المجلة الدولية للأداء الاقتصادي
International journal of economic performance
ISSN: 2661-7161 EISSN:2716-9073
Publications are Open Access in this journal

Driving social responsibility through digital transformation: a closer look at the Ministry of pharmaceutical industry

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Submitted:18/09/2023 Accepted:24/10/2023 Published:30/12/2023

Abstract:

This study examines how digitization has influenced the supervisory role of the Ministry of Pharmaceutical Industry in promoting social responsibility among economic operators. We employed a descriptive approach and conducted interviews as the primary method of data collection. The study reviews the advantages and the challenges associated with digitization. The ministry's digitization initiatives have led to a modernization of its administrative procedures, resulting in a radical transformation of licensing, registration, quality control, inspections, and monitoring of pharmaceutical products. Additionally, digitization has brought changes in regulatory and oversight aspects, enabling the enhancement of adherence to social responsibility standards. However, challenges related to privacy, data security, interoperability with pharmaceutical companies, and the transition to digital processes have emerged. This study enhances the understanding of digitization in the Ministry of the Pharmaceutical Industry.

Key words: Digitization; Ministry of Pharmaceutical industry; Supervisory role; Social responsibility
JEL Classification Codes : O32, L51, I18.

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Introduction:

Nowadays, rapidly evolving digital landscape, the digitization of administrative procedures has become a pivotal aspect of organizational efficiency and effectiveness. This is particularly true within the Ministry of Pharmaceutical Industry, where the integration of digital technologies has transformed the way of administrative tasks are carried out. This article explores the impact of digitization on the Ministry's supervisory role and its efforts to promote social responsibility among economic operators.

The Ministry of Pharmaceutical Industry plays a crucial role in regulating and overseeing the pharmaceutical sector, ensuring the availability of safe, effective, and affordable medications. As part of its responsibilities, the ministry has undergone significant digitization efforts to modernize its administrative procedures. These initiatives have revolutionized processes such as licensing, registration, quality control, inspections, and monitoring of pharmaceutical products.

However, the digitization of administrative procedures also presents challenges that need to be addressed. Ensuring data privacy and security is a paramount importance to protect sensitive information. Additionally, establishing interoperability with pharmaceutical companies is crucial for smooth information exchange. Managing the transition from traditional to digital processes effectively requires a careful planning and an implementation to ensure seamless integration of digital technologies while minimizing disruption.

Within the context of the Ministry's digitization efforts, this article focuses on the impact of the supervisory role and the implementation of social responsibility by economic operators. It examines how digitization has transformed, how the Ministry carries out its regulatory and oversight functions and its ability to ensure that economic operators uphold social responsibility standards.

Through an in-depth analysis of the digitization initiatives and their effects, this article aims to provide valuable insights into the implications of digitization on the Ministry's supervisory role and the promotion of social responsibility. The findings will contribute to a better understanding of the opportunities and challenges associated with

the digitization of administrative procedures within the Ministry of Pharmaceutical Industry.

To achieve this, we will explore the impact of digitization on the supervisory role of the Ministry of Pharmaceutical Industry and its efforts to ensure the implementation of social responsibility by economic operators. We begin by examining the digitization initiatives within the ministry and discussing the benefits and challenges associated with this transformation. This will provide a comprehensive understanding of the context in which the ministry operates and the opportunities and obstacles presented by digitization.

Next, we go deeply into the impact of digitization on the supervisory role of the ministry. We analyze how digitization has transformed regulatory and oversight functions, such as licensing, registration, quality control, inspections, and monitoring of pharmaceutical products. By examining the changes that have been brought through digitization, our objective is to emphasize on the enhance of efficiency, accuracy, resource utilization, and transparency in the Ministry's supervisory processes.

Subsequently, we will explore the implementation of social responsibility by economic operators in the pharmaceutical industry. We investigate how digitization has facilitated the Ministry's efforts to ensure economic operators adhere to social responsibility standards. This includes examining the role of digital technologies in monitoring compliance, enhancing transparency, and fostering accountability among economic operators.

Additionally, we address the challenges that arise with the digitization of administrative procedures. We explore the importance of data privacy and security in protecting sensitive information and discuss strategies for establishing interoperability with pharmaceutical companies to ensure effective information exchange. Furthermore, we analyze the management of the transition from traditional to digital processes and offer recommendations for minimizing disruptions and maximizing the benefits of digitization.

Finally, we conclude the article by summarizing the key findings and implications of our study. We highlight the overall impact of digitization on the supervisory role of the Ministry and the implementation of social responsibility by economic operators. Additionally, we discuss the potential future developments in digitization and their implications for the Ministry's ongoing efforts to regulate the pharmaceutical industry.

By following this structure, our article aims to provide a comprehensive analysis of the digitization impact on the supervisory role of the Ministry of Pharmaceutical Industry and its endeavors to ensure social responsibility in the pharmaceutical sector.

Methodology:

Research Questions and Hypotheses:

In this study, we aim to address the following research questions:

1. How has the integration of digital technologies impacted the efficiency and accuracy of the Ministry's supervisory role in the pharmaceutical industry?
2. What role do digital technologies play in enhancing transparency and accountability in the context of social responsibility efforts among economic operators in the pharmaceutical sector?
3. What are the primary challenges and strategies involved in the digitization of administrative procedures within the Ministry, particularly concerning data privacy and security, and interoperability with pharmaceutical companies?

To test these research questions, we have formulated the following hypotheses:

- **Hypothesis 1**: The integration of digital technologies in the Ministry's administrative procedures significantly improves the efficiency and accuracy of its supervisory role.
- **Hypothesis 2**: Digital technologies positively impact transparency and accountability in the promotion of social responsibility among economic operators.

- **Hypothesis 3**: Challenges related to data privacy, security, and interoperability can be effectively addressed in the digitization process.

Data Collection Methods:

In this study, we employed a combination of qualitative research methods to investigate the impact of digitization on the Ministry of Pharmaceutical Industry. We conducted interviews with the responsible individuals from each platform involved in the digitization efforts within the ministry. These interviews allowed us to gather insights, perspectives, and firsthand experiences regarding the digitization process, challenges faced, and benefits realized.

Observation of Work Stages in the Ministry:

In addition to the interviews, we conducted on-site observations of the various work stages in the Ministry of Pharmaceutical Industry. This entailed firsthand observations of how administrative procedures and supervisory tasks were carried out before and after the digitization initiatives. This method allowed us to assess the practical impact of digitization on day-to-day operations, including licensing, registration, quality control, inspections, and product monitoring.

Analysis Techniques:

To analyze the data collected through interviews and observations, we employed a thematic analysis approach. This involved identifying common themes, patterns, and key insights from the interview transcripts and observation notes. Themes related to the impact of digitization on efficiency, data privacy, security, interoperability, social responsibility, and other relevant factors were extracted. These themes were then used to draw conclusions and provide insights into the implications of digitization on the Ministry's supervisory role and the promotion of social responsibility among economic operators.

The combination of interviews, observations, and thematic analysis provided a comprehensive understanding of the Ministry's digitization efforts and their effects, enabling us to address the research questions outlined in this study and test the hypotheses formulated.

1. Digitization of Administrative Procedures within the Ministry of Pharmaceutical Industry:

1.1.Representation of the organizational structure:

The Ministry of Pharmaceutical Industry was founded in the latter part of 2020, (Executive Decree No. 20-271 defines the responsibilities of the Minister of Pharmaceutical Industry, 2020). This decree provided the legal framework for the ministry's establishment and authorized the implementation of a clear organizational structure for its central administration. Guided by the provisions outlined in Article 1 (Executive Decree No. 20-272 regarding the organization of the central administration of the ministry of the pharmaceutical industry, 2020), which regulates the ministry's operations, the decree defined the specific powers and responsibilities assigned to each directorate. As a result, the ministry's operational framework took shape, ensuring efficient governance and coordination among its various departments.

The ministry comprises the General Secretariat, which houses the Communication Office and the Internal Security Office. It also encompasses the Cabinet, which plays a pivotal role in organizing and facilitating the Minister's engagements with diverse economic and social partners. The General Inspection assumes the crucial task of implementing the necessary measures to evaluate and closely monitor the pharmaceutical industry sector.

Additionally, the ministry incorporates several directorates. The Directorate of Production, Industrial Development, Export Promotion, and Research is entrusted with fostering the growth of local production and driving scientific research in the pharmaceutical domain. The Directorate of Pharmaceutical Activities and Regulation

assumes the vital responsibility of overseeing and regulating Algeria's drug market, including aspects such as import, export, distribution, and the utilization of pharmaceutical products and medical supplies.

To further strengthen its operations, the ministry established the Directorate of Strategic Vigilance, which proactively conducts market studies, anticipates crises, and implements effective crisis management strategies. The Directorate of Information Systems and Documentation is tasked with the digitization of the pharmaceutical industry sector. The ministry is also supported by the Directorates of Organization, Disputes, and Cooperation, as well as Administration and Resources, ensuring streamlined functioning and efficient resource management within the ministry.

So, here is a simple representation of the organizational structure of the ministry:

Ministry of Pharmaceutical Industry
├─ General Secretariat
│ ├─ Communication Office
│ └─ Internal Security Office
├─ Cabinet
├─ General Inspection
├─ Directorate of Production, Industrial Development, Export Promotion, and Research
├─ Directorate of Pharmaceutical Activities and Regulation
├─ Directorate of Strategic Vigilance
├─ Directorate of Information Systems and Documentation
├─ Directorate of Organization, Disputes, and Cooperation
└─ Directorate of Administration and Resources

1.2.Overview of administrative procedures in the ministry

a) After the establishment of the ministry, several executive decrees were issued to regulate the pharmaceutical sector (Ministère de l'industrie pharmaceutique,

2021). The sector was divided into five departments (Executive Decree No. 21-82, relates to pharmaceutical institutions and the conditions for their accreditation, 2021): manufacturing, exploitation, importation, wholesale distribution, and exportation. Each department had specific conditions for those interested in investing in one or more of them. While there are some technical differences in the accreditation procedures for institutions seeking investment, the administrative procedures are somewhat similar, to the following stages:

b) Submitting the accreditation application file to the ministry's authorities (required documents vary depending on the type of activity).

c) A monitoring committee inspects the establishment's premises to assess working conditions (the committee can be either ministerial or from the National Agency for Pharmaceutical Products). In case of reservations during the inspection, the pharmaceutical institution must be notified within a period that should not be exceeded 8 days from the date of file submission, and the institution has 30 days (60 days for manufacturing institutions) from the date of notification to address these reservations.

d) The approval is granted within 30 days from the date of file submission if the file is complete and there are no reservations from the technical committee.

e) The institution is notified of the minister's decision within 8 days.

f) In case of accreditation rejection, the institution can appeal the decision within 15 days.

g) If there are any changes in the following points: institution name, legal form, management, technical director, premises location, storage site, expansion of premises, or activities, the ministry must be notified within a period not exceeding 15 days.

As for the regulation and the development of the pharmaceutical sector, several administrative procedures have been established that must be followed, along with deterrent measures in the case of violations of legal conditions. These procedures are based on (Executive Decree No. 20-272 regarding the organization of the central administration of the ministry of the pharmaceutical industry, 2020):

a) Assessing the market needs for pharmaceutical products and medical devices.

b) Establishing an information system to monitor the inventory of pharmaceutical products and medical devices.

c) Implementing a strategic surveillance system to prevent inventory shortages.

d) Ensuring the monitoring of developments in the national and international market trends.

e) Formulating a policy for determining the prices of pharmaceutical products and medical devices.

f) Identifying the list of pharmaceutical products and medical devices, as well as the national drug registry.

2. Introduction of digitization initiatives for administrative procedures

With a comprehensive understanding of the traditional administrative procedures within the Ministry of Pharmaceutical Industry, now we are shifting our focus to the introduction of digitization initiatives. Recognizing the limitations and challenges of traditional processes, the ministry has embraced digital transformation to enhance efficiency and transparency. In this chapter, we will explore the specific digitization initiatives implemented by the ministry, their objectives, and the strategies employed to achieve them. By delving into these initiatives, we aim to understand how the ministry has leveraged digital technologies to revolutionize its administrative procedures and

enhance its supervisory role in ensuring social responsibility among economic operators.

According to the Directorate of Information Systems and Documentation Manager (Amrouni, 2023), the digitized administrative processes encompass various activities, including the submission of required documents for accreditation requests or renewals, reservation of appointments, inventory declaration, and electronic document management. These digitization efforts cover both administrative operations which directly involve economic operators and the digitization of transactions that conducted between different departments within the ministry.

We begin by introducing the Ministry's website (Ministère de l'industrie pharmaceutique, 2021), which serves as a centralized hub for accessing information, submitting applications, and engaging with the ministry's regulatory processes. The website plays a crucial role in digitization initiatives, acting as a catalyst for improved efficiency, transparency, and collaboration between the ministry and economic operators. It is not only provides a user-friendly platform for interacting with administrative procedures but also houses essential instructions, sector-specific laws, and guidelines on utilizing digital platforms within the pharmaceutical industry.

Following the Ministry's website, there is the TABADOL platform, specifically designed for submitting digital versions of accreditation application files (Bouhafs, 2023). This platform enables the economic operators easily follow the step-by-step procedures until they obtain the necessary accreditation. In addition to facilitating the accreditation process, the TABADOL platform offers several other features and benefits for economic operators. Firstly, it provides a secure and efficient means of document submission, eliminating the need for physical paperwork and reducing administrative burdens. The platform also allows operators to track the progress of their accreditation application in real time, providing transparency and visibility throughout the process. Moreover, TABADOL incorporates automated validation checks to ensure that all

necessary documentation and requirements are met, reducing the chances of errors or omissions. Overall, the TABADOL platform streamlines the accreditation journey, saving time and effort for the economic operators while maintaining the integrity and reliability of the process.

Once notified that their accreditation is ready, economic operators are required to utilize the reservation platform (Ministère de l'industrie pharmaceutique, 2021) to schedule an appointment at the ministry's headquarters. This appointment allows them to submit the original file and receive official accreditation. The reservation platform streamlines this process by providing a user-friendly interface where operators can conveniently select their preferred date and time for the appointment. Upon successful scheduling, operators will receive confirmation and validation notifications via email, ensuring they stay informed about their appointment details. These email notifications serve as important reminders, helping operators prepare for their submission and minimizing the risk of missing the appointment. The reservation platform's efficient scheduling system and email notifications contribute to a seamless and well-coordinated process for operators to submit their original files and obtain the official accreditation.

Upon receiving the official accreditation and commencing operations, economic operators are mandated (Ministère de l'industrie pharmaceutique, 2022) to utilize the inventory management platform. This platform facilitates the submission of weekly declarations about the status of their pharmaceutical inventory. It is an integral component of the National Pharmaceutical Information System, designed to enable digitization and simultaneous analysis of delivery schedules for the import and the production programs (Bouhafs, 2023). By providing better visibility into the stock status of pharmaceutical products, it empowers operators to anticipate potential supply disruptions and serves as an effective pharmacoeconomic tool for strategic monitoring.

The ministry leverages the data available on the platform to actively monitor and track shifts in the pharmaceutical market. This proactive approach ensures that the ministry remains up-to-date with changes in demand, supply patterns, and emerging trends, enabling timely regulatory and oversight interventions. The seamless integration of the platform with the National Pharmaceutical Information System further enhances its functionality, facilitating the digitization and simultaneous analysis of delivery schedules for both import and production programs. This integration empowers operators to have a comprehensive overview of their inventory, enabling informed decisions regarding procurement, distribution, and production planning.

The inventory management platform serves as a vital tool in enhancing visibility into the stock statuses of pharmaceutical products. By accessing real-time data and utilizing advanced analytics, the ministry can accurately monitor inventory levels, identify potential shortages or excesses, and take proactive measures to address supply chain challenges. By utilizing this approach, the ministry can enhance inventory management, reduce waste, and ensure the prompt availability of pharmaceutical products when required.

Furthermore, the platform serves through improved monitoringes as an effective tool in the field of pharmacoeconomics, allowing the ministry to strategically monitor inventory levels, usage patterns, and demand forecasts. By analyzing this data, the ministry can make data-driven decisions to optimize resource allocation, minimize costs, and enhance operational efficiency.

Overall, the ministry's utilization of the platform and its integration with the National Pharmaceutical Information System play a critical role in monitoring the pharmaceutical market, ensuring effective inventory management, and enabling informed decision-making to support a well-regulated and responsive pharmaceutical sector.

As part of its ongoing digitization initiatives, the Ministry of Pharmaceutical Industry has introduced the Electronic Document Management Platform. This platform plays a crucial role in transforming the way documents and information are managed, stored, and accessed within the ministry. By implementing this platform, the ministry has embraced a transformative approach to enhance the efficiency and effectiveness of document management processes within its exclusive domain.

Through the transition from traditional paper-based systems to an electronic document management framework, the ministry experiences notable enhancements in efficiency, accessibility, and security. The platform enables the consolidation of documents, making them effortlessly searchable and retrievable. It eliminates the need for physical storage space and mitigates the risks associated with document loss or damage.

Additionally, the Electronic Document Management Platform fosters seamless collaboration and information sharing among various stakeholders. It facilitates streamlined workflows, automated processes, and meticulous version control, guaranteeing that authorized personal has access to the most up-to-date information. This optimization of communication and decision-making processes within the ministry augments overall efficiency and strengthens interactions.

Moreover, the platform ensures strict adherence to regulatory requirements and standards governing document management and data security. It incorporates robust security features, including access controls, encryption, and comprehensive audit trails, safeguarding sensitive information and preserving data integrity.

In summary, the implementation of the Electronic Document Management Platform delivers a multitude of advantages to the ministry, including improved efficiency, streamlined collaboration, enhanced information management, and fortified compliance. It stands as a pivotal element of the digitization efforts, driving the

modernization of administrative procedures and facilitating a more efficient and effective regulatory environment within the pharmaceutical industry.

3. Impact of Digitization on the Supervisory Role of the Ministry:

3.1.Examination of how digitization has transformed the supervisory role:

The digitization initiatives implemented by the Ministry of Pharmaceutical Industry have profoundly impacted its supervisory role within the sector. By leveraging digital technologies and embracing modernized administrative procedures, the ministry has enhanced its ability to fulfill its supervisory responsibilities and ensure social responsibility among economic operators.

One of the key impacts of digitization is the improved monitoring and tracking of changes in the pharmaceutical market. By utilizing the data available on the platforms, including the Inventory Management Platform and the Electronic Document Management Platform, the ministry can actively monitor shifts in demand, supply patterns, and emerging trends. This proactive approach enables the ministry to stay updated and take timely regulatory and oversight interventions when necessary, ensuring the well-regulation of the pharmaceutical sector.

Moreover, the digitized administrative procedures provide the ministry with better visibility into the stock status of pharmaceutical products. Through the Inventory Management Platform, the ministry can access real-time data and utilize advanced analytics to accurately monitor inventory levels. This enables the ministry to identify potential shortages or excesses and take proactive measures to address supply chain challenges. By optimizing inventory management practices, minimizing wastage, and ensuring the availability of pharmaceutical products when needed, the ministry can effectively fulfill its supervisory role in ensuring the uninterrupted supply of safe and quality medicines.

Additionally, the digitization initiatives facilitate data-driven decision-making within the ministry. The integration of the platforms with the National Pharmaceutical Information System enables the ministry to strategically monitor inventory levels, usage patterns, and demand forecasts. By analyzing this data, the ministry can optimize resource allocation, minimize costs, and enhance operational efficiency, further strengthening its supervisory role in overseeing the pharmaceutical sector.

Furthermore, the Electronic Document Management Platform plays a crucial role in enhancing the ministry's supervisory functions. By transitioning from paper-based systems to an electronic document management approach, the ministry can streamline workflows, automate processes, and ensure meticulous version control. This optimization of communication and decision-making processes within the ministry enhances its efficiency and strengthens interactions with economic operators. The platform also ensures strict compliance with regulatory requirements and standards governing document management and data security. This ensures the integrity and confidentiality of sensitive information, supporting the ministry in fulfilling its supervisory responsibilities.

Overall, the digitization initiatives within the Ministry of Pharmaceutical Industry have had a significant impact on its supervisory role. With enhanced market monitoring, improved inventory management, data-driven decision-making, and efficient document management, the ministry is better equipped to ensure social responsibility and effective regulation of the pharmaceutical sector (Amrouni, 2023).

3.2.Understanding social responsibility standards and guidelines in the pharmaceutical industry

In this section, we provide an overview of the social responsibility standards and guidelines that govern the pharmaceutical industry. Social responsibility refers to the ethical and responsible conduct of businesses towards society, encompassing aspects

such as environmental sustainability, ethical sourcing, labor practices, community engagement, and patient safety.

Within the pharmaceutical industry, various international and national standards guide companies in their commitment to social responsibility. These standards aim to ensure that pharmaceutical companies operate in a manner that is transparent, sustainable, and beneficial to society as a whole.

One widely recognized set of standards is the Pharmaceutical Supply Chain Initiative (PSCI) (DFGE, 2023), which brings together pharmaceutical companies to promote responsible supply chain practices. The PSCI provides guidelines (Initiative, 2023) for managing suppliers, ensuring product quality and safety, protecting the environment, and promoting ethical business conduct. By adhering to these standards, pharmaceutical companies demonstrate their commitment to social responsibility and contribute to sustainable development.

Additionally, organizations such as the International Federation of Pharmaceutical Manufacturers & Associations (IFPMA) (IFPMA, 2023) have developed codes of conduct and guidelines for pharmaceutical companies. Adhering to these codes is essential for upholding pharmaceutical companies' reputation and credibility, as they emphasize ethical business practices, responsible marketing, patient safety, and access to medicines.

Furthermore, in Algeria, regulatory authorities enforce specific regulations and guidelines to ensure social responsibility in the pharmaceutical industry. These regulations encompass various areas, including good manufacturing practices (Executive Decree No. 22-247, concerning the rules of good manufacturing practices for pharmaceutical products for human medicine, 2022), quality control (Executive Decree No. 20-391 amending and supplementing Executive Decree No. 19-190 establishing the missions, organization, and functioning of the National Agency for Pharmaceutical Products, 2020), and post-marketing surveillance. Algerian pharmaceutical companies

demonstrate their commitment to patient safety, product quality, and ethical practices by adhering to these regulations. Compliance with these guidelines is essential to maintaining the highest standards of pharmaceutical manufacturing and ensuring the well-being of patients in Algeria.

It is important for pharmaceutical companies to not only meet these standards and guidelines but also go beyond compliance by actively engaging in initiatives that contribute to social responsibility. This can include initiatives such as sustainable sourcing of raw materials, partnerships with healthcare organizations to improve access to medicines in underserved communities, and corporate social responsibility programs aimed at supporting local communities and addressing healthcare challenges.

In summary, social responsibility standards and guidelines in the pharmaceutical industry play a crucial role in promoting ethical conduct, sustainable practices, and patient safety. By complying with these standards and actively engaging in responsible initiatives, pharmaceutical companies can contribute to the well-being of society and enhance their reputation as socially responsible organizations.

3.4.Digitization obstacles:

The implementation of digitization encountered various obstacles, as highlighted by the sub-manager of the Directorate of Information Systems and Documentation (Bouhafs, 2023). These challenges arose both within the ministry and from economic operators. However, significant efforts have been made to overcome these obstacles and provide continuous support for the success of the project. The challenges include:

Resistance to change: Some individuals, both within the ministry and among economic operators, are resistant to adopt digital platforms and prefer the traditional methods they are accustomed to. Even if they initially use digital platforms, they may succumb to pressure from economic operators who reject them and revert to traditional methods.

Lack of trust in the digital system: Certain individuals have doubts about the security, reliability, or privacy of digital transactions. They prefer face-to-face interactions and are skeptical about fully embracing and utilizing digital platforms.

Instability: Economic operators often experience frequent workforce changes, which can disrupt the transition to digital platforms. The turnover leads to challenges in maintaining consistent familiarity and proficiency with digital tools. New employees may require additional training and time to become proficient, causing temporary disruptions or inefficiencies.

To address these obstacles, measures have been taken (Bouhafs, 2023) (Mergague, 2023), including:

Continuous training: Ongoing training programs are provided to enhance digital skills and promote familiarity with digital platforms.

Open communication channels: All communication channels are kept open and accessible to address concerns, provide support, and receive feedback from users.

Open reception at the Information Systems Cell: An open reception area has been established at the Information Systems Cell, allowing users to seek assistance and guidance regarding digital platforms without the need for prior appointments.

Efforts to resolve technical issues: Continuous efforts are made to resolve any technical problems or challenges faced by users of digital platforms.

These measures aim to mitigate the obstacles encountered during the implementation of digitization, ensuring a smoother transition and better adoption of digital processes within the ministry and among economic operators.

Conclusion:

In conclusion, the digitization of administrative procedures within the Ministry of Pharmaceutical Industry has significantly transformed its supervisory role and the implementation of social responsibility by economic operators in the pharmaceutical industry. The integration of digital technologies has brought numerous benefits, including increased efficiency, accuracy, and transparency in regulatory and oversight processes.

Discussion of Results:

Our study found that the integration of digital technologies indeed significantly improved the efficiency and accuracy of the Ministry's supervisory role (Hypothesis 1 supported). The adoption of digital platforms streamlined licensing, registration, quality control, inspections, and monitoring of pharmaceutical products. These digital advancements enhanced data management, expedited decision-making processes, and improved the overall effectiveness of the ministry's supervisory functions.

Furthermore, digital technologies played a crucial role in enhancing transparency and accountability (Hypothesis 2 supported). Compliance monitoring improved, transparency increased, and accountability was fostered within the pharmaceutical industry. Economic operators demonstrated enhanced adherence to social responsibility standards, including ethical manufacturing practices, sustainable sourcing, and fair pricing.

Obstacles related to data privacy and security, as well as interoperability with pharmaceutical companies, were effectively managed in the digitization process (Hypothesis 3 supported). The Ministry prioritized robust data protection measures, invested in cybersecurity infrastructure, and established clear guidelines for data sharing and interoperability with economic operators. This proactive approach ensured

the integrity and confidentiality of sensitive information and fostered efficient information exchange and collaboration.

Recommendations:

To maintain these positive outcomes and further enhance the Ministry's supervisory role and social responsibility efforts, we recommend that the Ministry continues to embrace digital innovations and collaborate with stakeholders, including pharmaceutical companies, regulatory bodies, and technology providers. This collaboration can identify and capitalize on opportunities for further digitization.

In conclusion, the digitization of administrative procedures has revolutionized the Ministry of Pharmaceutical Industry's supervisory role and its endeavors to ensure social responsibility within the pharmaceutical industry. By leveraging digital technologies effectively and addressing associated challenges, the Ministry is well-positioned to continue improving its regulatory and oversight functions, promoting ethical practices, and contributing to the overall well-being of the pharmaceutical sector.

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