



Special issue of The Scientific Journal of Business and Finance

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Green Service Supply Chain Management (GSSCM) Mediates the Relationship between Management Information Systems (MIS) and Organizational Performance (OP) for Enhancing the Community Health

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Published online: April 2024.

To cite this article: Allam,Hend E,Youssef, El-Sayed Abd El-Halim and Gad , Ramadan Abd El-Azem.**Green Service Supply Chain Management (GSSCM) Mediates the Relationship between Management Information Systems (MIS) and Organizational Performance (OP) for Enhancing the Community Health** , Special issue of The Scientific Journal of Business and Finance, 44, (Special issue), 213-222.

DOI: [10.21608/caf.2024.372935](https://doi.org/10.21608/caf.2024.372935)

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Abstract: healthcare is the backbone for the community health. In recent years, along with the growing concerns about medical errors, patient safety, spiraling up medical costs and the emergency of epidemics ex, covid-19 epidemic, health care has become a critical issue around the world. This research is part of an applied study made by the researcher attempting to test the (1) direct impact of (MIS) on (GSSCM), (2) direct impact of (MIS) on (OP), (3) direct impact of (GSSCM) on (OP), and (4) indirect impact of (MIS) on (OP) through (GSSCM). The researcher has used the deductive approach, proposing a research framework to be tested. The study population consists of 428 individuals of Governmental and Private Hospitals in Gharbia Governorate/ Egypt, while the sample size is about 201. Sampling methods is done using a questionnaire developed by the researcher. The researcher has excluded 11 individuals thus, number of valid and statistically analyzed forms are 190. Statistical techniques adopted for analyzing data are (1) Alpha test, and (2) Structural Equation Modeling (SEM). Results found that GSSCM mediates the relationship between MIS and OP. Finally the researcher presents recommendations enhancing the overall healthcare sector level.

Key Words: Management Information Systems, Green Service Supply Chain Management, and Organizational Performance.

1.Introduction

Health care is one of the most important sectors in any country. It considers human being, that's why governments give a great deal with its issues. Healthcare organizations provide services to the society like diagnosis, treatment, rehabilitation, and preventive health services. In recent years, along with the growing concerns about medical errors, patient safety, spiraling up medical costs and the emergency of epidemics ex, covid-19, healthcare has become a critical issue around the world

Healthcare organizations operate in both Governmental and private sectors. Governmental healthcare organizations aim to achieve the legally determined goals and to improve the society overall health level, unlike private ones in which increasing profitability and value of the organization is the primary objective. In relation to the Governmental sector, non-financial factors such as satisfaction of the client (patient), and other stakeholders as well as quality of service are more important than the financial objectives. However, the financial aspect of business continuity is also important. Achieving any of Governmental and/or private sectors goals requires an efficient and effective health organizations delivering healthcare services successfully.

Nowadays the efficiency and effectiveness of any organization depends on the efficiency and effectiveness of its supply chain, besides influencing the environment contributing to performance enhancement, when adding a green component which is known as green supply chain. So, healthcare managers have to concentrate not only on managing healthcare supply chains in an efficient and effective manner, but green healthcare supply chains as well.

Along with the technological revolutions, information systems have become vital for achieving the efficiency and effectiveness of the organization and its supply chain. This drives the researcher to study the relationship between management information systems (MIS) and green healthcare supply chain management in order to improve the hospitals performance.

2. Research Problem

Healthcare sector in Egypt suffering a lot of problems causing a clear phenomenon of high cost - low quality services. Consequently preparing a strategy for digital transformation is necessary to improve the efficiency of the national health system ex , dimensions of justice and social protection , filling gaps of the work force and health data , the environment , besides adopting protective measures in accordance with international rules and standards as well as , increasing number of training programs in managing and anticipating health crises , adopting different visions of human capital ; programmers , data exclusionists , and etc. , other than doctors , nurses , and other jobs , as well as research and development activities (القاعدة القومية للدراسات عن مصر , ٢٠٢١) .

Thus, the following research question has been developed; to what extent can MIS affect the green service supply chain management (GSSCM) and organizational performance (OP) in Governmental and Private Hospitals in Gharbia Governorate / Egypt?

3. Objectives: testing the (1) direct impact of MIS on GSSCM, (2) direct impact of MIS on OP, (3) direct impact of GSSCM on OP, and (4) indirect impact of MIS on OP through GSSCM

4. Techniques of data collection:

- Journal Articles, Books, Scientific Periodicals, and Reports, electronic sources, and... etc.,
- Questionnaires directed to the Governmental and Private Hospitals managers in Gharbia Governorate/Egypt.

5. Methodology:

The researcher has used the deductive approach proposing a research frame work as shown in figure (A) to analyze the relationship among research variables in which there are four main Hypotheses:

H1: MIS has a statistically significant direct positive impact on GSSCM.

H2: MIS has a statistically significant direct positive impact on OP.

H3: GSSCM has a statistically significant direct positive impact on OP.

H4: MIS has a statistically significant in direct positive impact on OP through the GSSCM.

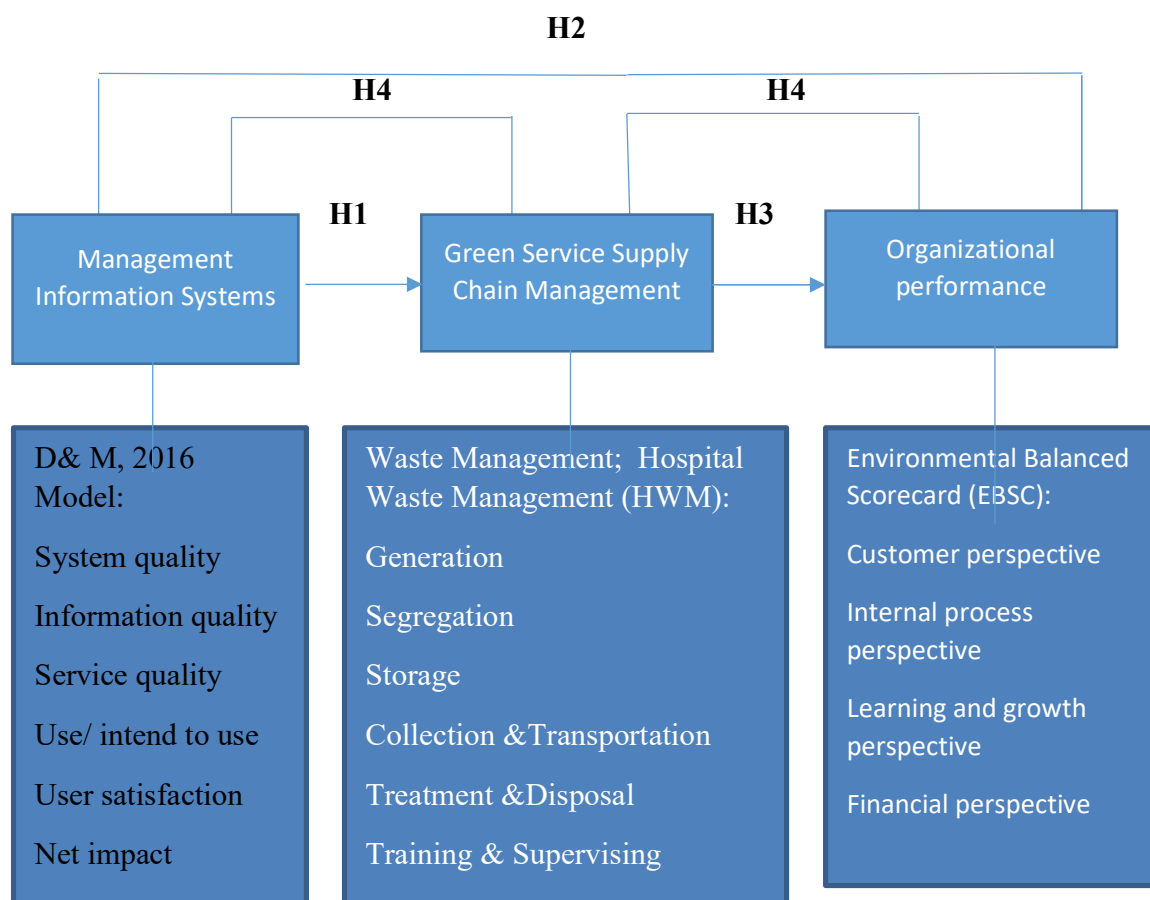


Figure A: Proposed Research Frame work.

The study population consists of 427 individuals of Governmental and Private Hospitals in Gharbia Governorate/ Egypt, while the sample size is about 201. Sampling methods is done using a questionnaire developed by the researcher. The researcher has excluded 11 individuals thus, number of valid and statistically analyzed forms are 190.

Statistical techniques adopted for analyzing data are (1) Reliability of the scales evaluated using Cronbach's Alpha. Results show that all alpha coefficients exceed the acceptable level of reliability which is 0.7. Therefore, all scales items have been statistically analyzed using technique (2) SEM and none has been eliminated.

The collected data are analyzed using Amos v25. Amos Graphic is used to draw a path diagram specifying four main relationships and eighteen sub-relationships between research variables. Subsequently SEM results are used to test research hypotheses. Accepting or rejecting the hypothesis depends on the significance levels which are 0.05, 0.01, and 0.001 reflecting strong significance, very strong significance and highly strong significance respectively.

5.1. SEM Results:

5.1.1. H1, including six sub-hypotheses:

H11: system quality has a statistically significant direct positive impact on GSSCM.

H12: information quality has a statistically significant direct positive impact on GSSCM.

H13: service quality has a statistically significant direct positive impact on GSSCM.

H14: user satisfaction has a statistically significant direct positive impact on GSSCM.

H15: use/ intend to use has a statistically significant direct positive impact on GSSCM.

H16: net impact has a statistically significant direct positive impact on GSSCM.

. Regarding the results, H11, H12, H14, and H15 are strongly accepted ($P < 0.001$), as well as H13 ($P < 0.05$). However, H16 is rejected ($p = 0.460$). In relation to the main hypothesis (H1) it has been strongly supported ($p < 0.001$).

These results can be analyzed that hospitals acquire quality systems presenting quality information used regularly for generating reports necessary for decisions making at different managerial levels. Furthermore, employees are trained to increase their educational level and skills as well as service quality. Thus, the decision making process has become more efficient affecting the GSSCM positively. However, achieving the desired goals is lacking; systems are mostly used for administrative works and some medical purposes, additionally some of these systems exists but, are not used in some hospitals. Thus, there is a need to have an efficient information system (IS) interacting effectively rather than working separately to achieve the desired goals successfully.

5.1.2. H2, including six sub-hypotheses:

H21: system quality has a statistically significant direct positive impact on OP.

H22: information quality has a statistically significant direct positive impact on OP.

H23: service quality has a statistically significant direct positive impact on OP.

H24: user satisfaction has a statistically significant direct positive impact on OP.

H25: use/ intend to use has a statistically significant direct positive impact on OP.

H26: net impact has a statistically significant direct positive impact on OP.

Results reveal that, H21, H25, and H26 are supported, ($p < 0.05$). While, H22, H23, and H24 are rejected, ($p = .276, .115, .177$) respectively. In relation to the main hypothesis (H2) it has been strongly supported ($p < 0.001$).

Considering these results, hospitals acquire quality systems used for enhancing the educational level of the employees through online meetings, videos, and instructions which have been increasingly reliable since the emergency of covid- 19 pandemic. This in turn contributes positively to the performance. Regarding information quality, service quality, and user satisfaction, they are lacking in the light of insufficient investing in efficient and effective IS contributing to improve the environmental performance.

5.1.3. H3:

Results reveal that H3 is strongly supported ($p < 0.001$). This means that GSSCM is crucial for achieving OP. Thus, managers should perform most of its practices effectively in order to enhance the OP. Considering these results, dealing with hospital wastes efficiently from generation to final disposal plays a critical role on keeping people and environment safe. This in turn achieves an important goal of healthcare organizations; healthcare organizations are not only for treating people, but plays a vital role in providing preventive services as well. In addition to decreasing patients' complaints regarding the lack of environmental considerations as well as financial subsidiaries and costs. Furthermore, increasing the hospitals chance to get international environmental certificates. All of these consequences are in turn the core for enhancing hospitals performance.

5.1.4. H4, including six sub-hypotheses:

H41: system quality has a statistically significant in direct positive impact on OP through the GSSCM.

H42: information quality has a statistically significant in direct positive impact on OP through the GSSCM.

H43: service quality has a statistically significant in direct positive impact on OP through the GSSCM.

H44: user satisfaction has a statistically significant in direct positive impact on OP through the GSSCM.

H45: use/ intend to use has a statistically significant in direct positive impact on OP through the GSSCM.

H46: net impact has a statistically significant in direct positive impact on OP through the GSSCM.

According to results, H41, H42, H43, H44, H45, and H46 are supported ($P < 0.05$). H42, H43, H44 have become significant by adding the GSSCM as a mediator ($P=.020, .016, .014$) respectively. Additionally H41, H45, H46 are supported ($p= .048, .022, .022$) respectively. Regarding the main hypotheses, (H4) it has been strongly supported ($p < 0.001$). Considering the findings, the significance of the standardized effects indicates that GSSCM plays a mediating role in the relationship between MIS and OP in Governmental and private hospitals in Gharbia governorate/ Egypt.

6. Contributions:

1- Exploring the concept (GSSCM); to the best of the researcher knowledge different studies apply the concepts green and sustainable supply chain interchangeably when studying the green attitude for both manufacturing and service sectors. However, applying these terms on service sectors is not precise.

Healthcare supply chain is an implementation of the service supply chain into healthcare businesses, which differs from the original supply chain especially for professional services (Ellram, et al. 2004). Furthermore, although green issues lie under the umbrella of sustainability they are not the same.

2- Presenting a body of further theoretical knowledge on MIS, GSSCM, and OP forming relationships among these variables that have not been connected before.

3- Contributing to MIS success research by determining the role played by MIS and its dimensions in improving the GSSCM and in turn enhancing the OP.

4- Contributing to the OP research:

- Adopting the GSSCM is important to enhance the OP.
- The indirect effect between MIS and OP is a theory and empirical evidence on the impact mechanisms through mediation by GSSCM.

7. Recommendations:

1- Visions, missions, and goals, have to be improved in the light of including the environmental considerations as one of the main purposes at different levels.

2- Developing an infrastructure separating patients' drainage lines from the public lines, in cooperation with the Ministry of Environment to ensure that they are disbursed in places that do not harm the environment or individuals.

3- Expanding the color coding system of waste bins in line with the (WHO).

4- Encouraging the use of modern technological means of waste disposal.

5- Hospitals should not only focus on having MIS but, an efficient and effective ones as well.

6- Preparing specific courses and programs to reinforce the culture of the efficient and effective MIS and its dimensions.

- 7- Broaden the usage of MIS in the way that maximizes its benefits; reducing medical errors, time, costs and enhancing services quality:
- Developing IS supporting HWM practices; quality information generated can be used as a feedback for evaluating and enhancing HWM practices and therefore enhancing the performance.
 - Tracking hospital wastes at the source of production till disposal at the right way ex, Radio frequency identification devices (RFID). This in turn protects patients, medical staff, and any other person inside the facility, as well as the environment. Additionally protects against the disastrous results related to the underground economy. Controlling hospital wastes is crucial especially at the time of epidemics ex, covid-19 epidemic.
 - Developing IS facilitating the flow of information more smoothly among different parts of the hospitals as well as among hospitals itself in order to realize how the different parts interact not how they act when taken separately, and to see beyond the details to the context of relationships in which they are embedded.
 - Developing IS linking between pharmacies, through which information can be provided about medicines available and their expiry date to benefit from instead of executing and wasting them.
 - Adopting the Geographical Information Systems (GIS) for identifying population densities and age groups in an attempt to determine their requirements of health care services. Ex, providing mobile medical campaigns providing health care services to citizens, especially old people
 - Adopting application for exchanging practical and academic experiences among doctors throughout the country.
 - Opening an external communication channels (Global Service Supply Chain) for knowledge exchange and co-operation among local and foreign hospitals under the ministry of health control. This may require adopting special programming languages to communicate internationally.
- 8- Developing IS connecting the ministry of health with pharmaceutical and medical supplies companies available to plan and coordinate the supply of current and future needs regarding each governorate as shown in figure (B).

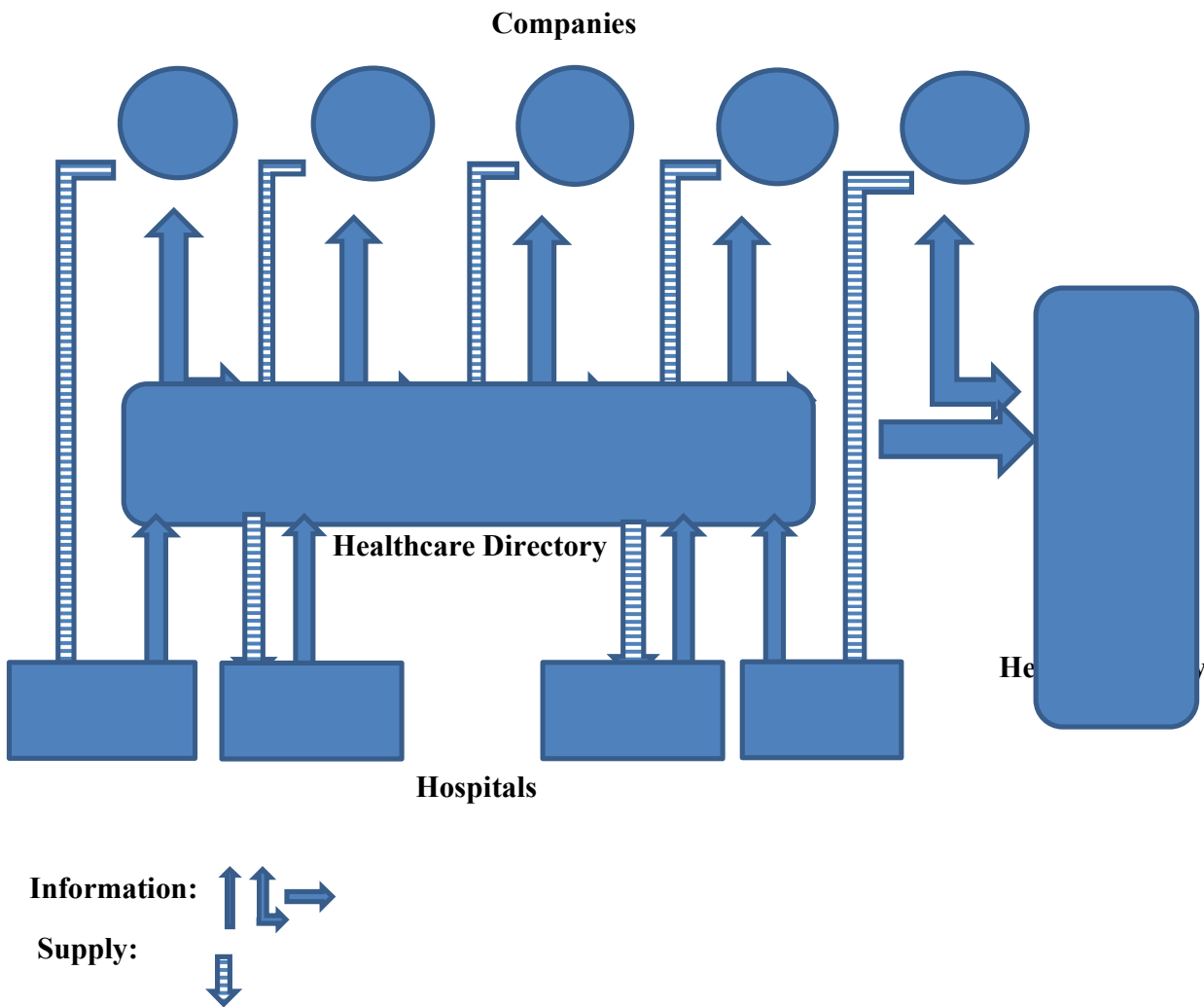


Figure B: Made by the researcher

This model attempts to:

- Provide the ministry of health with database regarding health diseases, especially chronic ones, in order to determine the prevalence rates in different regions, and subsequently identify and analyze the causes behind for treatment and prevention.
- Decrease costs: companies and health institutions become able to plan their needs and production efficiently through identifying and predicting different region's needs.
- Enhance dimensions of justice and increase services quality; redirecting materials and human capabilities to meet the requirements of each place.
- Gather all pharmaceutical and medical supplies companies under the ministry of health control. This in turn helps facing the underground economy and its disastrous consequences, in addition to controlling costs.

8. Conclusion:

MIS plays a vital role in achieving an efficient and effective GSSCM contributing to hospitals performance enhancement. At the end of this study the researcher presents number of recommendations to the managers and practitioners to enhance the overall healthcare sector performance including a model solving different problems ex, decreasing costs, and enhancing dimensions of justice as well as quality of services provided.

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