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RESEARCH ARTICLE

APPLYING SYSTEM DYNAMICS IN ANALYZING THE INTEGRITY OF QUALITY MANAGEMENT SYSTEMS IN HEALTHCARE

[1,2*]M. Alqahtani and [3]N. Khan

[1]Department of Industrial Engineering and Management Systems, University of Central Florida, Orlando, FL 32816-2993, USA
[2] Industrial Engineering Department, Prince Sattam Bin Abdulaziz University Al-Kharj, Saudi Arabia
[3] Assistant Professor of Industrial engineering Department, Kingdom of Saudi Arabia

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Corresponding author:
M. Alqahtani

ABSTRACT

Quality in general is classified as a high level in any organization to maintain the vision and mission of the organization. Quality in healthcare is used to sustain the perfect level of the patient care to be a high level in safe, reasonable and effective manner. Moreover, Quality Management System (QMS) is a system which adopts and practices different quality techniques, tools, philosophy and theories strategies in healthcare to achieve the target quality performance. Therefore, the research will develop a simulation model using the system dynamics technique to frame, understanding, and discuss the success factors that improve the implementation of QMS at the healthcare organizations.

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INTRODUCTION

One of the main components of any organization is quality. The organization is usually looking to keep their standers on a high level as an assurance to achieve their futures targets (Carney, 2011). Clarity and understanding the targets and the vision will be led to improve the quality of system management. Healthcare is one of the most important organizations in any country. it is an organization that provides medical care to induvial or societies. It has different sectors such as healthcare services and facilities, medical devices, and medical services and management (Mosadeghrad, 2014). A quality management system (QMS) is the permeant system used to supervise all organization operations, including processes and procedures, from a quality management viewpoint.

Applying quality management systems can improve the healthcare organization due to the presence of several sectors in a healthcare organizations. However, applying a quality system may be challenging because there will be many difficulties prevent the complete benefits(Munechika, Sano, Jin, & Kajihara, 2014). System dynamics is one of the modeling tools that show the weakness points in any process of procedures in the system(Brailsford, 2015). It is "capable of capturing the reciprocal and temporal causal mechanisms that underlie many complex and dynamic systems, and demonstrates its ability to extend existing variance theory from a system perspective(Fang, Lim, Qian, & Feng, 2018, p. 1303) . Therefore, this research will develop a simulation model using the system dynamics technique to frame, understand, and discuss the success factors that improve the implementation of QMS at healthcare organizations.

Quality Management System in Healthcare: The philosophy term of Quality Management (QM) has initially developed based on the organization's needs. After that, QM was becoming more proud and changed to be a tool to improve the quality of organizations such as Toyota Production System (TPS)(Dahlgaard-Park, Chen, Jang, &Dahlgaard, 2013). Hence, Lean and Six Sigma were successfully approved that can be applied at both organizations and work units (Cima et al., 2011). Therefore, TPS and Motorola were the first companies that introduced Lean and Six Sigma tools efficiently to the entire organization (Raja Sreedharan, Raju, & Srivatsa Srinivas, 2017).

Quality Management Systems (QMS) have series of standards under ISO 9000. The main module of QMS is ISO 9001 which is used for the quality of designing, developing, installing, and manufacturing. A global survey has been conducted in 80 countries and resulted that the number of using ISO 9000 certifications between the year 1994 (70,517) and 1996 (160,00) has increased to double(Ho, 1997; Sun, 2000). Quality Management System (ISO 9001) has been conducted in the Healthcare sector in order to identify some independent factors that will improve QMS.

System Dynamics: The system dynamics (SD) model is used as an evaluation tool that management can use to understand how the different solutions will affect the system and which solutions will be more efficient to be used. It is dealing with interior response loops and the delay period that influence the complete system. System dynamics has a different approach to studying any system than others approach because it focused on a systematic view for system structures and described how to present a simple system appears non leafier and confusing (Williams, 2012). One of the important things that can improve the education process of the healthcare system is understanding the structure's feedback. System dynamics provide a visual representation of the healthcare system and feedback loops. Also, it reflects the delay period and shows the system performance(Mehrjerdi, 2012).

Research Gap: The success factors that improved the quality management system in healthcare do not reflect the dynamics trend of the complex system (Faezipour & Ferreira, 2013).This indicates that the complex system does not evaluate the relationship of the behavior of each factor over time. In addition, the complex system does not consider the time delay between successful factors, hence, it will affect the quality management system in healthcare (Faezipour & Ferreira, 2013).

Research Problem Statement: Although many papers introduce the factors that improve the implementation of Quality Management Systems (QMS), some research areas where not been identified or found difficult to introduce. Hence, a previous study mentioned the successful factors that improve the QMS in Healthcare by doing the systematic literature review and doing a survey study (Rawshdeh, 2021). The identified factors will be refined in System Dynamics models for this thesis. SD simulation will be developed in the success factors resulting from the previous study to validate the factors. In addition, the research will show different scenarios of the behavior of the factors of the implementation, which helps the decision-maker manage the process and improve the chances of the rates. System Dynamics provides many scenarios to help the decision-maker to select the right decision in Quality Management System in Healthcare. Furthermore, the connection between the success factors and the systematic approach can be shown by implementing the SD model to evaluate the theoretical approach.

Research Question: The main objective of the research is to generate quantitative system dynamic models to investigate the integrity of the quality management system factors that are implemented in healthcare processes. Therefore, the system dynamics will consider the improving factors of the quality management system in healthcare. Then, the result of the model will show the investigation of the movement in the quality management system in healthcare.

The above problem statement is considered the following research questions to follow the study:

RQ 1: What are the system dynamics model tendencies in the quality management system in healthcare?
RQ 1.1: How does the model of SD apply? And what extent has it been?
RQ 1.2:What is the limitation of the current research in QMS due to a lack of system dynamics?
RQ 2: What are the relationships between the success factors of the quality management system in Healthcare?
RQ 2.1: How can the system dynamics develop a model through the available databases?
RQ 2.2: How can the model explain the critical points of the success factors that affect QMS in Healthcare?
RQ 3: How does the model explain the performance of the factors that affect the implementation of QMS in Healthcare?

Propose work

The dissertation's core purpose is to increase the level of understanding of the academic research and the professionality level in the industry part about how to predict the level of the effect of success factors in the quality management system in Healthcare. The aims of the dissertation are as follows

1. Identifying the previous altitude of different research that uses the system dynamics method in the quality management system.
2. Developing a quantitative system dynamics model from a previous professional academic study which is studying the success factors that improve the quality management system in healthcare.
3. Improving the knowledge and proficiency on implementing the quality management system in healthcare and the system dynamics model by contributing to the quality management system, healthcare, engineering management, and engineering system dynamics fields.
4. Developing a professional procedure in order to support decision-makers to improve the quality management system in healthcare and also to understand the behavior ofeach factorthrough the system.

Conclusion

Therefore, the research objectives are identified which are forward the research questions as following:

- Develop a systematic literature review contributing to the quality management system in healthcare and the system dynamics application.
- Develop a system dynamics model that integrates the identified factors of the improving quality management system in healthcare using previous studies.

The systematic literature review is in progress to be developed for the research proposal with the methodology, and the analysis details. Then, the system dynamics model will be completed by using a previous study and some case studies and then test the relationship between the factors that improved the quality management system in healthcare.

REFERENCES

Brailsford, S. C. 2015. *Hybrid simulation in healthcare: new concepts and new tools.* Paper presented at the 2015 Winter Simulation Conference (WSC).

Carney, M. 2011. Influence of organizational culture on quality healthcare delivery. *International journal of health care quality assurance*, *24*(7), 523-539.

Faezipour, M., & Ferreira, S. 2013. A system dynamics perspective of patient satisfaction in healthcare. *Procedia Computer Science*, *16*, 148-156.

Fang, Y., Lim, K. H., Qian, Y., & Feng, B. 2018. System dynamics modeling for information systems research: theory development and practical application. *MIS Quarterly*, *42*(4).

Mehrjerdi, Y. Z. 2012. A system dynamics approach to healthcare cost control. *International Journal of Industrial Engineering*, *23*(3), 175-185.

Mosadeghrad, A. M. 2014. Factors influencing healthcare service quality. *International journal of health policy and management*, *3*(2), 77.

Munechika, M., Sano, M., Jin, H., & Kajihara, C. 2014. Quality management system for health care and its effectiveness. *Total Quality Management & Business Excellence*, *25*(7-8), 889-896.

Rawshdeh, M. 2021. Factors That Affect The Successful Implementation of Quality Management Systems in Healthcare.

Williams, C. M. 2012. *Integration of technical operations and quality teams to build site unification.* Massachusetts Institute of Technology.

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