



Factors Affecting the Acceptance of E-commerce in Hospitals: A Narrative Review

Shahrzad Ashja Ardalan¹ and Abasat Mirzaei^{1,*}

¹Department of Healthcare Management, Faculty of Health, Tehran Medical Science, Islamic Azad University, Tehran, Iran

*Corresponding author: Department of Health Care Management, Faculty of Health, Tehran Medical Science, Islamic Azad University, Tehran, Iran. Tel: +98-9127789006, Email: amacademic@yahoo.com

Received 2022 May 24; Revised 2022 October 08; Accepted 2022 October 09.

Abstract

Context: The global use of the Internet has expanded e-commerce as a tangible representation of the information and communication technology (ICT) revolution in all industries. Like other sectors, e-commerce is essential in the healthcare sector for meeting patients' increasing demands and providing high-quality and cost-effective healthcare services at clinics, hospitals, and other healthcare centers.

Objectives: We investigated the factors affecting the acceptance of e-commerce in healthcare centers and hospitals.

Evidence Acquisition: In this narrative review, articles indexed in PubMed, Emerald, Scopus, ProQuest, and Google Scholar and published from 2010 to 2021 were searched using the "e-commerce", "healthcare", and "hospital" keywords. Inclusion criteria encompassed being conducted in the field of e-commerce in medical and health centers in Iran and the world and published from 2010 to the end of December 2021. Studies in which the role of e-commerce was inconspicuous, those that were irrelevant to healthcare centers, studies failing to note effective research parameters in abstracts, and finally, scientific sources lacking full text were excluded. Finally, ten relevant papers were chosen and analyzed.

Results: Based on our findings, today's technologies, such as e-commerce, have influenced the quality of healthcare and investments in the healthcare industry. Besides, high-ranking managers of healthcare centers and hospitals should support the establishment and deployment of e-commerce by providing appropriate facilities to implement such systems, e.g., adequate hardware and software needed to install and efficiently run the system.

Conclusions: In this way, the positive effects of e-commerce were shown in all aspects of healthcare centers, including improvements in healthcare services' quality, enhanced financial performance, and facilitated service provision. It is suggested that health centers provide adequate hardware and software to easily install and run the E-commerce system and other e-health programs so that medical personnel can more easily accept these technologies.

Keywords: Commerce, Health Care Delivery, Hospitals, Medical Informatics

1. Context

E-commerce, a domain of the digital economy, encompasses all financial and commercial transactions made on computer networks and the pertaining commercial processes (1). E-commerce used to rely on non-Internet communication via independent information exchange standards and protocols. However, the development of the Internet markedly reduced the costs of using e-commerce (2, 3). E-commerce is essential in healthcare to meet patients' increasing demands and provide high-quality and cost-effective healthcare services at healthcare centers (4, 5).

Medical cost optimization has improved the quality of hospital services and healthcare products (6). Similarly, de-

ploying and commercializing a new form of commerce, i.e., e-commerce, will represent the market in various distribution channels as a source of economic growth and sustainability (7). Still, the emergence of E-commerce in the healthcare industry has pushed IT personnel not only to move beyond designing and maintaining the infrastructure but also to rethink several aspects of dealing with clients (e.g., privacy and data security) (8).

Today, e-commerce not only expands to online sales but also encompasses the transportation of products and services, as well as information exchange via online networks (9). Additionally, e-commerce offers a better flow of information in different forms, such as electronic data exchange and direct communication with providers. By using e-commerce, healthcare centers can improve their

competitive performance by improving their rate of data transfer, cutting errors, upgrading the precision of received and sent data, reducing the storage inventory, planning logistics and inventory control, and developing quicker product delivery platforms (10).

Despite numerous benefits of e-commerce for producers, service providers, and patients, the application of e-commerce has been hindered by technological issues and several factors such as different technological standards, users' culture & behaviors, delayed product delivery, poor connection links, weak computers, high costs, tiresome tracking, unreliable services, slow network-based data transfer, and, finally, safety issues. So, the most serious challenge in using e-commerce is the provision of suitable technological infrastructure (11-13).

Like in other countries, electronic health and e-commerce have been implemented to some extent in Iran. Nevertheless, there are many obstacles, such as the lack of standard programs (due to multiple data formats), the high cost of electronic health systems (hardware, software, and maintenance), legal problems due to the refusal of electronic documents by judicial courts, technical problems (e.g., network and server problems), and health care providers' resistance to change. Also, the acceptance of E-commerce by patients and healthcare providers is a controversial issue. Studies on the factors influencing the acceptance of using E-commerce by hospitals are limited, which encouraged us to conduct the present study to explore this topic more closely.

2. Evidence Acquisition

In this narrative review conducted in 2022, we searched PubMed, ProQuest, Scopus, Emerald, and Google Scholar to gather articles published from 2010 to 2021 using keywords such as e-commerce, healthcare, and hospital (Table 1).

Inclusion criteria for studies were being conducted on e-commerce applications in the medical and health centers in Iran and in the world and being published from 2010 to the end of December 2021. Only studies written in English or Persian were included. Exclusion criteria in this phase were the role of e-commerce in the study being inconspicuous, being irrelevant to healthcare centers, not mentioning effective research parameters in the abstract, and unavailability of the full text.

After screening, a qualitative evaluation of the papers was independently performed by two supervisors of the study (members of the research team). Disagreements were resolved by a third researcher.

Table 1. Details of the Search Keywords Searched and the Number of Articles Retrieved in Each Database

Website/Database and Keywords Used	The Number of Articles Found
PubMed	
E-commerce hospital healthcare	9
E-commerce hospital	30
Healthcare organizations' b2b e-commerce adoption	0
E-commerce usage healthcare industry	0
Emerald	
E-commerce hospital healthcare	25
E-commerce hospital	46
Scopus	
E-commerce hospital healthcare	1233
ProQuest	
E-commerce hospital healthcare	1242
Google Scholar	
"E-commerce" + "hospital" + "healthcare"	17000
"E-commerce hospital" + "healthcare"	8
"Healthcare organizations" b2b e-commerce adoption	271
"Healthcare sector" b2b e-commerce	529

3. Results

The initial search retrieved 20,398 papers, which were imported into Endnote software. After removing duplicates and the items falling out of the specified time range, 15,071 remaining papers entered into the second screening phase, where their titles and abstracts were read carefully, resulting in the exclusion of 14,998 additional papers. Then the full texts of the remaining papers (n = 73) were evaluated, and 62 papers were omitted due to their titles being irrelevant to the topic. Finally, ten papers were selected according to the inclusion and exclusion criteria and after excluding duplicates and irrelevant articles. Table 2 summarizes the results of the selected studies.

4. Discussion

The current research reviewed studies on e-commerce and the factors affecting its acceptance in the healthcare industry. Although there are relatively few studies on e-commerce, the results of our study indicated that the use of various technologies in the healthcare industry has improved healthcare quality. As our results showed, the goal of technology, according to the studies reviewed, was to accept e-commerce and information technology in the

healthcare industry. Most studies showed that the benefits of e-commerce in healthcare-related, environmental, financial, organizational, human-related, and technological factors could be exploited to benefit physicians, nurses, patients, and healthcare centers.

Fedushko et al. noted the investment benefits of e-commerce and eHealth and highlighted the importance and success of AI and machine learning in health promotion. They also reported a rise in the investments made by governmental and private UK companies in healthcare in 2019 and 2020, demonstrating the significance of health technology and e-commerce in healthcare in terms of both profitability and service quality improvement (16).

Compared to eHealth, mHealth, as an e-commerce component, has shown various applications due to its system's portability and flexibility. Also, mHealth can be used in rural regions where it is difficult to have regular access to medical facilities. Therefore, it can be an inexpensive alternative for providing healthcare services to citizens. Compared to traditional healthcare providers, mHealth can reduce healthcare costs (22, 23) and provide all health-related information required for a healthy lifestyle (24). It is also a beneficial tool in the management of chronic health-compromising diseases.

Also, due to a large number of health-related apps, deciding on their appropriateness for users has become extremely difficult (22). A barrier to the acceptance of e-commerce in the healthcare system is the lack of a framework for evaluating mHealth apps. Thus, Rajak and Shaw (17) proposed a relatively comprehensive framework for assessing mHealth apps. This framework has several managerial outcomes and can be adopted by developers to rank mHealth apps. Also, the program's performance can be promoted using the framework proposed by Rajak and Shaw, and physicians can suggest appropriate healthcare apps to their patients based on this framework.

Hospitals' ability to allocate resources to IT evaluation has intermediary effects on the relationships between organizational drivers such as investment evaluation methodology (IEM), user information need assessment, IT maturity, and e-commerce realization (19). Four primary factors, including human-related, technological, organizational, and environmental elements, influence decision-making on accepting e-commerce and other technologies. External pressures are also vital in shaping the acceptance of E-commerce and similar technologies in hospitals. These external pressures that come from competitors and the government can reduce acceptance. Another serious challenge in hospitals and healthcare centers' accepting e-commerce is the selection of a proper framework to implement e-commerce. In order to overcome this challenge, Kong et al. (14) and Shahzad et al. (4) presented an

optimal framework and method.

Studies show that investment in E-commerce does not always result in profits. Due to their complementary nature, organizational factors and drivers must be managed together, not separately. Focusing on one driver from strategic alignment and ignoring other drivers and factors will not lead to optimal performance. Therefore, researchers have proposed that decision- and policy-making managers, especially hospitals' chief IT managers, should precisely assess all the factors affecting investments in E-commerce and ensure the correct assessment of the IT maturity level, adoption of proper methods for IT investment evaluation, assessment of users' needs, and IT evaluation resource level (20, 21).

The Iranian Ministry of Health and Medical Education and Iran's Social Security Organization are seriously pursuing the elimination of paper prescriptions and traditional insurance cards and replacing them with online registration of medical orders (24). Peikari and Rezazadeh (21) examined the relationship between professional errors and factors using an integrated model for the acceptance and use of theoretical technology. They argued that using the electronic prescription system has reduced professional and operation errors by users and promoted the pharmacy's financial and non-financial performance. Other advantages of this system include its ease of use and the existence of facilitators, as well as external and social factors.

Electronic services provide users with easy access to organizational facilities and garner clients' trust as the most outstanding capital of organizations. Still, their popularity is reported to be very low among users of healthcare organizations, and a small percentage of the goals of the electronic service system has been met in these organizations (8). An examination of the organizations that provide electronic services in Iran shows that the acceptance of electronic services by users is limited, and these services have not found their rightful place in organizations and cannot completely fulfill their crucial role. Motallebzadeh et al. (8), studying barriers to the acceptance of electronic services, reported that access to technological facilities (e.g., information security and Web skills) was an important indicator of the systemic factors (e.g., reliable information exchange and easy performance of organizational tasks) that could affect the perceived benefits and acceptance of electronic services according to the technology acceptance model. These items will ensure the benefits of electronic service systems for users. Systemic factors can also influence users' perceptions of the benefits of electronic services. According to Tavili and Ramezani Qomi (25), chief organizational managers can show their support for the deployment of electric service systems by providing facilities needed for the implementation, installation, and ex-

ecution of such systems, such as software, hardware, and other requirements.

The present study was limited by the small number of studies conducted on the acceptance of e-commerce in healthcare centers and hospitals. It is expected that eHealth and E-commerce technologies will have a more prominent role in the promotion of Iran's healthcare system because health information systems and technology are intertwined and rapidly growing in the country. Evidence shows that researchers in Iran have fallen behind other countries in studying e-commerce applications in the health sector. This delay can be attributed to health policy-makers and managers' lack of familiarity with the significance and position of e-commerce, as well as due to the state-run nature of most Iranian healthcare centers. As such, healthcare managers need to become aware of the latest technology-based systems and their positive outcomes in all aspects, such as healthcare service quality improvement, healthcare centers' financial performance improvement, and more accessible service provision. Therefore, relevant institutions must develop the necessary guidelines to pave the way for researchers in this area.

5. Conclusions

The positive effects of e-commerce in healthcare include healthcare service quality improvement, enhanced financial performance, and facilitated service provision. It is suggested that health centers equip themselves with adequate hardware and software to be able to easily install and run e-commerce and E-health so that personnel can be familiarized with and accept using them.

Footnotes

Authors' Contribution: Study concept and design: S.A. A. and A. M.; analysis and interpretation of data: S.A. A. and A. M.; drafting of the manuscript: A. M.; critical revision of the manuscript for important intellectual content: S.A. A., statistical analysis: A. M.

Conflict of Interests: The authors declare no conflict of interest.

Funding/Support: The department of healthcare management, Faculty of Health, Tehran Medical Sciences, Islamic Azad University, supported this study.

References

- Moriset B. *e-Business and e-Commerce*. 2018. Available from: <https://halshs.archives-ouvertes.fr/halshs-01764594>.
- Cylus J, Richardson E, Findley L, Longley M, O'Neill C, Steel D. United Kingdom: Health system review. *Health Systems in Transition*. 2015;17(5):1-125.
- Phan DD. E-business development for competitive advantages: a case study. *Inf Manag*. 2003;40(6):581-90. [https://doi.org/10.1016/s0378-7206\(02\)00089-7](https://doi.org/10.1016/s0378-7206(02)00089-7).
- Shahzad A, Hassan R, Abdullah NI, Hussain A, Fareed M. Covid-19 Impact on E-Commerce Usage: An Empirical Evidence from Malaysian Healthcare Industry. *Humanit Soc Sci Rev*. 2020;8(3):599-609. <https://doi.org/10.18510/hssr.2020.8364>.
- Handayani PW, Hidayanto AN, Budi I. User acceptance factors of hospital information systems and related technologies: Systematic review. *Inform Health Soc Care*. 2018;43(4):401-26. [PubMed ID: 28829650]. <https://doi.org/10.1080/17538157.2017.1353999>.
- Chen X, Liu C, Li S. The role of supply chain finance in improving the competitive advantage of online retailing enterprises. *Electron Commer Res Appl*. 2019;33:100821. <https://doi.org/10.1016/j.elerap.2018.100821>.
- Vial G. Understanding digital transformation: A review and a research agenda. In: Hinterhuber A, Vecovi T, Checchinato F, editors. *Managing Digital Transformation: Understanding the Strategic Process*. London: Routledge; 2021.
- Motallebzadeh B, Peikari HR, Sadeghi M. [Evaluating the Factors Influencing the Acceptance of Electronic Health-Services among Social Security Insurance Staff]. *Health Res J*. 2019;4(1):9-15. Persian. <https://doi.org/10.29252/hrjbaq.4.1.9>.
- Xu X, Gursoy D. A Conceptual Framework of Sustainable Hospital-ity Supply Chain Management. *J Hosp Mark Manag*. 2014;24(3):229-59. <https://doi.org/10.1080/19368623.2014.909691>.
- Alyoubi AA. E-commerce in Developing Countries and how to Develop them during the Introduction of Modern Systems. *Procedia Comput Sci*. 2015;65:479-83. <https://doi.org/10.1016/j.procs.2015.09.127>.
- Travica B, Jošanov B, Kajan E, Vidas-Bubanja M, Vuk-sanovigc E. E-Commerce in Serbia: Where Roads Cross Electrons Will Flow. *J Glob Inf Technol*. 2007;10(2):34-56. <https://doi.org/10.1080/1097198x.2007.10856443>.
- Lawrence JE, Tar UA. Barriers to e-commerce in developing countries. *Information Society and Justice*. 2010;3(1):23-35.
- Bharadwaj A, El Sawy OA, Pavlou PA, Venkatraman N. Digital Business Strategy: Toward a Next Generation of Insights. *MIS Q*. 2013;37(2):471-82. <https://doi.org/10.25300/misq/2013/37-2-3>.
- Kong Y, Hou Y, Sun S. The Adoption of Artificial Intelligence in the E-Commerce Trade of Healthcare Industry. In: Wang Y, Wang WYC, Yan Z, Zhang D, editors. *Digital Health and Medical Analytics. DHA 2020. Communications in Computer and Information Science*. 1412. Singapore: Springer; 2021. p. 75-88. https://doi.org/10.1007/978-981-16-3631-8_8.
- Bedoya Reina MT, Brereton N, Zilbermint M. Haven Health is About to Disrupt the U.S. Healthcare System. *J Community Hosp Intern Med Perspect*. 2021;11(3):357-60. [PubMed ID: 34234906]. [PubMed Central ID: PMC8118442]. <https://doi.org/10.1080/20009666.2021.1906832>.
- Fedushko S, Shevchuk L, Poritska A, Kravets R, Tymovchak-Maksymets O. E-Commerce and E-Health Strategies and Implementation Activities in the United Kingdom: Review Study. *arXiv*. 2021;August. <https://doi.org/10.48550/arXiv.2108.08271>.
- Rajak M, Shaw K. Evaluation and selection of mobile health (mHealth) applications using AHP and fuzzy TOPSIS. *Technol Soc*. 2019;59:101186. <https://doi.org/10.1016/j.techsoc.2019.101186>.
- Nilashi M, Ahmadi H, Ahani A, Ibrahim O, Almaee A. Evaluating the factors affecting adoption of hospital information system using analytic hierarchy process. *Journal of Soft Computing and Decision Support Systems*. 2016;3(1):8-35.
- Chao CJ, Su SH, Huang YH, Liu YC, Jalleh G, Huang YA, et al. Towards a B2B E-Commerce Evaluation Management Model to Assess Organizational Drivers in Hospitals. *Int Technol Manag Rev*. 2014;4(3):115. <https://doi.org/10.2991/itmr.2014.4.3.1>.

20. Lin C, Lin HCK, Huang YA, Geoffrey J. The fit between organizational B2B e-commerce policy, IT maturity and evaluation practices on B2B e-commerce performance in Australian healthcare organizations. *Afr J Bus Manage*. 2011;5(5):1983-2005. <https://doi.org/10.5897/AJBM10.883>.
21. Peikari HR, Rezazadeh M. Investigating the Relationship between Electronic Prescription System and Reduction of Pharmacists' Errors Using UTAUT Model. *Health Res J*. 2021;6(2):139-46. <https://doi.org/10.52547/hrjbaq.6.2.139>.
22. West DM. How Mobile Devices are Transforming Healthcare. *Issues in Technology Innovation*. 2012;(18):1-14.
23. Kumar S, Nilsen WJ, Abernethy A, Atienza A, Patrick K, Pavel M, et al. Mobile health technology evaluation: the mHealth evidence workshop. *Am J Prev Med*. 2013;45(2):228-36. [PubMed ID: 23867031]. [PubMed Central ID: PMC3803146]. <https://doi.org/10.1016/j.amepre.2013.03.017>.
24. Ahmadi M, Samadbeik M, Sadoughi F. Modeling of outpatient prescribing process in iran: a gateway toward electronic prescribing system. *Iran J Pharm Res*. 2014;13(2):725-38. [PubMed ID: 25237369]. [PubMed Central ID: PMC4157049].
25. Tavili N, Ramezani Qomi MR. [The relationship between managerial, technical and environmental factors with the desire to accept e-business among small and medium enterprises distributing pharmaceutical products in Tehran]. *J Mark Manag*. 2017;12(36):59-81. Persian.

Table 2. Description of the Results of the Selected Studies

Authors	Publication Year	Objectives	Methods	Identified Factors	Results
Kong et al. (14)	2021	Examining the acceptance of AI in e-commerce in the healthcare industry	Questionnaire and TOE framework	Data transparency, cost pressure, relative benefits, laws, and regulations	The effectiveness of the identified factors in the TOE framework was confirmed.
Bedoya Reina et al. (15)	2021	A review of haven healthcare center's disruption of the US healthcare system	A review of measures taken in haven	Identifying strategies for reducing healthcare costs and promoting patient satisfaction in the US	They confirmed Amazon Inc.'s specialty and capability in e-commerce, e.g., logistics, supply, and large-scale data management, supporting haven's efforts to resolve healthcare inefficiencies.
Fedushko et al. (16)	2021	A review of e-commerce, eHealth strategies, and administrative activities in the UK	A review of e-commerce measures in the UK	Identifying secondary specialties such as blockchain, IT health, virtual and augmented reality, sensors, personal genomics, telemedicine, big data, eHealth, mobile health, electronic medical/health records, AI, and machine learning	Presenting governmental and private sector investment levels in the UK healthcare domain and mentioning the 93.89 billion USD market of e-commerce, and in the UK, e-commerce constituted 30% of the country's economy. E-commerce also had a 6.1% share of the gross domestic product (GDP) of the UK.
Shahzad et al. (4)	2020	Examining the effect of COVID-19 on the use of e-commerce in the Malaysian healthcare industry	The TOE framework and a questionnaire	Organizational preparedness; having e-commerce knowledge; supply chain integration; technological infrastructure; External pressure	Organizational preparedness, knowledge of e-commerce, and supply chain integration have significant positive effects. On the other hand, IT infrastructure and external pressure have negligible effects on the use of e-commerce.
Rajak and Shaw (17)	2019	Evaluation and selection of mHealth apps	AHP and fuzzy TOPSIS techniques	User satisfaction; performance; ease of use and learning; quality of information	"User satisfaction", "performance", "ease of use and learning", and "quality of information" were the most critical factors in the evaluation and selection of mHealth apps.
Nilashi et al. (18)	2016	Identifying the factors affecting or hindering the acceptance of HIS in Malaysia	AHP technique	Environmental; human-related; organizational; technological	Technological factor (weight: 0.467) was identified as the most crucial factor in accepting HIS. This factor was followed by environmental (0.277), organizational (0.160), and human-related (0.095) factors, respectively, as the major factors in HIS acceptance, according to experts.
Chao et al. (19)	2014	Proposing a B2B evaluation management model to assess the organizational factors in hospitals and identify the relationships between B2B benefits	Mixed methods: qualitative (content analysis) and quantitative (questionnaire)	IT maturity; IT investment evaluation methods; IT evaluation process; B2B benefits	IT maturity positively and significantly affected the acceptance of IT investment evaluation methods, and the precise and complete user information need assessment positively and significantly affected IT evaluation and resource allocation. These factors, in turn, markedly and positively affected the realization of B2B benefits. The results also revealed that the IT maturity level relatively affects hospitals' ability to allocate IT evaluation resources.
Lin et al. (20)	2011	Compatibility between organizational B2B policy, IT maturity, and evaluation methods on B2B performance in Australian healthcare organizations	Qualitative content analysis	Organizational B2B strategy and policy; organizational IT maturity; IEM; BRM; B2B benefits; B2B satisfaction	There is a positive relationship between organizational B2B strategy and policy, organizational IT maturity, effective use of IEM and BRM, B2B benefits, and satisfaction level

Peikari and Rezazadeh (21)	2021	Determining the relationship between professional errors and UTAUT factors for using the electronic prescription system of the Social Security Organization by pharmacists in Isfahan (Iran) via the UTAUT model	Descriptive-correlational	Expect effort; reduction of professional errors; pharmacists' expected performance; facilitators; social factors; Intention to accept technology	The expected effort and a reduction in professional errors affected the expected performance of pharmacists ($P < 0.001$). The expected performance, effort, facilitators, and social factors significantly shaped the intention to accept ($P < 0.001$). The intention to accept and facilitators significantly influenced the acceptance of the system ($P < 0.001$).
Motallebzadeh et al. (8)	2019	Evaluating the influence of factors affecting the acceptance of electronic health services from the viewpoints of social security insurance employees	Descriptive-correlational	Systemic factors; perceived benefit; perceived simplicity; attitude toward the application; the behavioral decision for use	Significant relationships existed between systemic factors and perceived benefits; systemic factors and perceived simplicity; perceived simplicity and perceived benefit; perceived benefit and attitude towards the application; perceived simplicity and attitude towards the application; perceived benefit and behavioral decision for use; and attitude towards the application and behavioral decision for use

Abbreviations: AI, artificial intelligence; B2B, business-to-business; TOE, technological organizational, and environmental; AHP, analytic hierarchy process; HIS, hospital information system; IEM, investment evaluation methodology; BRM, benefits realization methodology.