

# AN EXAMINATION OF CUSTOMERS' PERCEIVED RISK AND TRUST AS ANTECEDENTS FOR ONLINE PURCHASING OF MEDICAMENTS

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**Abstract---***A number of studies have been carried out to understand the impact of the perceived risk and trust, as well as their influential antecedents on the customers' intention to buy medicaments online. However, the majority of these researches have concentrated on common factors, such as financial risks, delivery risks, and information security, all of which similarly affect all the products offered in online stores, while the parameters that specifically influence online purchasing of medicaments have not been examined. This study aims to enumerate this gap in existing research and attempts to offer a picture of specific determinants that significantly influence the customers' perceived risk and trust during online shopping of medicaments. In order to collect the data needed for the examination of this model, an online questionnaire was distributed, which resulted in 157 valid responses. The outcomes of the present thesis could also provide customers a better understanding of the challenges associated with online buying of medicaments and encourage them to make more responsible decisions in order to avoid further complications.*

**Keywords---***Risk, Trust, Antecedents, Factors, Parameters, Medicaments, Examination*

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## I. Introduction

In fact, transactions could be simplified for both consumers and suppliers using the Internet. The advantages of the Internet for customers are wider reach, easy access to information, the ability to compare prices, and overcoming time and spatial limitations. This method of transaction enables the suppliers to be directly in contact with their customers. Thus, the role of distributors and agents could be reduced, and ultimately, the final cost of the products is decreased (Shen & Chiou, 2010). The Internet could also facilitate the customer services and feedback processes by faster and easier transfer of consumer claims to the suppliers. Moreover, the Internet as a global medium, eliminates the geographical barriers for communication with employees and consumers different locations around the world, providing a "frictionless" situation for organizations. In online transactions, the perception of risk varies depending on the type of product. Medicaments (especially pharmaceuticals) are one of the most controversial products that could be purchased over the Internet. Buying pharmaceuticals over the internet has become increasingly popular among online shoppers. The Internet has provided a lucrative market for the sale of pharmaceuticals, due to the transnational and relatively lawless nature of this medium. However, this trend might cause significant safety challenges for a society, since a number of studies show that many of the products offered in online stores contain poor quality ingredients (Roy, Kesharwani, & Bisht, 2012; Nguyen et al., 2019; Nikhashemi et al., 2013; Pathiratne et al., 2018; Seneviratne et al., 2019; Tarofder et al., 2019). This fact means that the offered drugs could be counterfeit, adulterated, or contaminated with banned substances.

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Generally, the most significant characteristics of online shopping is that the Internet is more convenient compared to in-store channel. Convenience could be considered as extended opening hour, wider selection of suppliers, and so on. On the other hand, researches have also showed that online shopping is generally accompanied by a perception of risks, including the disclosure of financial and personal information and the possibility of not obtaining the proper product being ordered (D'Alessandro, Girardi, & Tiangsoongnern, 2012). Therefore, customers' decision during online shopping often relies on a trade-off between the perceived advantages and risks of purchasing the product via the Internet. Compared the perceived risk level between online and traditional shopping, and found that consumers perceived more risks when buying from the Internet compared to traditional stores. However, the increase of online shopping experience triggers to a lower perceived risk level during the purchase of products via the Internet, whereas higher perceived risks results in less interest for future purchases from the Internet. The level of perceived risk is also influenced by the nature of the product. The products are generally categorized into two groups, namely search goods and experience goods. Customers could easily evaluate the search goods (e.g. apparels, books, shoes, and so on) prior to purchasing, whereas experience goods (e.g. cosmetics and medicaments) could merely be ascertained after consumption. Studies showed that customers perceive a higher risk when buying experience goods rather than search goods (Ling, Daud, Piew, Keoy, & Hassan, 2011). This means that during online shopping, the latent or inherent risk that the "experience goods" carry for the customers is added to the general risk coming with online shopping. Medicaments are amongst the most challenging products from the "experience goods" category, which are increasingly being offered in online stores. The increase of online purchasing of medicaments, compared to traditional face-to-face channel, represents a significant shift in the interaction mechanism between patients and the healthcare system. People tend to purchase medicaments online due to the advantages of the internet as opposed to the traditional method, including convenience, price, avoidance of embarrassment, and the ability to purchase medicaments that might not be available without prescription, or might not be approved in the customers' country. However, along with such advantages that the Internet provides for e-patients, serious harms can also result from online purchase of medicaments (Kim, Ferrin, & Rao, 2008). The Internet facilitates access to pharmaceuticals without prescription, unapproved medicaments, and counterfeit products, which might jeopardize personal and public health. Although many online pharmacies adhere to safety standards, illegal Internet shops masquerading as legitimate pharmacies sell thousands of potentially unsafe and often counterfeit medicines. According to the World Health Organization (WHO), counterfeit medicines are defined as "the products that have been deliberately and fraudulently produced and/or mislabeled with respect to identity and/or source to make it appear to be a genuine product". It is noteworthy that both branded and generic medicaments are included in this definition. Counterfeit products may also include drugs with insufficient or no active ingredients, super potent drugs, drugs with dangerous impurities, or products with fake packaging (Cunningham, Gerlach, Harper, & Young, 2005). It is shown that the counterfeit medicaments sold over the internet, as well as the sensitive health-related information illegally passed on online databases might endanger the consumers' health. Prescription items even possess a higher level of risk, since they could potentially harm the patients if taken without a physician's close supervision. The counterfeit products may contain no active ingredients, which make them inefficient, or contain too much active ingredients, which make them harmful or even deadly for patients. For example, a chemotherapy drug to treat a cancerous tumor may not effectively cure the patient, due to the nonexistence or insufficient dosage of the active ingredient. Conversely, the drug might contain a high dosage of active ingredients, which would increase the side effects of the drug on patients' body (Lee, 2009). Moreover, the product might also contain other potentially dangerous contents, which could also jeopardize the patients' life. The purchase of medicaments from offshore suppliers might also lead to additional risks. For instance, the purchased drugs might be a legal product in its country of origin, but it might not be approved for usage in the consumer's country, and might be detained by the custom authorities after arrival to the buyer's country. The fact that online trading of medicaments is currently facing

significant challenges does not necessarily mean that there is no future for this transaction channel (Harridge-March, 2006). Understanding parameters that exhibit positive or negative impacts on customers' intention to purchase medicaments from online sources would be valuable for retailers in the development of effective strategies for the successful implementation of online distribution channels.

## II. Literature Review

E-market is "an inter-organizational information system that allows the participating buyers and sellers to exchange information about prices and product offerings". The e-market as "a virtual realm where products and services exist as digital information and can be delivered through information-based channels". These authors have also introduced the "e-retailing" term (or online shopping) for the activity of retailing or shopping through the e-market (Chen & He, 2003). Later defined the e-retailing as "use of an electronic media through which the customer and the marketer enter into a transaction for sale and purchase, to the benefit of both parties". Have also outlined, "The online shopping is the process consumers go through to purchase products or services over the internet". Stated that online shopping can minimize the effort, inconvenience, and time involved in browsing entire catalogues (Chang & Wu, 2012). This medium could provide the critical knowledge about firms, products, and brands in an efficient manner, and therefore, proliferate the competency of the customers in making comprehensive decisions during purchasing. However, in spite of the tremendous influences of the Internet on marketing activities, the market portion of online shopping is currently below two per cent of total retails, indicating that the adoption rate of purchasing via the internet by consumers is rather slow. Hereof, two significant psychological factors including the buyer's "perceived risk" and "trust" have been utilized to explain this purchasing behavior of customers. These two psychological factors are pertinent issues, and are examined extensively in literature (Orubu, 2016). Perceived risk is "the uncertainty that the customers face when they cannot foresee the consequences of their purchase decisions". Defined it as "the consumers' subjective belief of suffering a loss in pursuit of a desired outcome". Also described perceived risk as "the possible loss when pursuing a longed for result". The amount of risk perceived differs depending on the customers' subjective interpretation of this uncertainty (Chiu, Wang, Fang, & Huang, 2014). The uncertainty or risks perception could result in anxiety, and therefore alter the customers' purchase intention. With the emergence of online shopping, the various influences of perceived risk on this type of shopping has also been extensively researched. It is confirmed that the perceived risk is correlated with a wide range of parameters, such as customer demographics, experience in using the internet, product/service features, and Website attributes (Naiyi, 2004). For instance, due to the accumulated experience and knowledge, older customers target certain brands during the purchase that provide more confidence regarding their performance and decrease the time for collection of pre-purchase information. Similarly, with the increase of Internet experience, the efficiency of the product search is increased, and the perceived risk is lowered (Melewar et al., 2013). The perceived risk also varies across genders. Generally, female customers perceive higher levels of risks during online shopping. For instance, compared to males, females have stronger concerns in regard to the severity of the consequences of privacy loss because of shopping their needed products online.

Categorized the overall risk of online shopping into two types, namely, perceived risk in the context of products or services (PRP), and perceived risk of the online transaction (PRT), the PRP was defined as "the overall amount of uncertainty or anxiety perceived by a consumer in a particular product/service when the consumer purchases online". Five types of PRP were identified, including functional, financial, time, opportunity, and the total perceived risk with the product or service (Ariff, Sylvester, Zakuan, Ismail, & Ali, 2014). On the other hand, PRT was defined as "a possible transaction risk that consumers can face when exposed to electronic means of doing commerce" and was categorized into four types; privacy risk, security (authentication) risk, non repudiation risk, and the total perceived risk of the online transaction divided the

various risks into two behavioral and environmental classifications. Behavioral risk results from the opportunist online vendors and includes psychological, product, and retailer performance risks. Environmental risk is also raised from the volatile nature of this shopping channel, which is not controlled by the online vendors and shoppers, and includes financial and privacy risks (Peng, Wang, & Cai, 2008)(Peng, Wang et al. 2008)(Peng, Wang et al. 2008)(Peng, Wang et al. 2008)(Peng et al., 2008). It is important to note that the product characteristics is regarded as a crucial factor that influences the level of perceived risk during the purchase decision making. Generally, the perceived risk is greater for high-involvement products/services that necessitate the problem-solving behavior and possess some levels of personal significance compared to low-involvement products/services. Online sellers of low-involvement products may be more likely to successfully retain customers compared to those of high-involvement products, provided that an appealing shopping experience is implemented by these vendors. In addition, the products or services, with high degrees of search attributes, may result in a lesser perceived risk compared to product/service categories that require a certain degree of experience. Similarly, the product or services that are associated with ego-satisfying features, as well as feeling and touching prior to purchasing could bring about higher perceived risk to the consumers (Hassan, Kunz, Pearson, & Mohamed, 2006). In this study to investigate the specific aspects of perceived risk for online purchasing of medicaments that have higher levels of experience compared to search attributes. This product category needs special attention, due to its fundamental effects on both personal and social health, and its potential threats in case of abuse or usage of counterfeits. Facile accessibility to medicaments is one of the significant factors which reduce the risk of mortality and morbidity associated with various diseases. The accessibility of medicaments is essential in order to control the burden of illnesses. The availability of required medicaments also promotes the rational usage of these products. Nevertheless, the lack of vital medicaments is still one of the most severe public health challenges, especially in less-developed societies (Yang, Pang, Liu, Yen, & Tam, 2015). Studies show that around 30% of the world's population experience difficulties in accessing their needed medicaments. This issue is even more critical in the developing countries located mostly in Africa and Asia, where this percentage increases to over 50%. However, the emergence of online pharmacies has provided better accessibility to medicines, which are not available at the respective patients' country (Tandon, Kiran, & Sah, 2018). Furthermore, the customers in developing countries could purchase the latest and most advance medicines from developed countries via the Internet, often before these medicines are even available in their own countries. The governmental authorities in the pharmaceutical sector of different countries may implement certain regulations for the availability of medicaments. In completely public systems, medicaments are funded, provided, and distributed by an integrated governmental agency. In semipublic structures, the medicaments are often supplied by governmental pharmacies and health facilities, but paid for by patients at reduced prices (Büttner & Göritz, 2008). In these systems, the medicaments may be subsidized by financing from central budgets or social healthcare insurance. In entirely private structures, the patients or private insurance agencies usually pay for the medicaments that are bought from private drugstores. However, a combination of these approaches is often used in most countries. Generally, the objective of legal agencies is to provide the best and safest available medicaments to the patients. Unavailability of medicaments, low income, or the absence of insurance coverage should not be a risk factor that precipitates finding a medicament, or finding it through unapproved, illegal, or unsafe means. Recognizing this fact, many e-retailers offer customers a safe-haven from embarrassment. Even today, some people would rather take the risk and purchase these products in relative anonymity rather than visit their doctor for a legitimate prescription (Hsieh & Tsao, 2014). The Internet not only shows the potential to save customers' money, it could also save them from the embarrassment from purchasing certain products in the open. Such transaction mediums allow the individuals to avoid the gazes, queries, and comments from the salespersons or other customers during the purchase of products that are regarded as socially embarrassing items (Arora & Rahul, 2018). According to a research, 50% of online customers are concerned about the stigma involved in purchasing embarrassing

products in person (50%), while others (37%) use the internet to avoid nosy salespersons. Moreover, almost a third (32%) of online customers of such products are reluctant to carry these embarrassing goods around; whereas over a quarter of these customers (28%) are afraid of being recognized by acquaintances.

Uncertainty is defined as the probability of an unexpected outcome and the costs incurred due to the asymmetry of information. This is the result of the difficulties in anticipating the actions of the other parties and the expectation of opportunism, bounded rationality, and information asymmetry (Hsu & Bayarsaikhan, 2012). Therefore, a high degree of uncertainty could possibly increase the transaction costs due to the increased time and effort needed to evaluate the other party, search for the related information, and monitor the transaction process. Identified two types of uncertainty during the online shopping process, including product uncertainty and e-stores' behavioral uncertainty (Li, Kuo, & Russell, 1999). Product uncertainty involves the challenges in the qualitative evaluation of the needed good. Prior to or during the online shopping, the customers may not feel confident that the purchased products would comply with their expectations after delivery. When shopping from physical stores, the customers can examine the product, but in the case of online shopping, the performance uncertainty of the products that are offered in e-stores is the primary concern of online buyers. On the other hand, the behavioral uncertainty refers to the retailer's credibility, which would be explained in the trust section. Product risk of medicaments sold on-line can potentially be quite high due to its nature. There may be a high number of people, who normally shop on-line, but are hesitant in purchasing medicaments online, due to the high degrees of risk associated with these product categories (Li & Zhang, 2002). Despite its simple appearance, a tablet is quite a sophisticated product, taking many years of research and development to be commercially viable. These long-term periods of development and clinical evaluation could result in expensive prices for some medicaments.

Interpersonal trust is "an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied on". Trust is one's belief that the other party will behave in a dependable, ethical, and socially appropriate manner (Kim, Qu, & Kim, 2009)(Kim, Qu et al. 2009)(Kim, Qu et al. 2009)(Kim, Qu et al. 2009)(Kim, Qu et al. 2009)(Kim, Qu et al. 2009)(Kim, Qu et al. 2009)(Kim, Qu et al. 2009)(Kim et al., 2009). Trust "is an expectation that others one chooses to trust will not behave opportunistically". It is believed that the trusted party will fulfill all the commitments, despite the trusting party's dependency and vulnerability. Trust plays a fundamental role in sufficient capture of customers' intention for purchasing a product or service. In the presence of risk, customers need trust prior to completing a transaction; and higher perceived risk leads to a higher requirement for trust. It is clear that trust is a crucial parameter in most business relations, and in fact shapes the nature of many commercial and financial transactions (Chen, Yan, & Fan, 2015). Since the social atmosphere cannot be completely controlled through regulations and customs, individuals usually adopt trust as an essential strategy in order to reduce the social complications. In particular, trust is crucial for altering the visitors of a retailer's website into buyers, due to the presence of high degrees of risk and uncertainty in the most of online transactions. Prior to any online transactions, the visitors need to trust on the information given by the e-vendors and presume that they would behave in an ethical and socially acceptable way; otherwise, they would be reluctant to deal via the Internet due to the overwhelming complexities that exist in the online transactions.

Following are the hypothesis of this study;

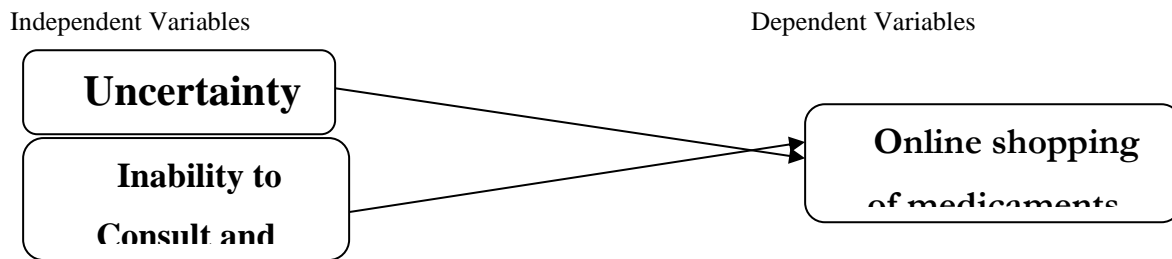
H1: Uncertainty has affecting role on the online shopping of medicaments.

H2: Inability to consult and follow-ups has affecting role on the online shopping of medicaments.

### III. Methodology

The dependent variable of this research was considered as "the online purchase of medicaments". On the other hand, the "website awareness", "unavailability of medicaments", "avoidance of embarrassment", "the uncertainty about the quality

and safety of the products”, and “inability to consult and follow-up with a specialist” were chosen as dependent variables. The mediators of this model were also determined as “perceived risk,” “trust”, and “intention to buy medicaments online”.

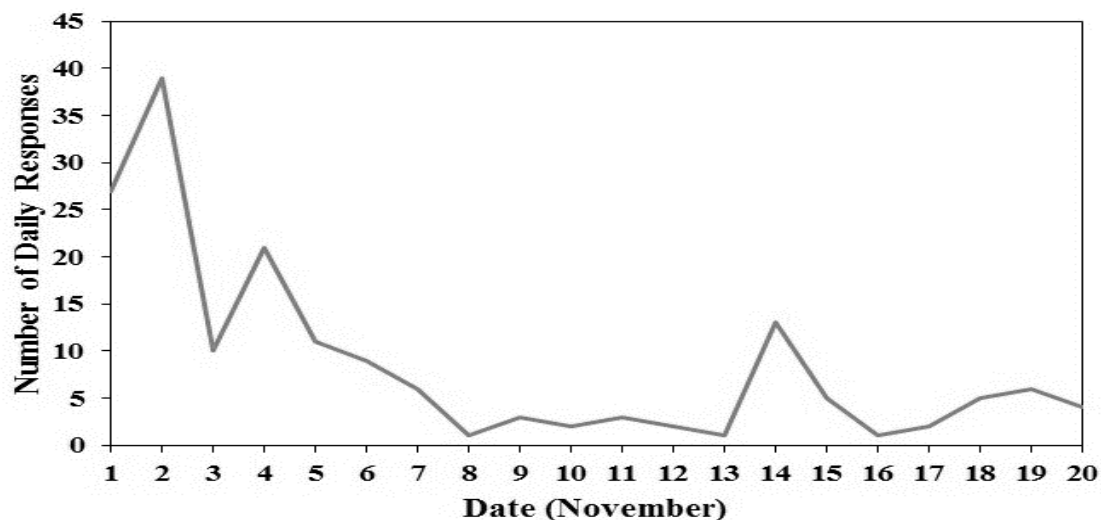


**Figure 1:** The theoretical model proposed for online shopping of medicaments and its comparison with the base model.

As mentioned previously, the proposed model is composed of nine constructs. However, the relationships between four constructs (trust, perceived risk, intention to buy online, and online shopping) have already been established in previous studies. Therefore, the main objective of this questionnaire was to examine the impact of five specific constructs, which have been added in the extended model. PCA analysis is regarded as a data reduction technique that could remove redundant or highly correlated variables from multivariate data analyses. The PCA analysis was further followed by the reliability analysis to ensure the validity of the obtained factors. Different scales including binary, multiple, 5-point Likert scales, as well as checkbox method were utilized in the questionnaire so that it could address the research objectives and provide appropriate answers for the research questions. The data collection process lasted for three weeks, and 171 responses were collected in this interval.

#### IV. Results

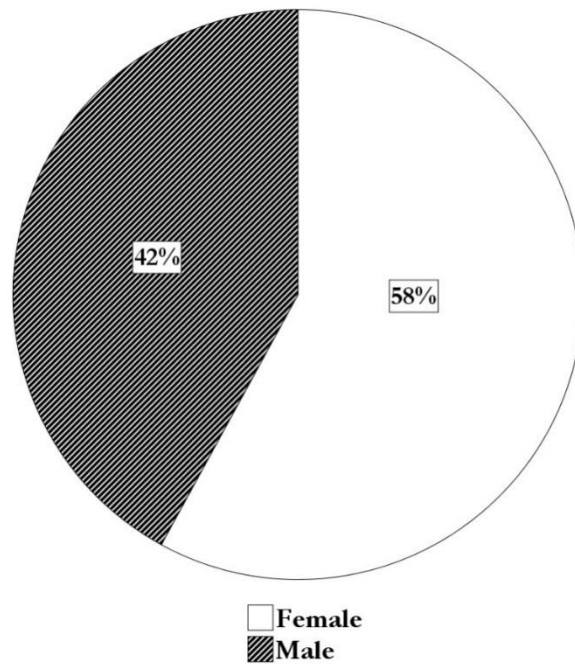
The following sections provide the results obtained from analyzing the data received from the participants of our study.



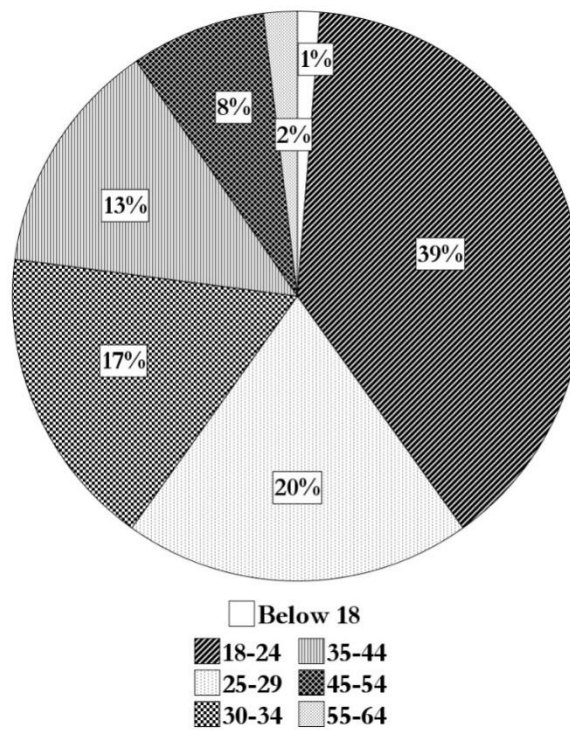
**Figure 2:** The number of daily responses received during the data collection period.

The respondents of our questionnaire were made up of 91 females and 66 males, illustrating the dominance of female respondents, who accounting for 58% of total participants. The descriptive statistics of the respondents’ age also showed that

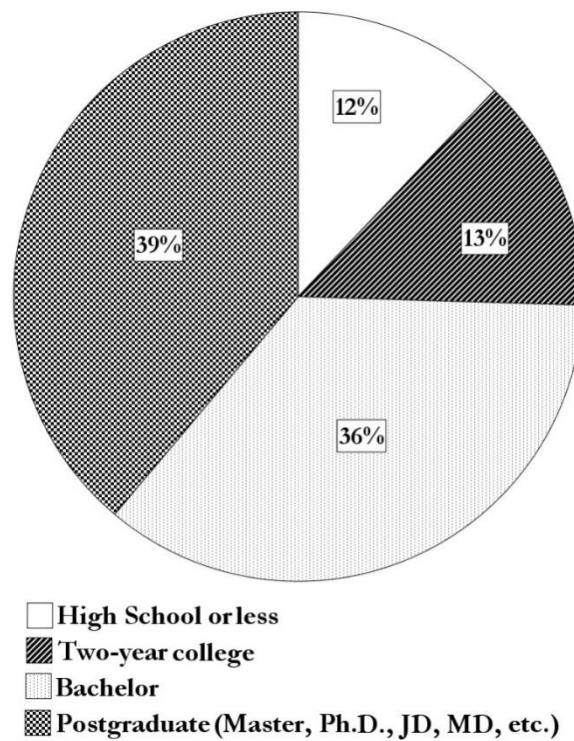
the majority of participants (39%) were between 18-24 years of age, followed by 25-29 (20%), 30-34 (17%), and 35-44 (13%).



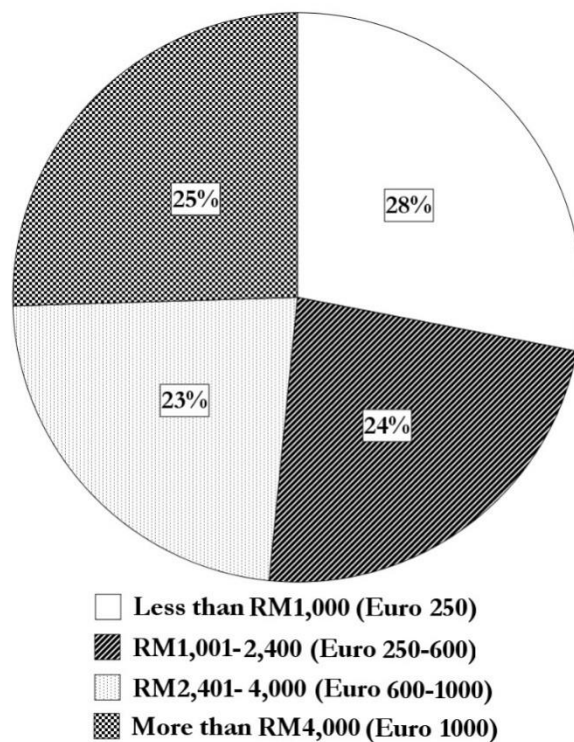
**Figure 3:** The respondents' gender distribution.



**Figure 4:** The distribution of participants' age.

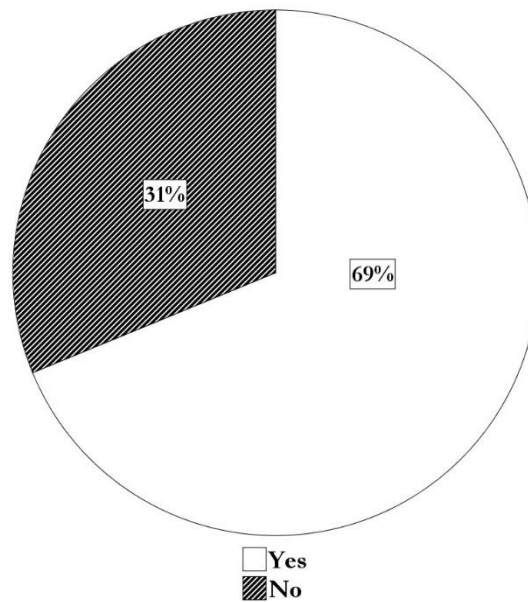


**Figure 5:** The pie graph, representing the education levels of the respondents.

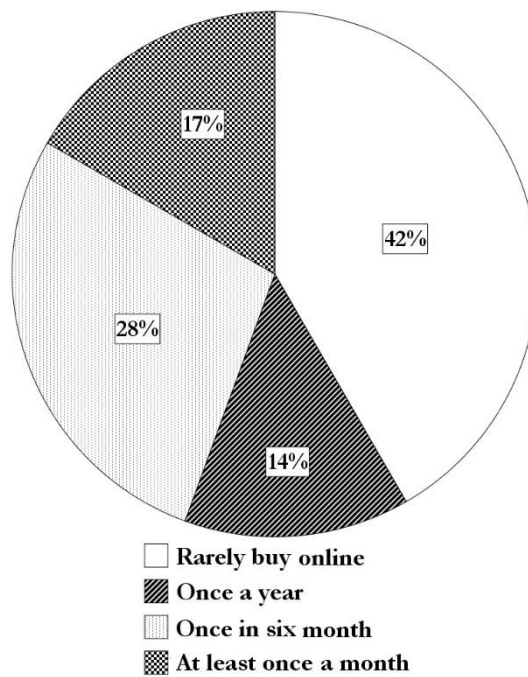


**Figure 6:** The monthly income distribution among the participants.

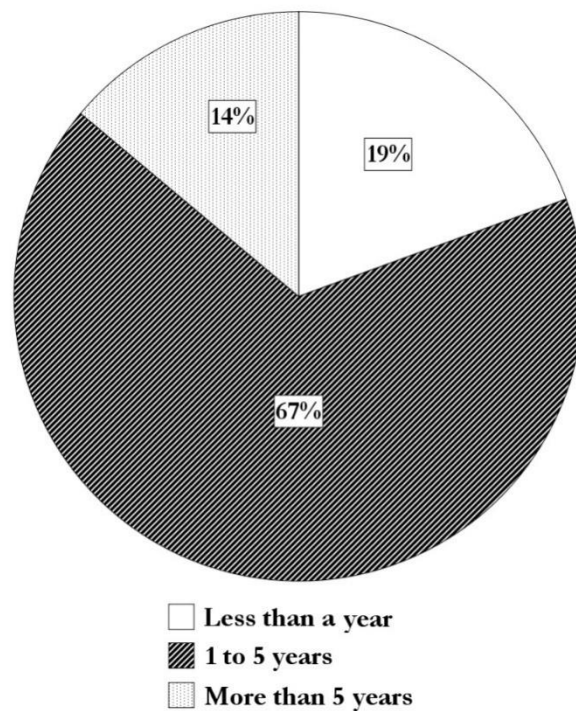
The majority of the participants (approximately 69%) indicated that they have previously used the internet for purchase of products or services.



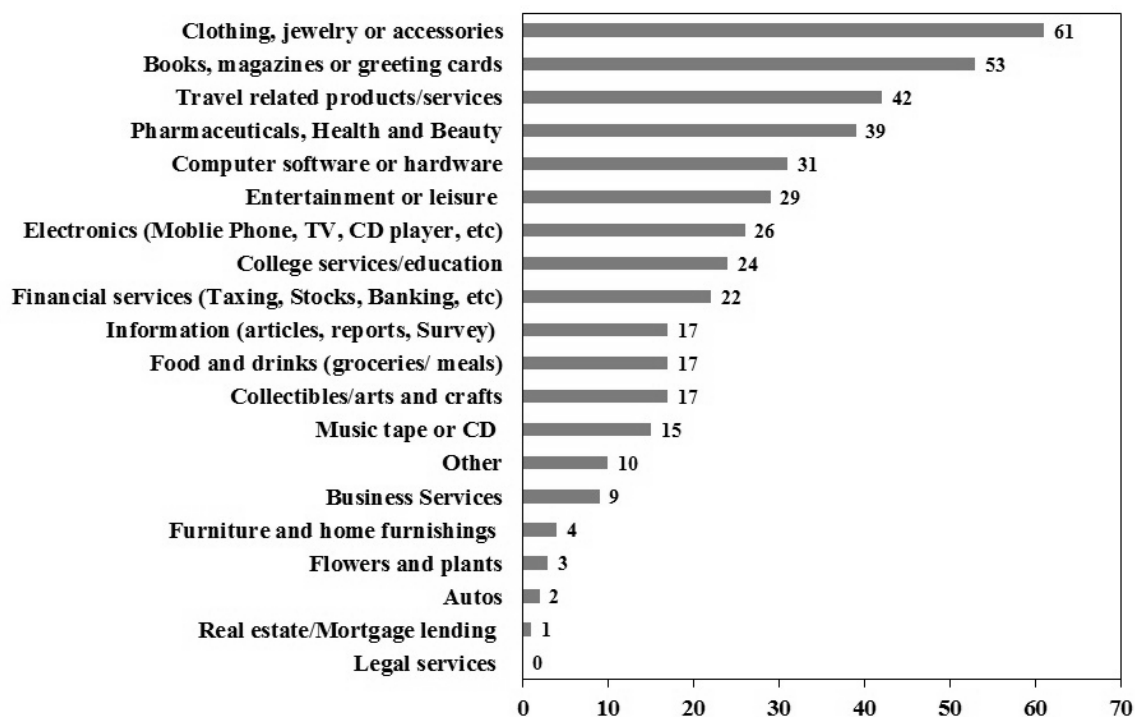
**Figure 7:** The participants' prior experience of online shopping.



**Figure 8:** The frequency of online shopping among the respondents who have previously used this shopping channel.

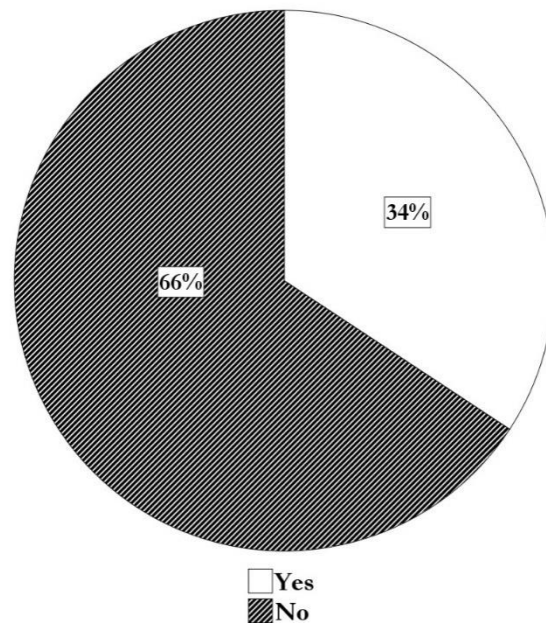


**Figure 9:** The duration of respondents' experience for online shopping.

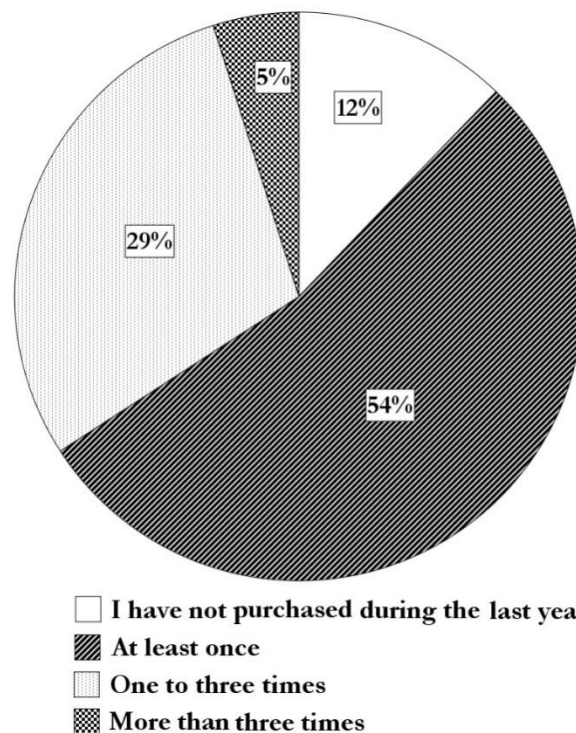


**Figure 10:** The popularity of online shopping of various product/service categories among the questionnaire participants.

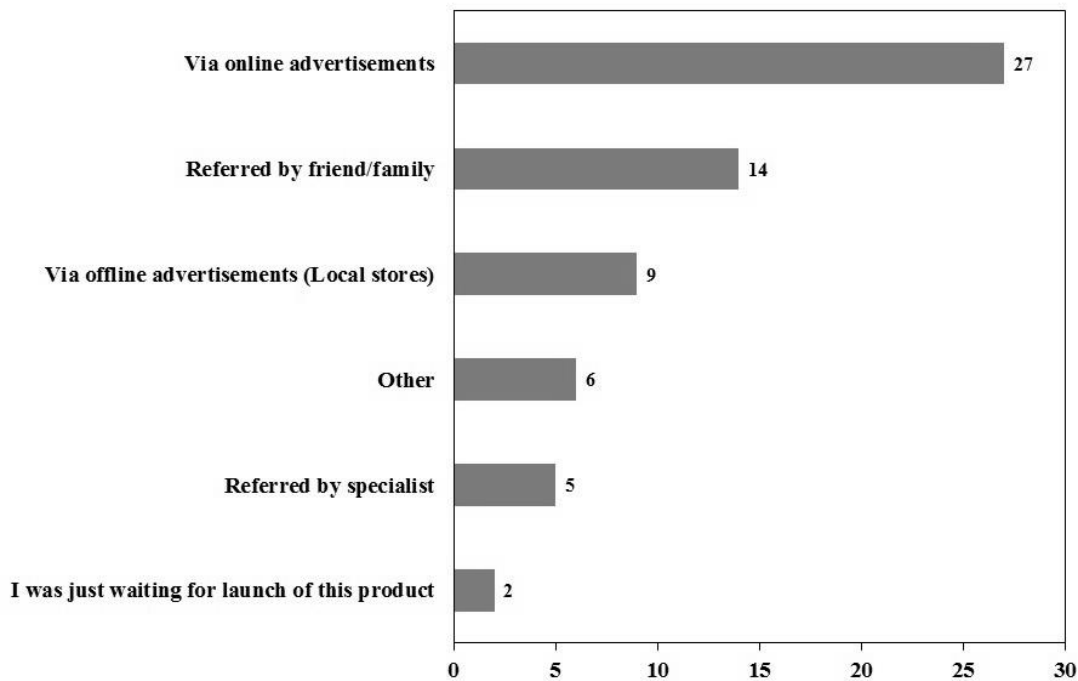
This fact is again confirmed by the results obtained revealing that a considerable portion of the respondents (34.3%) who had experience online shopping have applied this channel for the purchase of pharmaceuticals, health, and beauty products.



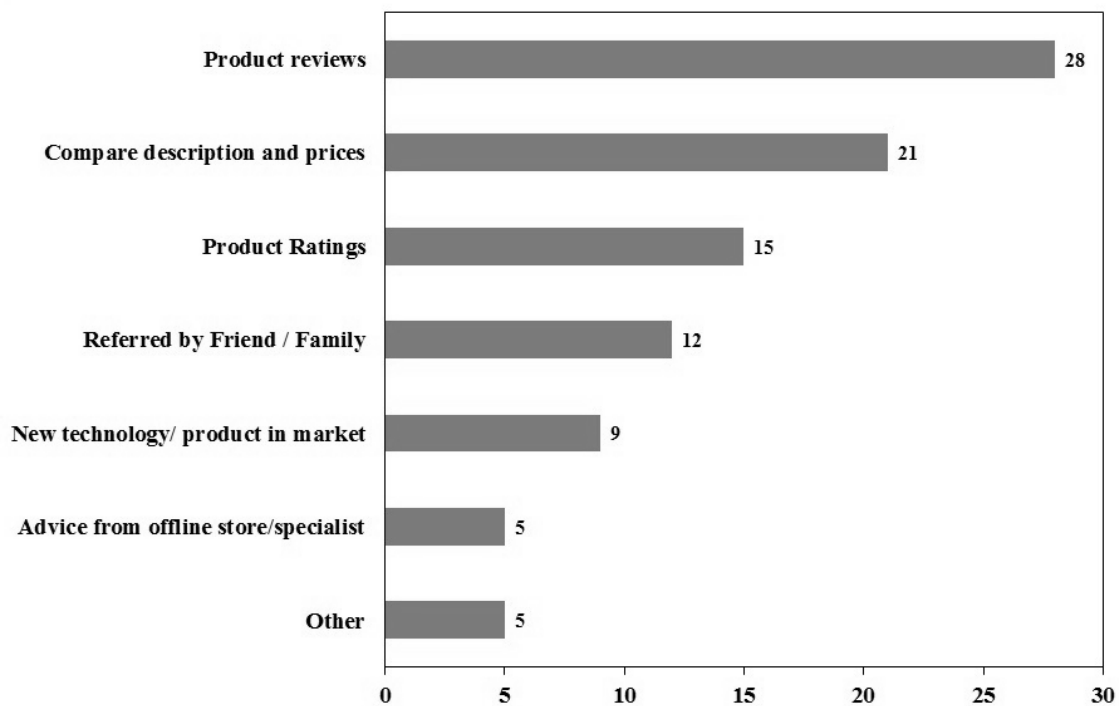
**Figure 11:** The portion of respondents with prior online shopping experience who have purchased pharmaceutical, health, and beauty products online.



**Figure 12:** The frequency of online shopping of pharmaceuticals, health, and beauty products among the respondents with experience of online shopping of these products.



**Figure 13:** The popularity of various incentives among participants for online shopping of medicaments.



**Figure 14:** The popularity of various ways among respondents to ensure the suitability of an offered medicament for their needs.

After performing the PCA analysis, a determinant of 0.089 for the Pearson correlation coefficients matrix was obtained, which confirmed the unimportant degree of multicollinearity in our data. Moreover, both Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (0.672), as well as the Bartlett's test of sphericity ( $P < 0.05$ ) demonstrated the validity of PCA analysis for our collected data.

**Table 1:** Descriptive analysis of the items of “Website Awareness”.

Item	Mean	SD	Skewness	Kurtosis
WA1. Drugs, healthcare products, and cosmetics that are advertised and sold in the well-known manufacture websites (Merck, Johnson & Johnson, Pfizer, L'Oreal, etc) are more trustful and less likely to be “fake” products.	3.71	1.002	-0.546	-0.112
WA2. Drugs, healthcare products, and cosmetics that are advertised and sold in the well-known retailers' websites (ebay, Amazon, Guardian, etc) are more trustful and less likely to be “fake” products.	3.12	1.064	-0.277	-0.648
WA3. Drugs, healthcare products, and cosmetics that are advertised and sold in the websites located in the less-developed countries are less reliable and more likely to be “fake”.	3.71	0.968	-0.513	-0.296
WA4. Drugs, healthcare products, and cosmetics that are advertised and sold in anonymous websites which may not have approval from legitimate authorities (e.g. FDI, SIRIM) are less reliable and more likely to be “fake”.	4.17	0.986	-1.111	0.574
WA5. The sellers who keep the personal information about my health confidential, are more reliable.	4.04	1.018	-0.778	-0.383
WA6. If I know a reliable website who offers my needed products, I do not need to visit other online stores to distinguish between “fake” and “original” product.	4.07	0.962	-0.974	0.481
WA7. The websites that enable a two-way communication before purchase (via address, contact no., email, chat, etc.) between the customers and the seller, are more reliable.	3.38	0.977	-0.440	-0.038
WA8. My ability to give feedback or complaints to the seller after purchasing the item increases the reliance on the seller.	3.57	0.995	-0.601	-0.056
WA9. The websites that enable an immediate communication before and after purchase between the seller and customer are more reliable.	3.41	1.050	-0.342	-0.417
WA10. Providing an online consultation with a specialist through website, will increase my trust to the website and its products.	3.54	1.065	-0.448	-0.415

The outcome of the PCA analysis on 10 individual items of the WA construct showed that all of the items provided sufficient pair wise values of Pearson correlation coefficient (0.30-0.70). Furthermore, all the items produced suitable ranges of communalities (0.446-0.707) and factor loadings (0.575-0.831). The various items of WA construct have been loaded onto three major factors, with Eigen values higher than 1.0. These factors in our study were designated as: 1) Website Interactivity, 2) Website Reliability, and 3) Website Brand, which collectively explained around 59% of the total variance. The obtained results for Cronbach alpha ( $\alpha$ ) are presented. As seen, the  $\alpha$  values of all three factors exceed 0.50, which demonstrates the internal consistency of variables in each factor. As mentioned previously, the obtained factors describe around 59% of the total variance.

**Table 2:** The results of principal components analysis on the items of “Website Awareness”.

Item No.	Item Abbreviation	Loading	$\alpha$	Eigen-value	Variance
<u>Website interactivity</u>			0.763	2.442	24.421
WA7	Communication before purchase	0.831			
WA8	Communication after purchase	0.746			
WA9	Immediate communication	0.787			
WA10	Online contact with a specialist	0.634			
<u>Website Reliability</u>			0.646	1.979	19.787
WA3	Location	0.732			
WA4	Legitimacy	0.784			
WA5	Security of customer Information	0.622			
WA6	Reliability of provided information	0.575			
<u>Website Brand</u>			0.607	1.517	15.166
WA1	Manufacturer's fame	0.818			
WA2	Retailer's fame	0.802			

The values of Pearson correlation coefficient matrix (0.398-0.487), determinant (0.254), KMO (0.747), and Bartlett's test of sphericity ( $P < 0.05$ ) confirmed the validity of PCA analysis on our data. Therefore, this factor could be called "Unavailability of Medicaments", which describes 63.394% of the total variance. The reliability analysis also provided a Cronbach alpha of 0.807, showing a satisfactory level of internal consistency between these four items.

**Table 3:** Descriptive analysis of the items of "Unavailability of Medicaments".

Item	Mean	SD	Skewness	Kurtosis
UM1. Online shopping encourages me to expose myself to the drugs, healthcare products, and cosmetics, which are only available online.	3.07	1.161	-0.063	-0.751
UM2. Online shopping encourages me to buy drugs, healthcare products, and cosmetics, which are not still available in my country.	3.27	1.180	-0.358	-0.7003
UM3. Online shopping encourages me to buy drugs, healthcare products, and cosmetics, which are not approved in my country.	2.64	1.277	0.317	-0.977
UM4. Online shopping encourages me to buy drugs, healthcare products, and cosmetics, which are available in my country but need prescription from a physician.	3.05	1.234	-0.098	-0.991

**Table 4:** Principal components analysis on the items of "Unavailability of Medicaments".

Item No.	Item Abbreviation	Loading	$\alpha$	Eigen-value	Variance
<u>Unavailability of Medicaments</u>			0.807	2.536	63.394
UM1	Availability only at online stores	0.696			
UM2	Unavailability at customer's location	0.815			
UM3	Unapproved at customer's location	0.850			
UM4	Necessity of prescription to buy	0.816			

**Table 5:** Descriptive analysis of the items of "Lack of Embarrassment".

Item	Mean	SD	Skewness	Kurtosis
LE1. Online shopping encourages me to buy drugs, healthcare products, and cosmetics, which are embarrassing, and I feel shy if my friends/family know that I buy and use these products.	3.14	1.222	-0.144	-0.862
LE2. Online shopping encourages me to buy drugs, healthcare products, and cosmetics, which need prescription, but I feel shy to ask from a physician.	3.10	1.213	-0.207	-0.954
LE3. Online shopping encourages me to buy drugs, healthcare products, and cosmetics, which I feel shy to buy them from traditional pharmacies.	3.22	1.185	-0.161	-0.852

It should be pointed out that the Pearson correlation coefficients of the items of this construct were 0.633-0.730, with a matrix determinant value of 0.219. Moreover, the obtained value of KMO test was 0.727, and the Bartlett's test of sphericity was significant ( $P < 0.05$ ).

The data presented in this table demonstrated that all three items of this construct have been loaded on one factor, which approximately defines 79% of the total variance. The Cronbach alpha was close to 0.90, showing a high internal consistency between these items. Based on this table, shyness from physicians resulted in the highest loading (0.915), followed by shyness from salespeople, and shyness from acquaintances.

**Table 6:** The results of the principal components analysis on the items of "Lack of Embarrassment".

Item No.	Item Abbreviation	Loading	$\alpha$	Eigen-value	Variance
<u>Lack of Embarrassment</u>			0.870	2.382	79.397
LE1	Shyness from acquaintances	0.874			
LE2	Shyness from physicians	0.915			
LE3	Shyness from salespeople	0.884			

As seen, "the needed pre-purchase information" factor could describe a slightly higher ratio of the total variance (approximately 36%) compared to the "product appropriateness" (about 33%), which shows the significant impact of

information flow on the customers' perceived risk when shopping online for medicaments. Both these factors could describe around 69% of the total variance.

**Table 7:** Descriptive analysis of the items of "Uncertainty".

Item	Mean	SD	Skewness	Kurtosis
UC1. inability to touch, see, and test the drugs, healthcare products, and cosmetics before buying online, increases the risk of buying fake product.	4.03	1.015	-0.846	-0.067
UC2. The new products that are sold in the online stores but may not have approval in my country yet, could be dangerous for my health.	4.18	0.932	-1.243	1.485
UC3. The information provided by the online sellers of the drugs, healthcare products, and cosmetics is mostly enough.	2.60	1.031	0.087	-0.778
UC4. Word-of-mouth endorsements (product reviews) from other users decreases my uncertainty about the effectiveness and safety of the product.	3.47	0.984	-0.328	-0.535
UC5. Positive comments from the licensed raters decrease my uncertainty about the effectiveness and safety of the product.	3.71	0.981	-0.552	-0.325

**Table 8:** The results of principal components analysis on the items of "Uncertainty".

Item No.	Item Abbreviation	Loading	$\alpha$	Eigen-value	Variance
<u>Needed Pre-Purchase Information</u>			0.653	1.800	35.995
UC3	Sufficiency of seller's information	0.530			
UC4	Word of mouth	0.864			
UC5	Product rates	0.874			
<u>Product Appropriateness</u>			0.660	1.630	32.593
UC1	Pre-purchase evaluation	0.844			
UC2	Legality in the target location	0.829			

The PCA analysis was also employed to determine the underlying factors of the IC construct. This analysis resulted in pair wise Pearson correlation coefficients of 0.291 (for IC1) to 0.607. Moreover, the IC1 item (item 35 in the questionnaire) could not provide a sufficient communality (0.280) and thus, it was removed from our analysis. Hence, the PCA analysis was repeated on the two remaining items, resulting in a determinant and KMO values of 0.631 and 0.500, respectively. The Bartlett's test of sphericity was also significant ( $P < 0.05$ ), demonstrating the validity of the PCA analysis on these two items. This factor could significantly describe the total variance (approximately 80%). Moreover, the Cronbach alpha for the items of this factor was 0.754, showing an acceptable level of consistency between these items.

## V. PRINCIPAL COMPONENT ANALYSIS ON ALL ITEMS

The determinant and KMO values obtained for this PCA examination were 0.000034 and 0.727, respectively.

**Table 9:** Descriptive analysis of the items of “Inability to Consult and Follow-ups”.

Item	Mean	SD	Skewness	Kurtosis
IC1. The side effects that may be caused by the purchased new drugs, healthcare and beauty products increase the risk of buying them online.	3.71	1.070	-0.505	-0.254
IC2. I need consultation before and after shopping drugs, healthcare products, and cosmetics online.	3.84	0.984	-0.533	-0.342
IC3. Inability to consult with a specialist increase the risk of side effects after using these products.	3.96	0.912	-0.591	-0.187

**Table 10:** The results of principal components analysis on the items of “Inability to Consult and Follow-ups” construct.

Item No.	Item Abbreviation	Loading	$\alpha$	Eigen-value	variance
	<u>Inability to Consult and Follow-ups</u>		0.754	1.607	80.375
IC2	Necessity of Consultation	0.897			
IC3	Not consulting leads to side effects	0.897			

**Table 11:** The results of principal components analysis on all the items of this study.

Factor	Eigen-value	variance
<u>Inability to Consult and Follow-ups</u>	2.677	10.707
<u>Unavailability of Medicaments</u>	2.581	10.324
<u>Lack of Embarrassment</u>	2.461	9.844
<u>Needed Pre-Purchase Information</u>	2.290	9.161
<u>Website interactivity</u>	2.220	8.878
<u>Website Reliability</u>	1.838	7.351
<u>Website Brand</u>	1.570	6.278
<u>Product Appropriateness</u>	1.553	6.210

These factors could collectively describe around 69% of the total variable. According to this table, the “Inability to Consult and Follow-Ups” shows the highest impact on total variance (10.707%), followed by “Unavailability of Medicaments” (10.324%), “Lack of Embarrassment” (9.844%), “Needed Pre-purchase Information” (9.161%), “Website Interactivity”

(8.878%), “Website Reliability” (7.351%), “Website Brand” (6.278%), and “Product Appropriateness” (6.210%). As shown in this table, the “Website Awareness” (or trust) could describe 22.507% of total variance, followed by “Uncertainty” (15.371%), “Inability to Consult and Follow-ups” (10.707%), “Unavailability of Medicaments” (10.324%), and “Lack of Embarrassment” (9.844%). Based on the data, discouraging constructs describe a higher portion of total variance (26.078%), followed by trust (22.507%), and encouraging constructs (20.168%).

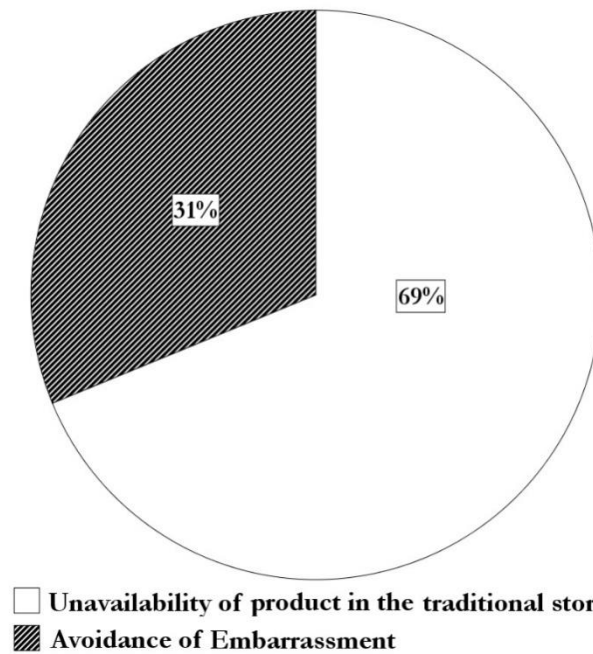
**Table 12:** The ratio of total variance described by each construct developed in the present study.

<b>Factor</b>	<b>variance</b>
<u>Website Awareness</u>	22.507
<u>Uncertainty</u>	15.371
<u>Inability to Consult and Follow-ups</u>	10.707
<u>Unavailability of Medicaments</u>	10.324
<u>Lack of Embarrassment</u>	9.844

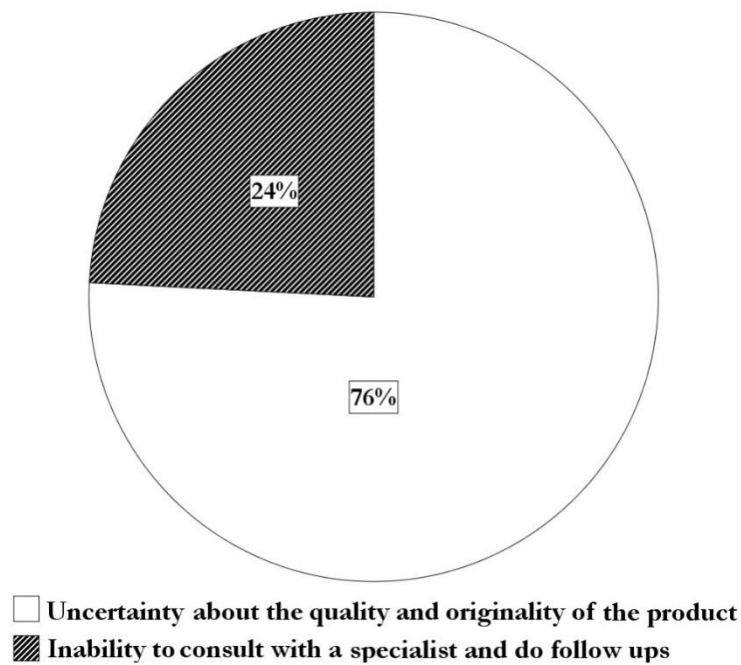
**Table 13:** The ratio of total variance described by trust, encouraging, and discouraging constructs.

<b>Factor</b>	<b>variance</b>
<u>Discouraging Constructs</u>	26.078
<u>Trust</u>	22.507
<u>Encouraging Constructs</u>	20.168

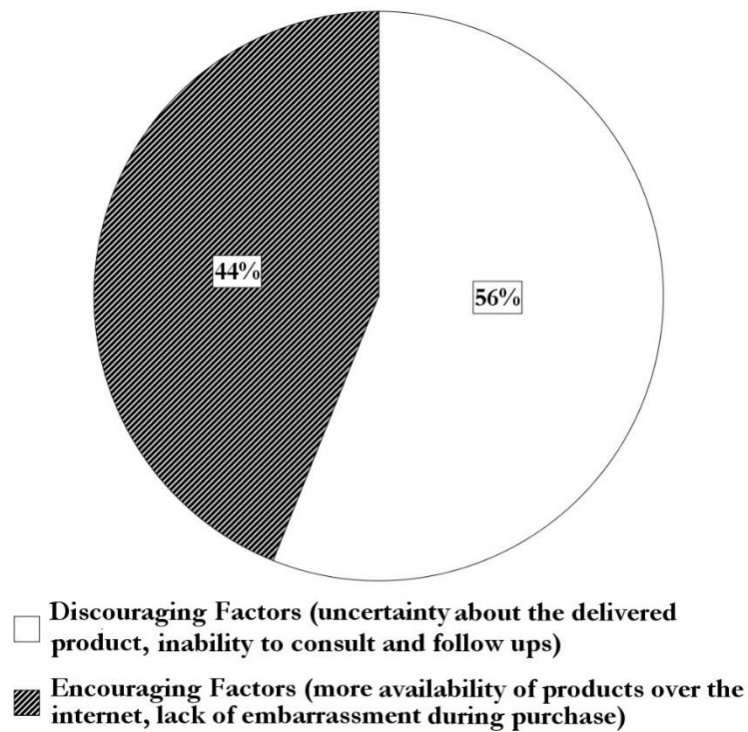
The majority of participants have indicated that it is less likely for them to purchase any medicament in the near future from the stores that offer these products online.



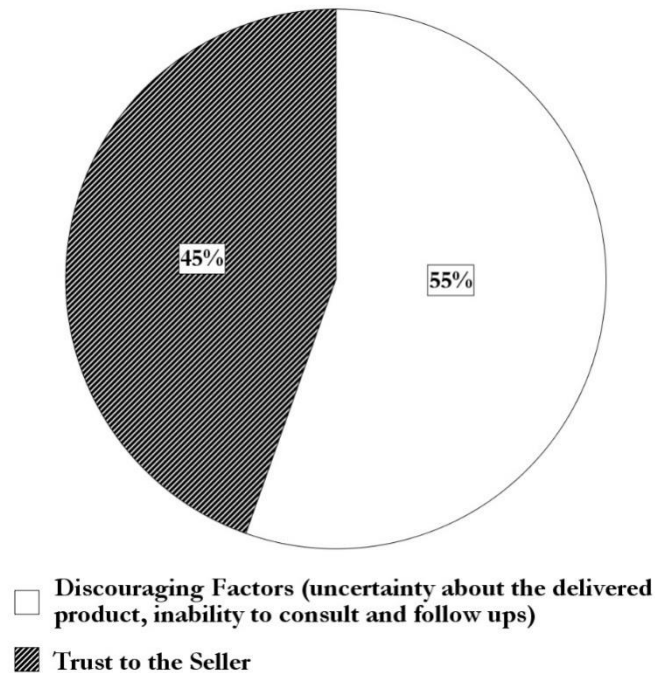
**Figure 15:** The respondents' opinions concerning the most affecting encouraging parameter for online shopping of medicaments.



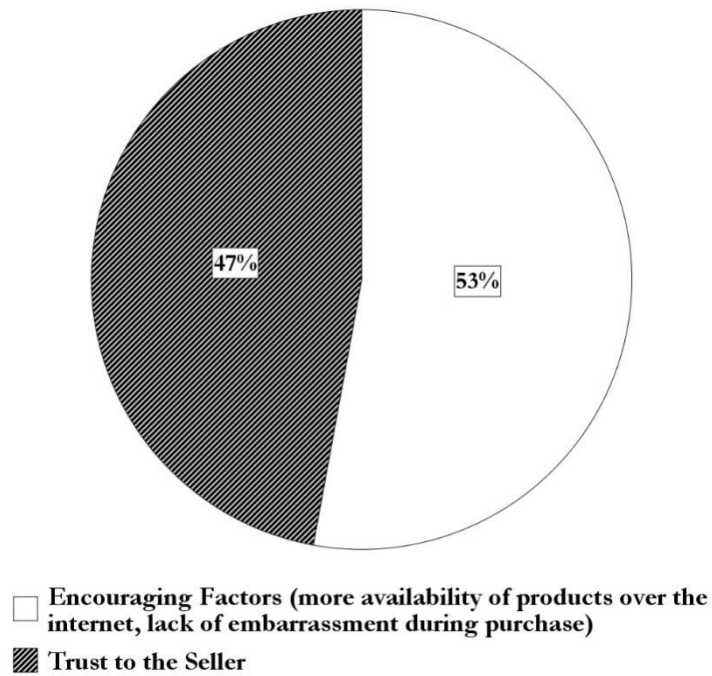
**Figure 16:** The participants' beliefs regarding the most influential factor discouraging them to purchase medicaments online.



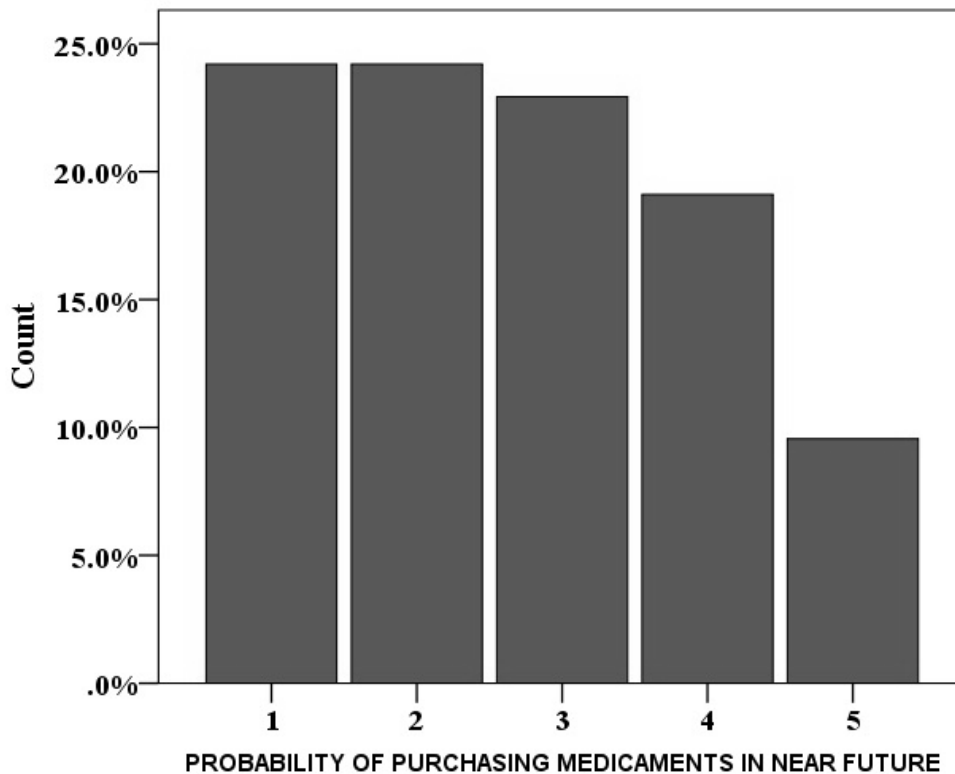
**Figure 17:** Participants' perceptions regarding the overall impact of discouraging, and encouraging parameters on their intention to purchase medications online.



**Figure 18:** Participants' point-of-view in regard to the overall effects of discouraging factors, and trust on their intention to buy medications online.



**Figure 19:** Participants' belief concerning the overall impacts of encouraging factors, and trust on their intention to buy medicaments online.



**Figure 20:** The probability of purchasing medicaments in the following year by the questionnaire participants.

## VI. Conclusion

The results outlined in the present research could assist in better understanding the threats associated with online shopping of medicaments, and it attempts to encourage consumers to make more responsible decisions and discerning selections to avoid further complications. Data collection was performed using an online questionnaire, resulting in the participation of 171 individuals. The impacts of the variables of interest were quantitatively evaluated using statistical software (SPSS). Analysis of the obtained data resulted in the following outcomes. It is also noteworthy that the positive influence of this research on seller's online strategies will result in indirect benefits for consumers. In particular, the online sellers' strategy in providing a website with improved quality, as well as increasing their brand awareness will increase buyers' confidence. From the social point of view, the outcome of this thesis assists regulatory agencies in implementing improved regulatory measures and standards that are capable of supporting legitimate online activities and prohibit the trade of illegal pharmaceutical products. The online pharmacies must also adopt effective strategies to address the consumer's concerns of purchasing medicaments online, and build sufficient levels of loyalty among target customers. For instance, offering high-quality and approved products, rapid transportation, provision of relevant certifications from appropriate authorities, keeping in touch with customers at different stages of transaction, and providing professional advice prior and after sale of pharmaceuticals could increase the consumers trust towards these websites. However, since the trading of pharmaceuticals via online channel is relatively new, this method has not been applied widely by consumers, and finding a sufficient sample size is challenging. Therefore, a more detailed study, with a wider sample size, is required to determine the differences in the influence of studied variables on various categories of medicaments, including pharmaceuticals, healthcare, and beauty products.

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