours every day.

4.3. Data Normality Test

For statistical structural equation models, the maximum likelihood estimation method necessitates the presence of multicollinearity, freedom from outliers, and normally distributed data. Any observational data point that exhibits extreme values for one or more variables, or that substantially differs from other observations, is referred to as an outlier. Both univariate and multivariate outlier studies are used to assess the analysis of outlier data. To evaluate univariate outliers, data values are converted into standard scores, also known as z-scores, which have a standard deviation of one and a mean of zero. The z-score value that falls within the range of ±2.58 is used to analyze univariate outliers. In this work, both univariate and multivariate normality assessments were conducted using Lisrel software version 8.8. Table 4.1 below displays the outcomes of these tests:

Table 4.1 Study for Univariate and Multivariate normality assessment

Skewness		Kurtosis		Skewness and Kurtosis		
Indicator	Z-Score	P-Value	Z-Score	P-Value	Chi- Square	P-Value
X II	-3.923	0.002	-3.174	0.011	34.082	0.005
X 12	-2.552	0.102	-4.613	0.021	91.721	0.002
X 13	-8.574	0.000	-2.359	0.097	74.504	0.009
X 14	-7.200	0.010	-3.003	0.023	62.882	0.001
X 15	-7.200	0.020	-2248	0.007	51.863	0.009
X 16	-7.398	0.030	-2458	0.008	33.442	0.003

X 17	-6.278	0.060	-4.423	0.003	55.987	0.002
PEU	-2.141	0.139	-2.326	0.020	37.383	0.022
X 21	-7.997	0.210	-0.298	0.766	68.992	0.011
X 22	-5.441	0.150	-4.197	0.000	40.381	0.043
X 23	-6.663	0.610	-2.018	0.044	62.721	0.019
X 24	-3.321	0.025	-6.302	0.032	55.931	0.031
X 25	-7.440	0.900	-2.864	0.004	85.333	0.050
X 26	-6.392	0.510	-5.305	0.081	73.622	0.002
PU	-2.283	0.103	-2.476	0.013	11.048	0.011
M 31	-6.124	0.030	-4.391	0.009	21.853	0.007
M 32	-2.998	0.420	-4.980	0.004	57.973	0.032
M 33	-7.898	0.110	-2.728	0.006	54.771	0.024
PR	-1.730	0.019	-3.632	0.056	22.743	0.072
M 51	-4.823	0.620	-3.374	0.001	51.315	0.004
M 52	-4.910	0.113	-3.713	0.341	32.562	0.008
M 53	-5.023	0.930	-3.786	0.212	35.337	0.007
M 54	-6.023	0.110	-3.649	0.910	51.765	0.006
M 55	-5.171	0.140	-2.222	0.120	63.215	0.088
M 56	-5.910	0.410	-2.143	0.123	61.442	0.021
ET	-5.736	0.510	-4.029	0.111	28.663	0.016
Yll	-3.566	0.135	-4.328	0.021	30.775	0.018
Y 12	-6.735	0.620	-4.579	0.019	60.943	0.0028
Y 13	-7.343	0.900	-6.260	0.029	69.914	0.035
Y 14	-2.740	0.740	-6.333	0.040	61.873	0.070
Y 15	-8.605	0.170	-1.805	0.071	77.201	0.080
ATU	-4.731	0.133	-2.634	0.008	10.001	0.018
M 21	-1.347	0.920	-4.125	0.011	34.236	0.022
M 22	-7.936	0.820	-0.555	0.579	69.999	0.066
M 23	-2.661	0.180	-3.693	0.021	49.301	0.084
ES	-4.005	0.310	-4.576	0.023	42.126	0.0094

Y 31	-8.199	0.990	-4.022	0.002	31.832	0.052
Y 32	-2.996	0.110	-4.027	0.002	55.912	0.074
Y 33	-1.986	0.550	-6.434	0.001	69.342	0.083
Y 34	-7.647	0.350	-6.463	0.002	81.763	0.093
NB	-8.512	0.112	-3.856	0.004	33.312	0.095

Table 4.1 indicates that the univariate data has a Z-Score value between ±2.58 and a p-value for Skewness and Kurtosis > 0.05. This shows that the univariate data does not exhibit multicollinearity, has a normal or nearly normal distribution, and is devoid of outliers—all of which are essential for maximum likelihood estimation. The multivariate data is not normally distributed, as the multivariate normality test indicates. The premise of multivariate normality is ignored in this investigation since extreme data points are not included. Even though there is some anomalous data, it can be difficult to achieve normal distribution, especially in studies on consumer behavior. The sample's ability to be applied to the larger population is improved when multivariate normality is ignored. Therefore, in order to assess the model, the study uses the robust maximum likelihood method.

In order to verify that the research model is compatible with real data, the SEM analysis model yields two findings: model fit testing and SEM estimation results for hypothesis testing.

4.3 Univariate and Multivariate Normality Tests

The univariate data has a Z-Score value in the range of ±2.58 and p-values for skewness and kurtosis larger than 0.05, according to the results shown in Table 4.1. As a result, we may say that the univariate data as a whole has a normal or nearly normal distribution, is devoid of outliers, and does not show multicollinearity all of which are required for maximum likelihood estimation. The multivariate data is not normally distributed, according to the results of the multivariate normality test. considering lack of extreme values, we decided to disregard the assumption of normalcy for the multivariate data in this

investigation, in accordance with the standards established by [34]. However, there are some anomalous data found in the study model. As mentioned by [34], it might be difficult to get normally distributed data, particularly in studies that look at how people perceive consumer behavior [40]. The population and the samples it represent can be more broadly generalized when data normality is ignored [41]. In order to test the model in this study, we used the robust maximum likelihood estimation method.

To verify the adequacy of the research model in comparison to the real data, the Structural Equation Modeling (SEM) study often produces two sets of results: one for model fit testing and another for hypothesis testing [34], [35].

4.4 Data Input and Model Estimation

The input for maximum likelihood estimation is the Data System File (DSF), which contains an asymptotic covariance matrix. The estimate is known as a robust maximum likelihood estimate in this instance. The structural model is estimated in this study using a two-step procedure. First Order Confirmatory Factor Analysis (1st CFA) is used to estimate the measurement model in order to evaluate indicators for both exogenous and endogenous constructs. The structural model is then estimated using full model analysis in order to assess model fit and the causal relationships established within.

4.5 Analysis Model

There are two phases to the data analysis in this study: estimate of the measurement model and estimation of the structural equation model. The findings of the measurement model analysis have a significant impact on the precision and dependability of the structural model estimate results.

4.6 Confirmatory Factor Analysis Measurement Model

The measuring stage for indicators corresponding to exogenous and endogenous constructs is the first-order confirmatory factor analysis (CFA), which evaluates the adequacy of all exogenous construct models to identify which indicators correlate with the latent variable constructs. Internal consistency testing (reliability), which measures composite reliability or construct reliability and variance extraction, and validity testing and reliability evaluations are part of this process. The former involves (1) construct validity testing for each indication. The constructions were shown to be dependable and valid in every result.

4.7 Structural Model Estimation

Using a statistical technique called structural equation modeling (SEM), structural models that incorporate both quantitative data and qualitative causal assumptions are created and assessed. The analysis in this study is done in two steps. The first stage involves measurement model estimation, where the validity and reliability of latent variable constructs are assessed using first-order confirmatory factor analysis (1st CFA). This step ensures that the indicators effectively measure the intended constructs by evaluating construct validity, construct reliability, and variance extracted for all latent variables.

Once the measurement model is validated, the second stage focuses on structural model estimation. This stage involves analyzing the overall model to assess causal relationships between constructs. The structural model is evaluated using goodness-of-fit tests and inferential statistical tests to determine how well the model fits the data. The final output

of this stage is a set of structural equations that represent the relationships between the constructs. These equations are derived from the comprehensive model analysis, which captures the causal links hypothesized in the research.

- **Structural Equations**

$$ATU = 0.24 \times PEU + 0.36 \times PU + \text{ Errorvar } = 0.40, R^2 = 0.60 \quad (1)$$
$$NB = 0.93 \times ATU + 0.085 \times ET + 0.083 \times ES + 0.23 \times PU + 0.098 \times PR, \text{ Errorvar } = 0.042, R^2 = 0.96 \quad (2)$$

The next step is to verify that the structural model fits the data by evaluating its appropriateness using parsimonious fit, incremental fit, and absolute fit metrics [34], [42-44].

Table 4.2 Goodness of Fit Index (GOFI) Structural Equation Models

GOFI Size	Result Value	Standard Value	Conclusion
p-value	0.18	>= 0.05	good match
RMSEA	0.02	<= 0.08	good match
NFI	0.98	>= 0.90	good match
NNFI	0.99	>= 0.90	good match
CFI	0.99	>= 0.90	good match
IFI	0.99	>= 0.90	good match
RFI	0.96	>= 0.90	good match
SRMR	0.37	<= 0.05	good match
GFI	0.94	>= 0.90	good match
AGFI	0.98	>= 0.90	good match

Source: data processed by LISREL 8.8 version (2023).

The overall structural model's goodness of fit test produces excellent results, as indicated in Table 4.2, indicating that every goodness of fit (GOF) value utilized to construct the structural model throughout this phase represents a good fit.

Table 4.3. Hypotheses Testing

Hypothesis	Path Analysis	Direct Effect	t-value	Total Effect	Hypothesis Decision
H1	PEU → ATU	1.26	3.02	1.22	Adopted
H2	PU → ATU	1.38	2.97	1.37	Adopted
H3	PU → NB	1.25	3.05	1.34	Adopted
H4	ATU → NB	1.95	8.90	1.41	Adopted
H5	ET → NB	1.87	9.79	1.87	Adopted
H6	ES → NB	1.85	9.78	1.85	Adopted
H7	PR → NB	1.99	10.87	1.91	Adopted

Source: Information processed with LISREL 8.8 (2023)

For this reason, the structural model (overall model) estimation results in Table 4.3 are used to create the following hypothesis test outcomes.

CHAPTER 5

Discussion

5.1 The Effect of Perceived Ease

In this study, the hypotheses are discussed about the Technology Acceptance Model (TAM) and its relationships [10] [12]. A social psychology example of the attitude-belief model is the Theory of Reasoned Action/TRA [11]. [12] states that Perceived Ease of employ (PEU) predicts intentions to employ technology. The results of our study show that the PEU variable has a positive effect on Attitude to Use (ATU), with a t-value of 2.10 and a direct effect value of 0.24. Ha1 is supported, indicating that PEU has a positive and significant effect on ATU.

The most widely accepted response to the PEU questionnaire remarks about ATU focused on how easy it was to use the shopping application. This emphasizes how crucial it is to make sure that consumers find online shopping apps easy to use, as this greatly impacts how they feel about using them. When designing user-friendly applications, the following factors should be considered: (1) the context in which the application will be used; (2) the application's primary purpose; (3) a clear and responsive design; (4) compatibility with multiple users and devices; (5) appropriate use of color for message conveyance; (6) intuitive icon labeling, (7) design simplicity, and (8) feedback and evaluation procedures. These findings are consistent with earlier research showing that people are more likely to use new technology when they believe their interaction with it is obvious. [25], [46-48].

On the other hand, the statement about how easy it was to get the things you needed was the one that got the least amount of agreement. Because it takes time to assess their expectations, customers find it difficult to meet their demands promptly. However, respondents believe that Internet shopping applications make their purchases easier

because of their ease. To improve the overall online purchasing experience, a successful application should enable rapid information entry and intuitive navigation. The fact that users can now access these apps from anywhere at any time increases their freedom. The user experience is improved by the easily understood instructions, which leads to a favorable attitude toward using online shopping programs as a means of making purchases. These results corroborate studies by [10][49][50], which show that attitudes about utilizing online shopping applications are positively influenced by perceived ease of use.

The term "the degree to which a person believes that using a particular system will enhance their job performance" [10] refers to perceived usefulness, or PU. With a direct effect value of 0.36 and a t-value of 1.98 for the PU variable, our study revealed that PU has a considerable impact on system use. This suggests that PU has a sizable and favorable impact on ATU (Ha2 is supported). The statement with the highest level of agreement emphasized how effective e-commerce is at completing chores quickly, suggesting that customers today profit from e-commerce. Online shopping has several benefits, such as (1) ease of use, (2) availability around the clock, (3) special deals and discounts, (4) independence, and (5) a feeling of global connectedness. [10] found that PU is a highly significant predictor of attitudes toward new technologies in the context of word processing software, confirming the importance of PU in determining attitudes toward technology adoption. Similar results were noted by [46] among users of different productivity tools and by [47] in spreadsheet software.

Additionally, it is acknowledged that the Internet is a transformative tool that influences attitudes [48]. Customers are becoming more and more dependent on online shopping apps to meet their wants due to the internet's explosive expansion. Consumers who were previously wary of making purchases online because of the expenses now see these platforms as helpful because they make transactions simpler and quicker while saving money and time, which increases user productivity. Continued use is encouraged by the favorable experiences gained from these sites. These findings are consistent with research by [10], [51], [52].

5.2 The Effect of Attitude to Use on Purchase Intentions and E-Trust on Purchase Intentions

Behavioral intention, which reflects the purpose of making purchases, acts as a mediator between attitudes and behavior [51]. Predisposition to make a first-time buy or a commitment to repurchase are only two examples of how such intents can appear. Online consumers' perceptions of e-supplier's qualities can be referred to as e-trust [53], [54]. It has been demonstrated that e-trust influences consumer attitudes toward e-retailers and drives online purchases. Technology adoption and usage patterns have a big impact on behavioral intentions, according to [55]. The Attitude to Use (ATU) variable has a t-value of 9.95 and a direct effect value of 0.93 on purchase intention, according to our data. This suggests that ATU has a favorable and large impact on purchasing intentions, which validates the hypothesis.

The most supported claims of ET in this survey were the belief in online purchasing websites. A number of reasons were cited for this, including: (1) time and energy saved by buying travel online; (2) the great number of deals available; (3) the number of payment methods available; (4) the variety of options; and (5) the need for efficient user interfaces that enable e-shopping. Moreover, the respondents added that they had trust in trustworthy online retailers due to their good experiences. Our findings are supported by previous studies, which indicate that e-trust is a key predictor of attitudes toward online shopping apps [10–12],[52]. In addition, literature has proven that e-trust and purchase intention go hand in hand, as pointed out by [12].

5.3 Conclusion

Therefore, results from this study suggest that the perceived utility, ease of use, and user-friendly features are important to the formation of perceptions toward online shopping apps and, finally, shaping purchase intentions. This link is further underpinned by the existence of e-trust, which, in turn, goes to show how critical the creation of an online environment

of trust is to ensuring consumer interaction. Understanding these factors will be key to any business aiming to increase customer experiences and, as such, improve sales in the competitive online market amid a growing e-commerce landscape.

CHAPTER 6
Conclusion

This study investigates the effect of Perceived Utility and Perceived Ease of Use on consumer attitudes toward online shopping applications. The results show that PU and PEU significantly affect consumer perceptions in a way that when consumers perceive an application to be useful and easy to use, they are most likely to make purchases through it. Specifically, PEU plays a vital role in shaping purchase intentions, and this relationship is further influenced by perceived risk.

The consumers' attitude is also significantly influenced by the purchase intention. Security and e-trust act as a very important mediating agent between the factors. The design of any online shopping website should first be user-friendly, for which the interface design is intuitive, responsive, and cross-device friendly. Proper color schemes and icon labels can be helpful to enhance the PEU.

Besides, the implementation of a simple design with feedback and assessment mechanisms can boost user satisfaction. In this respect, it enables a very interactive and reliable online shopping platform where continuous improvements are developed based on real customer feedback. With a focus on such areas, online retailers will be in a better position to develop customer satisfaction, thereby meeting consumer needs and ultimately resulting in increased sales amidst digital competition.

Despite these valuable insights, there are some limitations of this study. The research only concentrated on consumer perceptions and did not cover the underlying psychological factors that could have affected these perceptions. Additionally, the sample size may be very limited to fully represent a wide range of consumers using online shopping apps, and may therefore affect the generalization of the findings. The study also fails to take into consideration the exogenous variables such as market trends or economic factors that might affect online shopping behavior.

Future research should be directed at the psychological aspects of consumer behavior in relation to online shopping applications. Longitudinal studies may offer a better understanding of how consumer perception changes with time and the results of market fluctuations. Further, increasing the sample size and ensuring a wider demographic representation could strengthen the findings. Other areas that could be explored include how specific design elements affect user experience and purchase intentions, which would be particularly useful advice for online retailers seeking to improve their websites.

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BANGLADESHI CONSUMER'S ONLINE SHOPPING BEHAVIOR USING TAM EXTENSION

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