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Investigating the Factors Influencing the Adoption of Online Pharmacy in Oman

Abir Al Sideiri[1,2*], Zaihisma Binti Che Cob[1], Sulfeeza Bte Mohd Drus[1]

[1] College of Computing and Informatics, Universiti Tenaga National (UNITEN), Kajang, Selangor, Malaysia

[2] Department of Information Technology, Buraimi University College, Buraimi, Oman

Abstract: There is a low level of adoption and acceptance of online pharmacies in Oman; only very limited Omani Citizens are aware of online pharmacies. Even fewer Omanis accessed and bought medicines using online pharmacy systems. Therefore, the online pharmacy business is facing a significant challenge in adaption in Oman. Despite many attempts on using web applications that mimic the actual pharmacy operations, such attempts are still preliminary. They need more theoretical modeling and practical enhancements to trust, reliability, efficacy, and other factors of success. The main aim of the current study is to investigate the factors that influence the adoption of online pharmacy to give a better understanding of technology adoption and acceptance in an Omani context. This study carries out under UTAUT-2 to examine the perception of customers on adapting online pharmacy. The study has presented an extensive review of existing books, journals, reports, newspapers, articles, and reputable online information on the issue at hand. The thought of relevant literature is closely linked to UTAUT-2 variables and the adoption of online pharmacy in Oman. The most important factors, such as performance expectancy, effort expectancy, social influence, facilitating condition, habit, hedonic motivation, and price value, were observed as their influence on the adoption of online pharmacy among Omanis. This study provides valuable, insightful information about the effectiveness of a specific online pharmacy application and a more comprehensive assessment of users' perspectives on the factors that might influence their adoption of new technology in the context of Oman.

Keywords: technology adoption, unified theory of acceptance and use of technology, technology acceptance model, online pharmacy.

调查影响阿曼采用在线药店的因素

摘要：阿曼在线药店的采用率和接受度较低；只有非常有限的阿曼公民知道在线药店。使用在线药房系统访问和购买药物的阿曼人甚至更少。因此，在线药店业务在阿曼面临着重大的适应挑战。尽管有许多尝试使用模拟实际药房操作的网络应用程序，但此类尝试仍处于初步阶段。他们需要更多的理论建模和实践增强来增强信任、可靠性、有效性和其他成功因素。当前研究的主要目的是调查影响在线药房采用的因素，以便更好地了解阿曼语境中的技术采用和接受情况。本研究在犹他州-2下进行，以检查客户对适应在线药店的看法。该研究对现有书籍、期刊、报告、报纸、文章和有关当前问题的知名在线信息进行了广泛审查。相关文献的思想与犹他州-2变量和阿曼在线药店的采用密切相关。最重要的因素，如绩效预期、努力预期、社会影响、便利条件、习惯、享乐动机和价格价值，被观察为它们对阿曼人采用在线药店的影响。这项研究提供了关于特定在线药房应用程序有效性的有价值的、有见地的信息，并更全面地评估了用户对可能影响他们在阿曼环境中采用新技术的因素的看法。

关键词：技术采用、技术接受和使用的统一理论、技术接受模式、在线药店。

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About the authors: Abir AlSideiri, College of Computing and Informatics, Universiti Tenaga National (UNITEN), Kajang, Selangor, Malaysia; Department of Information Technology, Buraimi University College, Buraimi, Oman; Zaihisma Binti Che Cob, Sulfeeza Bte Mohd Drus, College of Computing and Informatics, Universiti Tenaga National (UNITEN), Kajang, Selangor, Malaysia

1. Introduction

The application of scientific knowledge for practical purposes, especially in the pharmaceutical industry in Oman, has advanced personal innovation in the physical health sector and technology from day-to-day activities. For instance, the increasing use of smartphones, the internet, and social media are excellent opportunities for businesses to prosper, made possible with internet marketing that includes – mobile phone marketing (M-Marketing) and Facebook marketing (F-Marketing). Several retail companies are offering their goods and services on an online platform [1]. Despite the growing increase in businesses and activities, Oman's current situation poses some limitations and challenges. These challenges reflect the readiness of the country to ride on "e-commerce – commercial transactions conducted electronically on the internet," – a country's readiness for e-commerce can be viewed and assessed by many factors. Among others, the critical factors are network infrastructure that includes narrow and broadband, and on costs of internet access [2].

Globally, Oman is high ranked for smartphone and internet penetration [3]. However, the country is home to advanced information and communication technology (ICT) infrastructure. Its citizens have adopted e-commerce at a relatively slow pace [4]. Oman has to witness low adoption of e-commerce tools and systems in some sectors of the economy, including online pharmacy [5]. It has been empirically proven that few people are aware of the existence of online pharmacies, with the fewer number of those who bought medicines over the internet [6]. Despite the rapid advancements in mobile telecommunication technologies, these challenges have significantly changed customers' shopping and purchasing behavior [7].

In contrast, there is evidence that some countries within the developing nations have a relatively higher level of online pharmacy acceptance than Oman, while online pharmacy sales are approximately 30% [8]. However, online pharmacy and internet marketing are more interested and adopted by young consumers in Oman, exceptionally well-educated, and computer interacted businessmen or women.

To support the online pharmacy and practices of online marketing that are interested and adopted by increasing number of young consumers in Oman. The Ministry of Commerce and Industry recently created an e-commerce department in the Commercial Affairs Department of the General Directorate of Trade. It aims to organize and develop the sector and keep abreast of developments, methods, and modern systems for buying and selling via electronic channels. Ass the Ministry encourages home business owners and small and medium-sized companies to promote their products and use modern methods and technologies in marketing them. Inside and outside the Sultanate, the department will also contribute to facilitating e-commerce business, enhancing the reliability of its transactions, and preserving dealers' rights [9]. The electronic transformation in commerce is no longer an option but rather an inevitable must, and the Oman Vision 2040 paves a suitable ground for the transition to e-commerce. There is a renewal in the laws, an electronic platform, and a will from the Omani youth. Omani people need to believe that the future is in their hands alone, and the Sultanate is ready to move to a sustainable economic model capable of providing job opportunities for the people of the Sultanate and maximizing the utilization of the available resources and capabilities [10].

This study would be segmented into five chapters: introduction, literature review, research methodology, data analysis, and discussion and conclusion.

2. Literature Review

In line with critical factors on network infrastructure, including narrow broadband and on-cost internet access, online pharmacy practices in Oman are still limited. However, online pharmacy practices enable the patients to get accessible services with low cost and more convenience. Online pharmacies aim to provide services that assist patients in adhering to their drug treatments. Practically, customers can use refill reminders that notify them via e-mail when it is time to refill or renew prescriptions. The provision of e-mail reminders provides a low-cost scalable approach towards addressing the problem of drug non-compliance. This enables consumers to make informed decisions and save money. Also, the penetration of new arrivals has made the online pharmacy market fragmented in nature. The main factors driving the growth of online pharmacies include the convenience and privacy of this new channel. Patients with limited mobility or who live far from the pharmacy benefit most from legitimate online pharmacies [11]. Due to the attractive advertising campaigns of pharmaceutical companies on television in the press and low-cost products, consumers find the above option more beneficial. However, the risks associated with counterfeit medicines are expected to affect the overall market growth seriously. Technological developments such as electronic prescription methods and barcode drug identification are expected to drive the global online pharmacy market in the coming years [11]. Due to the error-free prescription process and constant government efforts toward quality and affordable healthcare, E-prescriptions are in demand. The uneven proportion of patient-specialists further increases the need for accurate e-prescribing arrangements [12].

In the same way, e-commerce has compelling evidence to have changed the entire economic sector that includes the healthcare industry – however, the change has witnessed specific challenges due to peculiarities like the online pharmacy business. For

example, some studies argued that even though some developing nations' online pharmacy market seems to be flourishing, it still encountered several setbacks and challenges [7]. [7] further highlight these challenges to be two-folded. Firstly, it has to do with the strict regulations by the government of online pharmacy operations. These strict policies serve as a limitation to the high rate of online pharmacies in the country. Secondly, they attributed that most consumers are not comfortable with an online pharmacy, which led to a lower acceptance rate.

In general, the online pharmacy industry can be grouped into three major categories [13]:

1) A traditional online pharmacy dispenses medicine to the user upon presenting a prescription obtained from a physician. This type of online pharmacy is considered the most legitimate [14];

2) Online consultation pharmacies. In this case, the user will provide their medical point and history online to review the report and prescribe the medicine to be used. Most users prefer this type of online pharmacy as the services of a medical doctor and pharmacist are provided [15];

3) "Rogue" pharmacy or online drug shop, which allows consumers to purchase prescription drugs without a physician's consultation or a valid prescription [15]. Such pharmacies are considered illegal by law enforcement agencies. Most people who abuse drugs usually prefer such types of online pharmacies.

With online pharmacies, people could place a request for medication at their need that is established on the instruction they have at their disposal and get it delivered to them at their convenience. In this age and date, buying drugs online is a challenge in Oman due to the low patronage or low level of awareness received patterning to online pharmacy activities or e-business. Some research studies have argued that despite the growth of online pharmacy in some developing and developed nations globally, there are still some issues and challenges associated with an online pharmacy. Some studies have also ascribed that most people are not convinced about purchasing medications online since many people find it challenging to embrace the online pharmacy paradigm [17].

In further examinations, some significant issues are related to the regulations of the legislative and executive authorities where laws and moral standards have been enacted in the online pharmacy profession and trading. These strategies and approaches serve as a deliberate act to regulate the soaring inflated operations of online pharmacies globally. A process that leads to bottommost receiving and obtaining assets [18].

2.1. Omani Society and Acceptance of Technology

In the past 50 years, Oman has transformed from a lonely wilderness to modern Oman, representing a rarity of technological expertise and traditional social conservatism. Such a mixture cannot be accomplished [15], [19]. The use of the Web is a clear example of this disagreement. In 2011, a recent scan showed that only 44 percent of the population is using the Internet (Communications and Information Technology [5], whereas a study conducted with Internet World Stats [13] calculated growth in Internet use of 75.8 percent during 2007-2008. The reason that ICT infrastructure continues to improve is one of the reasons for this relatively low use [20].

Since the acceptance and use of e-government may also be related to other socio-cultural issues that affect internet acceptance, [13], [14] declared the essence of this issue to be that technology innovation is based on its innovator's cultural convictions and values. Which, if adopted as they stand, are at odds with the host environment culture. Several researchers have said that innovators frequently ignore the history of the hosting community [26]. The low Internet acceptance rate in the Arab world was alleged to be due to cultural inconsistencies with that invention, [27] revealing that Arabs have a strong affinity for their cultural beliefs and values to accept technologies introduced into the Arab world.

The rejection is not directed at technology but at its society, contrasting with Arab culture and values. Governments and organizations in the Arab world are reluctant to accept technology; as an Arab country, Oman has many features, such as language, culture, and religion, with other Arab states [13]. [14] stated that more money is spent on technology transfer by Arab countries and organizations. [28] noted that the socio-cultural attributes of adherents affect Internet acceptance in OMAN. Such factors can influence the acceptance and use of e-services such as e-commerce and e-government.

In the past, numerous difficulties characterized the adoption of e-commerce and e-banking initiatives in Oman, [9], [13], [27] examined the factors influencing e-commerce acceptance in Oman, discussed the distrust of internet security and privacy, the lack of computer and internet education and the lack of Internet service exposure and awareness. These affect not only e-commerce acceptance but also pharmaceutical acceptance. Research that shows Internet and Web infrastructure adoption in Oman is unusual given the studies mentioned earlier.

However, recent years witnessed extensive use of e-banking technologies as more Omanis have adopted the emerging technology along with new generations assisting older generations in learning and using the online technology [2], [10].

Appendix A shows the previous studies conducted for online pharmacy adoption.

3. Methodology

Extensive efforts were made to identify articles presenting various acceptance and technology adoption

models. The technology acceptance models and theories that are frequently used in online pharmacy adoption can be figured out from the previous section. In this section, the two most popular models are introduced and explained in their general form.

3.1. Technology Acceptance Model (TAM)

The original Technology Acceptance Model [19] and its derivatives (TAM-2, TAM-3) have energized the demonstration of different constructs with external technological aspects such as the (Trust, Awareness, Risk); it is comparable to the link between the TAM theory and the UTUAT-2 theory in the correlation between the two theories' constructs: perceived usefulness [20]; similarly, expected effort and perceived ease-of-use are denoted to cover each other within the designed framework [21]. Fig. 1 demonstrates one of the versions of TAM theory, which shows the role of trust, awareness, and risk in lightening the TAM model. Comparing the variables of UTAUT-2 displayed in Fig. 2 [22] and the TAM model depicted in Fig. 1 [19], [23], [24] would result in redesigning their framework to remove any two variables with high similarity to avoid redundant efficacy during the analysis and justification of the new proposed model.

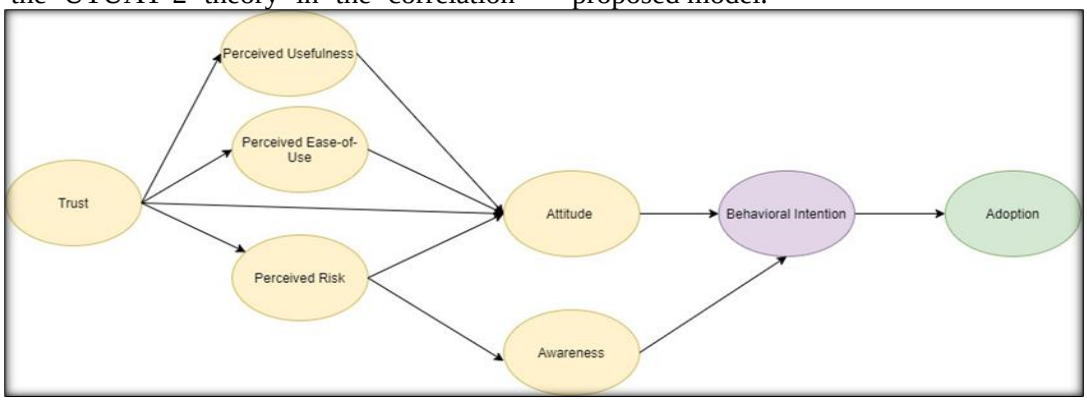

Fig. 1 TAM model version [23]

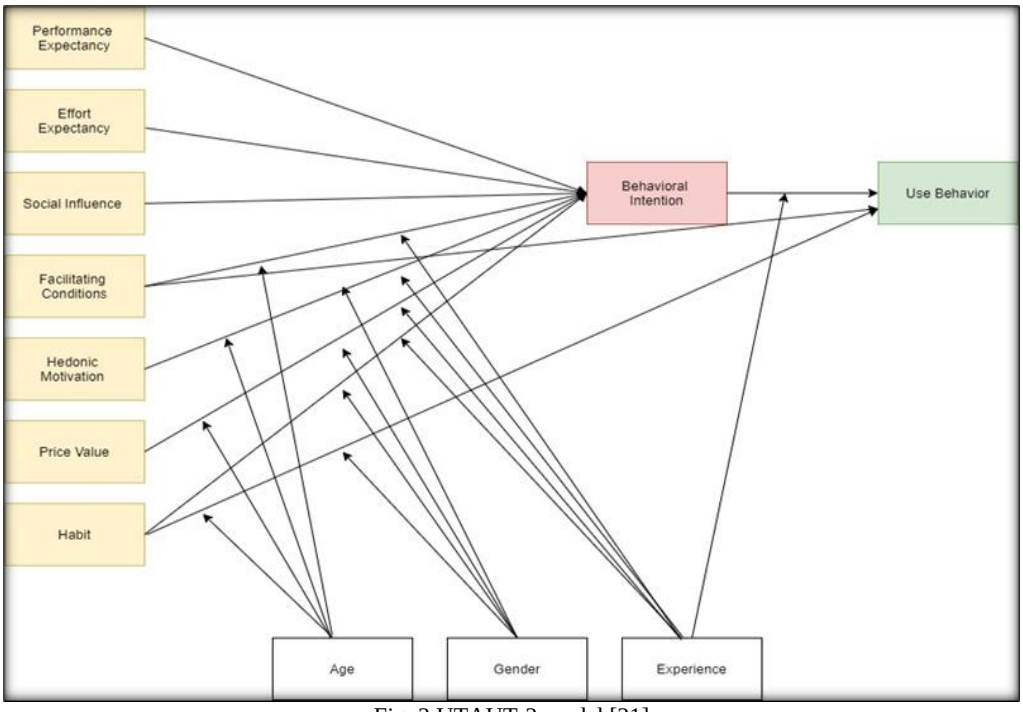

Fig. 2 UTAUT-2 model [21]

3.2. Unified Theory of Acceptance and Use of Technology (UTAUT-2)

The original UTAUT explained intentions to use IS based on perceptions reminiscent of the TAM theory, namely performance and effort expectancy. Social influences, facilitating conditions, and several moderators were added [21]. For overcoming the original criticism attributable to the parent adoption theories, the UTAUT theory was further modified to include more context.

Factors such as price value, habit, and hedonic motivation forming UTAUT-2 [21] resulted in the introduction of the UTAUT-2 model that represents a comprehensive theoretical framework and has enjoyed high popularity and solid empirical validation in a variety of disciplines and task environments [25], [26], [34]. Fig. 2 shows the UTAUT-2 framework.

Research on individual acceptance and use of IT tools is empirical [21], [25]; additionally, there is research on technology adoption by organizations and groups that hold the promise of using technology before judging the effectiveness of the desired outcomes, such as improvement in employee productivity and task/job performance in organizations. [21] synthesized these models into the Unified Theory of Acceptance and Use of Technology (UTAUT) identifies their key factors (performance expectancy, effort expectancy, social influence, and facilitating conditions) and their moderators (age, gender, experience, and voluntariness) related to predicting behavioral intention to use technology and existing technology used primarily in organizational contexts. Based on UTAUT theory, performance expectancy, effort expectancy, and social influence were theorized and found to influence the behavioral intention to use technology, while behavioral intention and facilitating conditions determine technology use.

Recently, [1] proposed and tested UTAUT-2, which incorporates new constructs (hedonic motivation, price value, and habit) that focus on recent theoretical mechanisms in a consumer context. UTAUT-2 explained 74 percent of the variance in consumers' behavioral intention to use technology and 52 percent of the conflict in consumers' technology use. Therefore, in UTAUT-2, seven constructs are identified as the main determinants of intention: performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit.

4. Results and Discussion

Oman is among the developing nations witnessing peculiar issues in adopting online digital drugstores with little effort being put in place for the acquisition, which will aid fast services to people with mental health challenges [27], [28]. Despite the significant advancement in the internet of things and the latest technological environment, online digital pharmacy is still behind in developing nations across Asia. People are still not ready to change their shopping and payment behavior [28], [29]. According to Al-Arifi [30], the buying of patient medication is not a standard norm in Oman due to the relatively low adoption. Research has recounted consumers' low participation in digital drugs therapy. However, some studies have argued that the acceptable use of technology has continued to impact consumers' lives [30], [31]. However, purchasing online digital pharmaceutical services is considered an important development to healthcare services, mainly in Oman. The research under investigation made use of (UTAUT-2) as drivers of consumer adoption of online medicines in Oman has been applied.

Similarly, perceived risk and technology trust will be considered as an extension of the UTAUT-2 construct. Therefore, the study's main aim is to "attempt to identify the factors responsible for adopting online pharmacy with the moderating role of personal innovation and Word of Mouth in the healthcare sector in Oman" [13]. The moderators in use are personal innovation and word-of-mouth moderators. Personal innovation measures the degree of ability to deal with innovations by individuals in Oman. Furthermore, the use recommendation of word-of-mouth is justified because the oral suggestion is a powerful approach to encourage others to utilize the same service (the online pharmacy). However, this recommendation exhibits the intention of use and develops a new behavior that leads to the adoption of online pharmacy.

Previous research has argued that only 2.7% of consumers are aware of the presence of online pharmacies in Oman, with an estimation that approximately 52.7% are willing to try order from online pharmacies [6]. However, 45.9% of consumers have difficulty differentiating between legal and illegal online pharmacies [6]. In developing nations, especially in the East Asia region, there is a relatively higher level of online pharmacy acceptance due to consumer demand and need to be compared to Oman [15], [16] In contrast, online pharmacy sales in the developed nation have been recorded about 30% of the pharmacy market shares in volume and value [3].

The studies of [10] examined the intention to use and adopt mobile banking technology, which could be regarded as one particular type of online technology. Constructs extracted from the UTAUT-2 theory and perceived risk and trust are harmonized to hypothesize the behavioral intention of the use and adoption process. However, examining the behavioral elements could result in introducing performance expectancy, effort expectancy, hedonic motivation, price value trust, and risk constructs that could impact positive influence on the development of behavioral intention on the use and adoption of online technology, this positive significance varies from one construct to another depending on the degree of capacity and strength on the mutual significant between these constructs. Consequently, based on the literature, it is essential to employ perceived risk independently as a construct to define the intention of using an online pharmacy in the retail system in Oman [13]. One recent study examining hedonic motivation as an intrinsic part of the UTAUT-2 theory on extrinsic driving dichotomy shows the impact of the UTAUT-2 approach on hedonic motivation [6]. However, a large part of the academic research has focused on the extrinsic driving dichotomy. The recent rise in the use of technology adoption by individuals in the non-organizational sector has led to a consumer-focused paradigm of science that entails a broader unified theory of technology adoption and use (UTAUT-2) [35]. However, the aim of surveyed literature these studied was to re-emphasize the much-needed focus on

consumer dichotomy with the adoption of online pharmacy. This involved a systematic examination and meta-analysis in UTAUT-2 studies of hedonic motivation an effective structure. The main drivers of non-hedonic and non-significant hedonic motivation experiments of individuals in utilizing factors that influence online pharmacy were extrinsic. Contrary to UTAUT-2, the hedonic motivation association of moderators did not matter when determining the individual behavioral intention on the adoption of online pharmacy [6].

The difference in behavioral purpose among demographic groups was explored. It could provide an opportunity to develop a new strategy to encourage the use of the last-mile delivery service for self-service parcel delivery on the adoption of online pharmacy. The facilitating condition construct is tied extensively with both the technology trust and the perceived risks. The belief is increased when an individual's confidence is elevated by external help when necessary. However, psychological and materialistic risks are reduced when an intervention is expected during technology failure incidents. This study adds facilitating condition construct in the prospect model due to its influence on other constructs and the additional knowledge it can perceive from the customer's behavioral intentions [32].

The value brought by the conceptualization of intentions in adoption models lies in their ability to predict potential technology acceptance under a microscopic lens [31]. Therefore, the behavioral intention has mainly been and repetitively reported to have an active role in shaping the actual usage and adoption of new systems [8], [21], [22], [31]. Accordingly, the current study supposes that the actual adoption of self-service technology (SST) technology could be primarily predicted by the customers' willingness and behavioral intention to adopt the system.

It is very stressful to overlook the influences that affect the human's decision or intention to use new technology; the complication resides in the fact that contradictive impacts – from someone's perspective-could act as convergent impacts –from another one's perspective.-. Therefore, investigate each variable's role in using the new technology, considering additional factors that could act as moderators and mediators in any proposed model [31].

5. Significance of the Study

Researchers argue that the best way of validating and advancing any model or theory is through its application in different cultural settings and contexts. The current study primarily contributes to the literature on technology acceptance in general and in the Arab world and Oman specifically.

The significance of online pharmacy is that the online pharmacy's environment is distinctive compared to other pharmaceutical transactions or internet healthcare services. Since it has to do with a great significance on the individual safety, security, and well-being of human life, since the level of risk and trust need to be considered, therefore, practically, the practical significance will help to increase the level of online pharmacy awareness that is seen as a limitation or barrier among the Omani nationals when considering awareness as the main factor that could influence consumers' adoption or intention of online pharmacy and healthcare services in global world view. The significance will also help online drug users have a solid preference for buying medication via cyberspace with a high level of trust and less liability or risk involved.

6. Conclusion

This study provides valuable, insightful information about the effectiveness of a specific online pharmacy application and a more comprehensive assessment of users' perspectives on the factors that might influence their adoption of new technology in the context of Oman. The current study primarily contributes to the literature on technology acceptance in general and in the Arab world and Oman specifically. Practicing online pharmacies could offer better pricing than offline stores, with increased access, lower transaction and product costs, convenience, and greater anonymity for consumers. Online pharmacies provide accessibility to people with limited mobility and people in remote areas.

The practical significance of this research will assist policymakers and practitioners in the healthcare industry (for example, pharmaceutical) to amplify the welfare of consumers' adoption and minimize the risks associated with the use of online pharmacies. This approach should aim to increase health literacy, consumer awareness, and knowledge required for making appropriate health choices, thereby acknowledging the risk factor associated with online pharmacy and making the most of the multitude of opportunities offered by the world of medicine. Furthermore, a double-level approach could be adopted. First, the policy with regulations that regulate online phenomena globally among Omani nationals needs to be effective. Second, policymakers should have adequate needs to focus on individual consumer protection and control. Therefore, with the significance of this study, these suggestions will be achieved from the significant practical perspective from this study under investigation.

In the future, the study will be expanded to address issues relevant in the context that help to examine all variables being investigated to develop a framework and hypotheses for the current analysis. Furthermore, it will be focused more on the review of related theories that support the relationship among the variables and the utilization of online digital pharmacy in Oman. It

will discuss the issues of relative importance will also be addressed that could help broader the study. Also, a model will be proposed to test the relationship between the variables that influence online pharmacy adoption.

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Appendix A

No.	Research Title	Methods and framework	Finding	Country
1	Attitudes and Perceptions of	A cross-sectional survey of healthcare providers was conducted	Most respondents (92.4 %) knew that the clinical pharmacist is an integral part of the medical team. In	Saudi Arabia

	Healthcare Providers towards Clinical Pharmacy Services at a Tertiary Care Hospital in Riyadh, Saudi Arabia [17]	in King Khalid University Hospital, Riyadh, Saudi Arabia, from September to November 2013. A self-administered questionnaire was delivered to health care professionals (HCPs) who included physicians, pharmacists, and nurses.	comparison, 86.5 % of the participants expressed confidence in the ability of clinical pharmacists to improve the quality of patient care through their practice. Despite the relative lack of awareness of the increasing interest in clinical pharmacy practice (59.6 % were not aware of such a trend), pharmacists were less appreciative ($p < 0.05$) of the positive role of clinical pharmacists in direct patient care compared to both physicians and nurses (67.4, 74.3 and 72.3 %, respectively)	
2	Online Pharmacy: An E-Strategy for Medication [20]	Review article	Internet pharmacies can offer a degree of privacy not found at the local pharmacy. Patients can obtain prescriptions and ask questions away from the prying eyes and listening ears of neighbors, co-workers, and other parties. Finally, Internet pharmacies assist homebound patients and those living far from a traditional pharmacy. However, Internet pharmacies that perform illegal dispensing practices assert the wrath of potential dangers to consumers' health. Pharmacies that provide prescription medication without a valid prescription or provide a prescription based on an online questionnaire enable consumers to bypass an essential safeguard—a face-to-face consultation with a licensed physician.	India
3	Factors Influencing Online Shopping Behaviour: The Mediating Role of Purchase Intention [23]	Structural Equation Modelling to examine the model fits and hypothesis testing. The study determined the relationship between subjective norm, perceived usefulness, and online shopping behavior while mediated by purchase intention. University students aged between 18 and 34 that currently pursuing their studies at University Malaysia Perlis were selected as the subject of analysis. 662 out of 800 questionnaires distributed were valid for coding, analyzing, and testing the hypothesis. Collected data were then analyzed using SPSS version 18.0 and AMOS version 16.0.	The study depicted that subjective norm and perceived usefulness significantly positively influence online purchase intention, but subjective norm insignificant influence shopping behavior negatively. It is interesting to note that perceived usefulness also insignificantly influences online shopping behavior. Finding also revealed that purchase intention significantly positively influences online shopping behavior. For future research, the sample from working adults and other variables related to online shopping were included to minimize sampling bias.	Malaysia
4	A detailed analysis of online pharmacy characteristics to inform safe usage by patients [7]	Using piloted search terms via Google and Yahoo search engines, identified websites were screened for regulatory status, adherence to regulatory standards, administrative requirements, clinical assessment requirements, and additional details deemed to be of relevance to a user. Characteristics of regulated and non-regulated (defined as those with an absence of a correctly linked regulatory logo) websites were compared to identify differences that could be used to improve patient safety.	The primary outcome measures Regulatory status, adherence to regulatory standards, quality of information provision, barriers to medicines access. Results 113 websites sold diazepam, fluoxetine, and simvastatin; were identified within the first 100 results. Less than a quarter were found to be regulated online pharmacies. Eighty websites were willing to sell the medication without a prescription. Which are liable to abuse, have potentially serious interactions, and require counseling to ensure patient safety are readily available via the internet. UK consumers should be aware of the importance of regulatory logos when purchasing medicines via this route and ensure that the seller can be meaningfully contacted by the contact details provided. The provision of clinical information should not be used alone as an indication of the seller's provenance.	School of Pharmacy, University of East Anglia, Norwich, UK
5	A nationwide web-based survey of a sample of Italian community pharmacists' perceptions and opinions about online sales of medicines and falsified drugs [8]	A self-administered questionnaire was distributed using an online platform between October 2016 and January 2017. Collected information included: demographics, workplace, and role, opinions towards the online sale of pharmaceuticals, whether the pharmacy has a website, knowledge, and views about falsified drugs	Favorable opinions about the online sale of pharmaceuticals were expressed by 4.9% of participants for prescription drugs, 25.4% for non-prescription medications, and 51.6% for other products. Favorable opinions occurred more often among males and owners/directors of pharmacies in comparison to females and employees and among pharmacists working in pharmacies with websites doing e-commerce. Knowledge about falsified drugs was limited, with 24.5% of respondents failing to indicate that falsified medicines may contain less or different ingredients, 46.4% less and other excipients, and 72.3% ignoring that falsified drugs may be lethal. One in 3 respondents did	Center for Research in Medical Pharmacology , University of Insubria. Varese (Italy)

			not know about falsified medicines in Italy; however, 51 participants had previous experience with falsified medications, and 21 provided specific information.	
6	Acceptance and use of online pharmacies and the online customer journey for the purchase of OTC medicines. [24]	This study was conducted as a combination of quantitative survey and qualitative interview. The target group of this study was 18–74-year-old-people people living in the Greater Helsinki area. The data was collected with an online survey (n = 262), one focus group discussion (n = 5), and a one-to-one interview (n = 3). Participants of both the survey and interviews were chosen by convenience sampling. They were drawn in via social media, mainly by Facebook, and in cooperation with a few pharmacies in the Greater Helsinki area. Quantitative survey analysis was made using version 25.0 of the IBM Statistical Program for Social Sciences (SPSS). Data obtained with open questions and interviews were analyzed using conventional deductive content analysis.	In this study sample, 16.5% had bought medicines online. Independence from time and place, convenience, and time-saving were the most significant drivers to shop OTC medicines online. At the same time, the most significant barriers were lack of additional value, the high price of the delivery and long delivery time, and the acute nature of the problem. The lower cost of the medicine was the most vital factor in getting people to consider buying online. Results indicate that the online customer journey follows the general five-stage decision-making model while purchasing unfamiliar medicines. The internet turned out to be the primary source of information before purchase, and self-diagnosis could be made with the help of information found on the internet. In addition, perceptions and experiences of significant others and advice from the pharmacist were considered as helpful help in the process of self-diagnosis.	University of Helsinki, Finland
7	Evaluation of the online pharmaceutical market and counterfeit medicines: Development of a Risk-based safety mapping of online pharmaceutical market [11]	The risk-based safety mapping of the online pharmaceutical market as a comprehensive methodology consists of three basic steps focusing on the critical patient safety issues. The first step consists of assessing whether there is an increased demand for an active ingredient or product outside the traditional supply chain (high-risk medicines) in case of prescription-only medications (more significant in case of drugs that can only be accessed in a clinical setting) or when a product has several off-label or illegitimate indications or when a drug is in shortage we suspected that patients/consumers or health professionals might turn to the online market of these products to exceed such barriers.	These steps are further divided into specific questions indicating priority issues related to online medication purchases: (1) Evaluation of available information; (2) Evaluation of vendor characteristics; (3) Product analysis. Numerous drugs are liable for illegal trade. Somatropin was chosen for the study as it is a relatively innovative product, and besides its approved indications, several unauthorized off-label and prohibited uses have been published previously. The results clearly illustrate that prescription-only biologic drugs are widely available on the internet and can be easily accessed by anyone. However, numerous patient safety concerns are raised based on the study results (e.g., access without prescription and compromised product quality). Most online vendors did not require a valid medical prescription before dispensing. Limited or even no medical information was provided for customers and patients. Additionally, none of the websites requested any health information during the ordering process or before purchases. Our result supports the fact that online medications are not necessarily cheaper. The price, including shipping fees, was similar for one sample while significantly higher for the other two samples. All three purchased somatropin samples arrived relatively quickly, and products seemed to be authentic by visual examination.	Faculty of Pharmacy The University of Pécs. Hungary
8	Exploring the Factors that Influence the Adoption of Online Pharmacy in Saudi Arabia: A Conceptual Review [29]	Literature review	Perceived risk and trust can be considered the main factors influencing consumers' adoption of online medicine. Consumers will strongly intend to purchase medicine through the internet with a high level of trust and less risk involved.	Saudi Arabia
10	Factors Affecting Consumers' Intention to Purchase Online [15]	In this research, the e-mail survey method was used to collect data and gather information. The measures of the questionnaire have initially been in English and translated into Turkish. As known, pre-testing is required before gathering data [16, 33]. With this respect, the developed	As a result of empirical research, available data were collected from 419 participants. According to the structural equation model, while product and financial risk have a reverse relationship with intention to purchase, other independent variables as convenience and merchandise variety and price consciousness have positive relationships.	Turkey

		questionnaire was pre-tested on 30 consumers before conducting the surveys. Face-to-face and electronic survey methods with the consumers were used in the data collection process. Among the 448 consumers contacted, 440 of them agreed to participate in the survey. At the end of the data screening period, 419 usable questionnaires were gathered.		
11	Factors affecting pharmacy engagement and pharmacy customer devotion in community pharmacy: A structural equation modeling approach [26]	The survey was carried out from February to April 2016 by using self-administered questionnaires. The questionnaire was approved by Chulalongkorn university ethical committee. The study population was Thai citizens who lived in the Bangkok Metropolitan area and received service from community pharmacies in Bangkok and the vicinity in three months. The unit of analysis was the customer who received pharmacy professional services at a community pharmacy. The criteria for including the subject in the study were Thai citizen 1) who earned a living, 2) could read or write the Thai language, 3) who received pharmaceutical services multiple times at a study community pharmacy in the past three months.	Only perceptions about pharmacists in customers receiving professional pharmacy services were statically significant regarding the relationship with pharmacy engagement.	Thailand
12	Factors influencing community pharmacists' recommendation of over-the-counter medications in four Vietnam cities [30]	The study was conducted at community pharmacies in Vietnam from June 10 to October 30, 2017. Community pharmacists completed a final data set for analysis of 422 questionnaires from four different cities in Vietnam. Exploratory factor analysis was used to determine potential factors underlying a set of 20 questions related to the research topic. The association among the obtained factors and between the accepted factors and the pharmacists' demographics were determined by applying the Mann-Whitney U test and the Kruskal-Wallis test.	Using factor analysis, the current study identified five factors, accounting for 61.53 % of the study's variance, including customer, economic, professional, brand, and product. The product factor was found to have the most significant influence on pharmacists' recommendation of all the elements.	Vietnam
13	Factors that Affect Consumers to Buy Medicine from E-Pharmacy [10]	This research understands which factors influenced consumers to buy medicine from e-pharmacy overall and amongst different age groups. The study is conducted on other independent parameters, including medication cost, medicine usage awareness, availability of treatment, quality of treatment, and information safety. The separate parameter will be considered more by a particular age group and prominent factors in all. The survey consists of several questions on all these parameters. It is conducted online, where around 109 respondents responded, and six respondents' data is not filled out. So, a total of 103 respondents were used for the study.	Although various independent variables are correlated with the buying intention individually for different groups, the two factors that are prominent in all the consumers (independent variable significantly associated with dependent variable) amongst the diverse group are Fake/Counterfeit medicine and safety of information, which means no age group would like to compromise on the part of quality, and also consumers nowadays would like to safe their personal data on the web portal. Also, our study can conclude that people aged less than 35 shows a positive response towards medicine from e-pharmacy, and people above that age are still not sure whether they would like to buy medicine from e-pharmacy. They are neutral towards buying from e-pharmacy and wanted to continue buying medicine through retail chemist/offline channel.	Pune, India
47	Purchase behavior of online	The shopping behavior of customers of Internet pharmacies was	This article summarizes the possible procedures when purchasing through e-commerce. It presents the results of	Czech Republic

	pharmacies clients [31]	researched in quantitative research through an online interview. We carried out this quantitative research. By a simple random selection, 1,200 customers were chosen of an Internet pharmacy from the population of 5,630 clients. Its owner also operates a brick-and-mortar pharmacy in the center of Prague and runs a private clinic for fat reduction, modification of metabolism, and a healthy lifestyle. The research was conducted through Internet polling. This research was (among other things) focused on mapping the way of searching and purchasing pharmaceutical products in the e-shop and the reasons for repeat purchases in e-shops.	quantitative research among clients of online pharmacies focused on mapping the reasons that lead clients to shop in an internet pharmacy, purchase frequency, and procedure for purchasing over-the-counter medications and nutritional supplements on the internet.	
15	The extent of use of online pharmacies in Saudi Arabia [7]	An Arabic survey questionnaire was developed for this study. The questionnaire was distributed via e-mail and social media. Four sections were created to cover the objectives: experience with online shopping in general, demographics, awareness of the existence and customer experiences of buying medicine online, and reasons for buying/not buying medicine online.	A total of 633 responses were collected. Around 69% (437) of them were female, and the majority (256, 40.4%) were in the age range 26–40. Only 23.1% (146) were aware of the existence of online pharmacies where 2.7% (17) of them had bought a medicine over the Internet and 15 (88.2%) respondents out of the 17 were satisfied with the process. Lack of awareness of the availability of such services was the main reason for not buying medicines online. Many respondents (263, 42.7%) were willing to try an online pharmacy, although majorities (243, 45.9%) could not differentiate between legal and illegal online pharmacies. The largest categories of products respondents were willing to buy them online were non-prescription medicines and cosmetics.	Saudi Arabia
16	A Proposed Prototype of E-Pharmacy Web Application for the Consumers of Saudi Arabia	System design	The e-pharmacy practices will provide a stepping stone for the growth of online pharmacy in Oman.	Saudi Arabia
17	National Pharmacist Competency System at Ministry of Health Hospitals in Saudi Arabia [28]	Document Analysis	Improves pharmaceutical care delivered to the patients. It prevents drug misadventures, improves patient quality of life, and raise patient satisfaction in the health care system	Saudi Arabia
18	Recommendations to Improve Advanced Pharmacy Practice Experiences in an ACPE International Certified Program: A Qualitative Approach [33]	Forty-eight health care professionals of different backgrounds participated in a roundtable discussion during a 1-day meeting. The discussion revolved around three predefined themes: the Doctor of Pharmacy (PharmD) program learning outcomes, regulations and responsibilities, APPE activities and syllabi, non-clinical rotations, and assessment. Discussion of each theme was summarized and incorporated in the result. The discussion was transcribed verbatim.	Discussion regarding the PharmD program learning outcomes emphasized clinical outcomes with an additional focus on basic sciences. The regulations and responsibilities table incorporated guidance toward developing student professionalism. APPE activities and syllabi, non-clinical rotations, and assessment recommendations encompassed crucial issues such as effective communication among the college, preceptors, and students, scheduled site visits, financial reimbursement for preceptors, student preparatory workshops, and non-clinical rotations.	College of Pharmacy, King Saud University, Riyadh, Saudi Arabia
19	Electronic Health Record Portal Adoption: a Cross Country Analysis [18]	This research applied a new adoption model using the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) as a starting point by incorporating the Concern for Information Privacy (CFIP) framework. To evaluate the research model, we used the partial least squares (PLS) – structural	The predictors of user behavior are habit and behavioral intention. The statistically significant factors of behavioral intention are performance expectancy, effort expectancy, social influence hedonic, price value, and tradition. Social influence, hedonic motivation, and price value are only predictors in the US group. The model explained 53% of the variance in behavioral intention and 36% of the variance in user behavior.	USA

		equation modeling (SEM) approach. An online questionnaire was administered in the United States (US) and Europe (Portugal). We collected 597 valid responses.		
20	Cultural factors influencing e-commerce usability in Saudi Arabia [28]	Islamic beliefs and norms tightly bind the culture in Saudi Arabia, and strict rules and regulations govern the behavior of different groups of people, according to age and gender. For example, sex segregation is part of the culture, and usually, males are viewed as responsible for the welfare and behavior of their female relatives. Several studies have shown that gender influences technology acceptance, especially in gender-based societies like Saudi Arabia. Women's activities are monitored by their male relatives, and there are strict rules related to the use of the internet. The Saudi government itself monitors, as well as restricts, many websites.	The study found that age, gender, and computer proficiency influenced the adoption and use of online shopping in the kingdom. There were three kinds of online retail participants: high-frequency, moderate frequency, and low-frequency users. High-frequency users were usually young people, with a relatively higher percentage of women showing superior shopping skills online. Average users were primarily male and middle-aged, and their ICT knowledge was moderate. Low-frequency male and female users were most likely to be between the ages of 18 and 24. This study will potentially assist professionals interested in services supported by ICT, the wider business community, and the government in undertaking comprehensive, effective, and sustainable solutions to improve e-commerce in Saudi Arabia.	Saudi Arabia