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Identifying Barriers to the Adoption of Electronic Prescribing: A Stakeholder Analysis Approach Using a Power-Interest Matrix

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A B S T R A C T

Background: Identifying stakeholders and understanding their characteristics is crucial for achieving objectives efficiently. Concurrently, there is a growing movement towards utilizing technology, particularly electronic (e) prescribing, to enhance quality, safety, and efficiency within the healthcare system. To strengthen and support the e-prescribing system, collaboration among all stakeholders is essential. This collaboration will help establish a robust electronic health information infrastructure and improve healthcare delivery for all members of society.

Methods: This study aims to identify barriers to the acceptance of e- prescribing from a stakeholder perspective. It employs a mixed-methods approach, combining quantitative and qualitative research. Data collection involved focus groups to identify and prioritize stakeholders, while interviews were used to extract barriers. Following data collection, the interest-power matrix was utilized for analysis.

Results: The findings revealed that the primary barriers identified by stakeholders, including physicians, hospitals, and insurance companies were as follows: a lack of awareness among doctors regarding costs, deductibles, and billing; insufficient training for stakeholders on e-prescribing; inadequate infrastructure; lack of forecasting for necessary financial resources; insufficient training for relevant personnel; poor communication with insurance companies; intermittent system outages and slow performance; lack of insurance coverage for certain tests; the presence of multiple insurance systems; and ineffective communication channels between doctors and insurance agents.

Conclusion: Infrastructure challenges are significant barriers to the full implementation of e-prescribing which must be addressed. To improve implementation issues, continuous monitoring of prescription systems is recommended. Overall, it is advisable to reform the infrastructure, integrate insurance systems, adopt electronic signatures and standards for electronic prescriptions, and provide practical training. Health policymakers can facilitate the adoption of e-prescribing by taking measures to eliminate the barriers identified in this study.

Keywords: Prescription, Electronic prescribing, Stakeholder Roles

Introduction

Health systems serve as the primary custodians of health production, promotion, and improvement within society. To address the expectations of customers and stakeholders, manage resource limitations, and meet the growing demands of society, countries have developed various regulatory models and tools tailored to their specific structural, economic, and cultural characteristics. These models have been implemented across both inpatient and outpatient service centers (1). The role

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and significance of stakeholder's individuals, groups, and organizations that can influence an organization's actions and goals through their interests are well understood by managers, policymakers, and researchers (2). It is essential to identify stakeholders and consider their characteristics to achieve objectives efficiently, and various frameworks and models have been proposed for this purpose (3).

Simultaneously, there is an accelerating movement towards utilizing health information technology and electronic (e) prescribing to enhance the quality, safety, and efficiency of healthcare systems. Strengthening and supporting e-prescribing requires collaboration among all stakeholders involved, which is crucial for establishing a robust electronic health information infrastructure and improving healthcare for all members of society (4). Overcoming the challenges and limitations of paper-based prescribing is increasingly difficult due to the growing number of pharmaceutical items and the complexities of medical care. Significant advancements in information and communication technology, along with the widespread availability of computers and their decreasing costs, have facilitated the adoption of new technologies and electronic systems in prescribing, presenting a viable solution to these challenges. This approach not only improves the quality of healthcare services but also helps reduce rising costs (5).

The pressing need for information within the healthcare delivery system, coupled with the inadequacies of paper records, has propelled the shift towards computerized information systems, ultimately aiming for the establishment of electronic health records (6). E-prescribing is defined as a system that allows for the e-prescription of medications and the electronic transmission of prescriptions from healthcare providers to pharmacies (7). The implementation of such systems involves numerous stakeholders, each with distinct demands and expectations, making it practically impossible to satisfy all parties. Therefore, it is crucial for project managers to identify, evaluate, and prioritize stakeholders effectively. One of the tools used for this purpose is the interest-power matrix (8).

National healthcare systems are under significant pressure from changing demographics and an increasing demand for healthcare and pharmaceutical treatments. As a result, the volume of prescriptions and pharmaceutical items has surged, leading to greater societal dependence on the prescription system and the processing of medical prescriptions (9). In this context, the implementation of an electronic prescription system offers numerous opportunities for more effective and efficient prescribing. This technology enables secure transmission of electronic prescription information among interested parties, either directly or through intermediaries (10). A study by Moniz et al. demonstrated that the risk of error in the electronic transmission of prescription data from doctors' offices to pharmacies is approximately half of traditional outpatient prescriptions, which involve printing and handing them to patients (11).

E-prescribing has been extensively discussed in expert reports and national public plans, and it has been tested, implemented, or currently conducted in several European and American countries. The adoption of e-prescribing represents an irreversible intervention in the prescribing process (12). The presence of diverse stakeholders with varying interests and expectations poses significant challenges for project managers in effectively managing these stakeholders. Since it is nearly impossible to meet all stakeholder expectations, prioritizing stakeholders becomes necessary, which can be accomplished through various methods. The interest-power matrix categorizes stakeholders based on their influence and level of interest in the project. Given the importance of electronic prescription systems, this study aims to identify barriers to the adoption of electronic prescriptions from a stakeholder perspective.

Materials and Methods

This study was applied in nature and employed a

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mixed-methods approach, utilizing both quantitative and qualitative methods. In the qualitative analysis of stakeholders, each subject under the study was associated with stakeholders who either influence or were influenced by it. Stakeholder analysis begins with identifying stakeholders and gathering information about their activities, perceptions, behaviors, and thoughts regarding the phenomenon under consideration. Among the various inductive methods used in analysis, one of the most common one is the interest-power matrix (13). This method can be applied in interviews, focus groups, and workshops, and is based on two criteria: stakeholder interest and power, focusing on the future of the organization and stakeholders' interests in its activities and achievements (14).

In the first stage, the authors utilized the observations and suggestions of health experts and academic professors through a focus group approach to extract and classify a list of stakeholders. Members of the focus group were selected using purposive sampling based on three key characteristics: they were experts, physicians, and managers with at least five years of experience in electronic prescription projects and health information technology in hospitals. The initial goal of the focus group was to hold a conceptualization meeting, followed by a group interview to compile a comprehensive list of e-prescribing stakeholders. Stakeholders in this study include all individuals or organizations involved in the electronic prescription process.

Once a complete list of stakeholders was obtained, it was reviewed, categorized, processed, summarized, and was made usable. To facilitate this, another meeting was held with the members of the focus group. The purpose of this meeting was to categorize stakeholders based on their importance and impact on the organization. During this stage, it was crucial to ensure that the information remained confidential and that personal opinions did not influence the final list. With the assistance of focus group members, priority stakeholders were identified according to the interest-power matrix.

To prioritize stakeholders, the results from the previous stage were reviewed, and prioritization was conducted during a group interview with focus group members. Using the power-interest table, stakeholders were categorized in a matrix, with one axis representing their level of interest in the organization and the other representing their power to influence it. Focus group members were asked to position the identified stakeholders within this matrix. Stakeholders were classified into four categories based on their importance:

1. **High power and high interest (effective management strategy):** these stakeholders should be fully engaged in the change process, and strategies should be developed to meet their needs and expectations.

2. **High power and low interest (satisfaction strategy):** Efforts should be made to meet their needs and gain their satisfaction, but excessive information should be avoided to prevent disengagement.

3. **Low power and high interest (information strategy):** This group should be regularly informed and their support should be utilized to facilitate the organization's activities.

4. **Low power and low interest (monitoring strategy):** Minimal effort should be expended on these stakeholders, and their performance should be monitored.

The most challenging and critical step in stakeholder analysis is identifying and extracting barriers to e-prescribing adoption from stakeholders' perspectives. This was achieved through interviews, allowing stakeholders to identify barriers themselves, which leads to more realistic results.

In the initial stage of stakeholder analysis, the statistical population consisted of health experts and university professors, with a sample of ten experts selected based on their experience (minimum of five years) with e-prescribing projects through purposive sampling. During the barrier extraction stage, the statistical population

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included all e-prescribing stakeholders identified by relevant experts, with the sample focusing on key stakeholders who exhibited higher power and interest than others.

To ensure validity and reliability in this study, various methods were employed. The interviews were reviewed and analyzed multiple times by the researcher to ensure accuracy. The transcripts were shared with the interviewees, who provided feedback on the consistency of the findings with the researcher's interpretations. Any discrepancies were addressed to correct any misunderstandings. In summary, to validate the accuracy and reliability of the data, the researcher employed self-review methods and participant feedback (member checking technique).

In the stakeholder identification and prioritization phase, the focus group method was utilized for data collection, while interviews were employed during the barrier extraction phase. After data collection, the interest-power matrix was used for data analysis.

Results

Using a qualitative stakeholder analysis approach to identify barriers to the adoption of electronic prescribing, the following results were obtained:
In the first stage, focus group members were asked to position the identified stakeholders within the interest-power matrix. The classification of stakeholders according to this qualitative approach is presented in Table 1.

Table 1. Classification of beneficiaries

Satisfaction strategy	**Effective management strategy**
Private offices	Hospitals
Pharmacies	Physicians
Clinics	Health insurance organization
Ministry of Health	Social Security Insurance Organization
Software support company	
Monitoring strategy	**Information strategy**
Banks	Headquarters of the University of Medical Sciences
Pharmaceutical companies	Treatment Economics Unit of the Vice President of Treatment Patients

In the second stage, this study aimed to extract barriers to the adoption of e-prescribing from the perspectives of stakeholders and implementation constraints. Stakeholders categorized as having high power and interest, as well as requiring an effective management strategy, was prioritized. In the third stage, the results from interviews regarding barriers to the adoption of e-prescribing from the perspectives of key stakeholders were extracted and presented.

Table 2. Barriers to accepting electronic prescriptions

Obstacles	**Beneficiaries**	**Row**
Weaknesses of insurances regarding timely notification of instructions, lack of insurance coverage for some examinations, multiple insurance systems, lack of effective communication links between doctors and insurance agents, lack of appointing specific people to respond 24 hours a day to system problems and errors. Necessary instructions for writing prescriptions at the time of interruption or slowness of the systems or the Internet, interruption and slowness of the system	Physicians	1
Inadequate infrastructure, not predicting necessary financial resources, insufficient training of related personnel, lack of communication with insurances, dissatisfaction of patients in conditions of interruption and slowness, interruption and intermittent slowness of the system.	Hospital	2
Lack of necessary cooperation of doctors, lack of awareness of doctors about costs and deductions and billing, lack of sufficient training of beneficiaries for electronic prescribing, unawareness of patients about the referral system, lack of monitoring of drugs delivered from the pharmacy, security problems and misuse of the e-prescribing system	Insurances	3

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Discussion

This research employs a mixed-methods approach to investigate the barriers to the adoption of e-prescribing systems through stakeholder analysis. The identified barriers span various sectors. Regarding the provision and forecasting of financial resources, it is essential for managers to review all costs associated with prescribing and to establish a sustainable and appropriate financial source as a fundamental pillar for progress in this area. Collaboration and participation among all stakeholders are crucial, as lack of cooperation and coordination has been identified as a significant barrier to the adoption of electronic prescribing.

The human resources management department within organizations should provide necessary training to inform all members about relevant concepts. A lack of awareness and adequate training contributes to reluctance in adopting this approach. Additionally, the traditional culture and mindset of employees present obstacles that many researchers have highlighted. The absence of a suitable motivation system and a lack of clarity regarding the benefits of electronic prescribing further hinder implementation.

The results of this study indicated that the most significant obstacles to electronic prescribing in the systemic area were related to infrastructure, user interface, and effective training and communication. Although e-prescribing systems are becoming more prevalent in health systems, studies show that user acceptance and utilization levels are not always satisfactory (15).

One of the obstacles identified was related to the perspective of influential stakeholders, specifically insurance companies. The lack of serious involvement from supplementary insurance has created challenges for both insured individuals and providers. Studies conducted in Turkey, Finland, and the United States have emphasized the lack of integration among insurance systems and between insurance institutions. For instance, research by Eltajoury et al. found that 76% of physicians reported insufficient support from insurance institutions as a barrier to software implementation (16).

The findings also revealed insufficient training at the onset of the electronic prescribing process and during system and guideline changes. Currently, there is a lack of training for both physicians and patients. In a study by Bulut et al., over a quarter (26.5%) of family physicians reported issues with slow system performance, system downtime, and Internet connectivity problems (17). Similarly, Kivekäs Eija's study in Finland indicated that weak telecommunications networks contributed to physicians' uncertainty about receiving electronic prescriptions (18).

Conclusion

Given that the implementation of the electronic prescription system is a legal requirement aligned with the goals of the Sixth Development Plan, it is imperative to address infrastructure challenges, which are significant barriers to the full realization of this national initiative. Insurance-related and regulatory issues must also be addressed through ongoing follow-ups. To improve the implementation of prescription systems, continuous monitoring and immediate application of findings are essential. Infrastructure reform, integration of insurance systems, the introduction of electronic signatures, the adoption of electronic prescription standards, and practical training should be prioritized.

Multiple stakeholders with diverse demands and expectations are involved in project implementation, making it nearly impossible to satisfy all parties. Thus, identifying, assessing, and prioritizing stakeholders are crucial for project managers. In this study, key stakeholders were identified using the interest-power matrix, and it is recommended that managers from the Ministry of Health focus on these stakeholders and the barriers identified from their perspectives. By considering their demands and expectations, they can enhance satisfaction and facilitate smoother implementation of e-prescribing.

Research Limitations: One limitation of this study was the lack of access to all stakeholders. To

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encompass the views of all stakeholders, their availability to the researcher is necessary. Nonetheless, efforts were made to identify and incorporate the opinions of the most significant stakeholders. The information extracted from stakeholders may vary due to differing perceptions.

Ethical Considerations

This article is the result of a research project titled "Using the Stakeholder Analysis Approach (Power Interest Matrix) to Identify Organizational Barriers to the Adoption of Electronic Prescription," with the ethics code IR.SSU.SRH.REC.1402.015

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Authors' Contributions

MS.A, A.Z, E.S and M.H designed research and conducted research; MS.A and M.Z analyzed data; MS.A wrote the manuscript. All authors read and approved the final manuscript.

Conflict of Interests

The authors had no conflict of interest to declare.

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