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Effect of Safety Management and Green Practices on Sustainable Performance of Health Care Organizations

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Abstract

Safety management is a systematic approach that is demonstrated by consistent practices. These practices promote continuous improvement in all areas of the organization to prevent accidents, protect personnel, and ensure that production continues without interruption. Safety management can be viewed as a baseline model while green practices act as a benchmark process by which to measure future improvement. The purpose of this research work is to check the effect of safety management and green practices on sustainable performance of healthcare organizations, where lean-green synergy mediates the relationship between them. The study is descriptive in nature. The data used in this study have been collected by the author by visiting different healthcare organizations. Simple random sampling technique is used for data collection. The questionnaire has a sample size of 204 people. The SPSS and Smart PLS software packages are used for data analysis. The results showed that both safety management and green practices have a positive effect on sustainable performance, and this relationship is mediated by lean-green synergy. The results also indicate that both safety management practices and green practices contribute directly to sustainable performance of healthcare organizations

1. Introduction

Safety management is a framework for providing the necessary data and best practices to reduce accidents and increase safety within an organization. It helps organizations respond more quickly and effectively in case of an emergency. However, to provide this protection, organizations must consider how green practices will impact their success. Green practices are defined as "any activity undertaken with the aim of minimizing the environmental impact or

enhancing the environment" (Yong et al., 2020). Health care organizations are starting to recognize the need for green practices to be implemented within their facilities. Health care organizations focus on providing life-saving interventions to patients with a finite number of resources. These resources include their personnel, supply chain infrastructure, and network services that allow for data sharing between facilities. In order for health care organizations to maximize the utilization of these resources, they must have an accurate picture of their assets as well as their operation environment. Therefore, safety management and green practices work together to reduce waste and increase efficiency.

Safety management is a systematic approach that is demonstrated by consistent practices (Saeidi et al., 2019). These practices promote continuous improvement in all areas of the organization to prevent accidents, protect personnel, and ensure that production continues without interruption. It helps employees experience a change within the workplace that is recognized by managers as a safe working environment (Purwanto, 2020). Green practices allow organizations to focus on ensuring the needs of all stakeholders through environmental conservation methods. With health care organizations' goal being to provide services for life-threatening diseases and conditions, they must create an environment where their resources are protected from waste and accident. As a result, green practices and safe-management practices work together to increase the protection of resources. Safety management will focus on the community or environment, while green practices will focus on the individual (Cankaya & Sezen, 2018).

Safety management is an internal system that focuses on the prevention of accidents and injury, whereas green practices are an external social environment that focuses on the protection of resources. Safety management, however, can be seen as an extension of green practices as there are many similarities between these two approaches. Safety management can be viewed as a baseline model while green practices act as a benchmark process by which to measure future improvement (Shad et al., 2019). To implement these practices, organizations may need to set up a policy that mandates the use of traditional green practices such as recycling. In addition to this, they will also need to implement safety management practices such as regulated safety checklists and an Emergency Action Plan. The implementation of both green and safety management practices starts with the execution of a detailed strategy plan. The strategy procedures are used to create awareness among all employees regarding the implementation of new policies and strategies for increasing the efficiency and effectiveness of operations.

The main objective of this research is to understand the role of safety management practices and green practices in the sustainable performance of hospitals. Sustainability is defined as an "ability to be maintained at a certain rate or level". The main focus of this study will be on the healthcare industry because there are many organizations within this industry that are currently facing issues regarding sustainability. Healthcare organizations must consider how they can reduce the environmental impacts of their business while simultaneously

increasing efficiency. This in turn will allow them to reduce costs and eventually increase the capacity to provide services.

2. Literature Review

Relationship between safety management and sustainable performance:

Safety Management is a systematic approach to the identification, analysis and implementation of effective risk management practices (Wijethilake & Lama, 2019). Rawashdeh, (2018) conducted research on Safety Management and identified that "safety management needs to be a continuous process, with the theory, tactics and techniques of safety being used depend on the hazards and risks of it." In order to overcome the problem of safety management process, Mousa & Othman, (2020) identified that "the gap between theory and practice is too big."

According to the current trend of acquiring Safety Management, there are many benefits that can be derived from it (Kamali et al., 2018). First of all, it only can fulfill the principle and the spirit of safety culture (Kamble et al., 2020). Because safety managers tend to pay more attention to safety rather than costs, in order to reduce the negative impacts of accidents, this is a very effective way (Foo et al., 2018). Safety Management is very beneficial in terms of maintaining a balance between cost and safety (Iranmanesh et al., 2019). Another benefit of Safety Management is that it enables organizations to reduce risk by requiring managers to take actions (Giannakis et al., 2020). In addition, it's in accordance with the principle of "safe operation is always a priority over production" (De et al., 2020). One more advantage of safety management is that it can improve the capability of organizations to develop safety culture (Hourneaux Jr et al., 2018). Safety Management as a professional discipline has had a long tradition in the United States (Jabbour et al., 2020).

A majority of the safety managers utilize intuitive logic to manage safety in their organization. This is because safety issues are often not easy to define (Alsayegh et al., 2020). The huge success of this method has led many organizations to abandon the tried and tested system, hoping that they can do it with their own intuition (Mousa & Othman, 2020). However, this is not possible since intuition should always be accompanied by scientific data and procedures, which are essential for any type of decision making (Zaid et al., 2018). In other words, safety management with an intuitive method is useless. According to Cankaya & Sezen, (2018), the safety managers in organizations generally focus on the processes and instruments (i.e., those things that can be counted). The sad truth is that in many organizations, performance of these things cannot be measured or nothing to show for them. Therefore, it's not surprising

that there are too many accidents and injuries every year (Chavez et al., 2022). Safety management with a sharp method focuses on the prevention of accidents by analyzing the root causes and risks of poor performance. This approach is much more reliable since it helps avoid problems before they occur (Di Vaio & Varriale, 2020).

The relationship between safety management and sustainable performance is that safety management actively aims at improving performance, enhancing sustainability and increasing productivity (Purwanto, 2020). Sustainable performance is a way of doing business that focuses on the present without compromising the future. Sustainable performance is a combination of finance and consideration, as well as performance information and analysis (Yusliza et al., 2020). This means that a sustainable organization acts in a way that is beneficial to the organization in the present, while considering the future (Saeidi et al., 2019). Sustainable performance can be achieved by maintaining excellent operational procedures such as safety management, while also looking into its future (Ahmed et al., 2016). So that it is hypnotized that:

H1: There is a positive relationship between safety management and sustainable performance.

Relationship between green practices and sustainable performance:

In recent years, there has been increased awareness surrounding a number of environmental issues (Yusoff et al., 2020). We have seen the rise in the volumes of waste and a decline in air and water quality (Abbas, 2020). In response to these concerns, more companies are introducing new green practices including hybrid cars and recycling programs (Roscoe et al., 2019). The company that implements sustainable practices such as recycling will reduce the negative impact on its bottom line by lowering operating costs, reducing costs of disposal fees, and decreasing energy consumption costs (Yong et al., 2020). A company can also create a competitive edge by differentiating itself from others who are less environmentally conscious or responsive to environmental issues (El Dessouky & Alquaiti, 2020). Previous research has reported that green practices have the potential to generate both environmental benefits and business benefits (Misso et al., 2018). A variety of green practices have been identified and defined by the United States Environmental Protection Agency (Aboul-Dahab & Saied, 2021). These practices include, but are not limited to, purchasing materials that are renewable and sustainable, making plant-based choices, setting energy efficiency goals, reducing pollution in production processes and operating procedures, reducing energy use and waste through operating systems (Alshehhi et al., 2018).

The relationship between green practices and corporate performance is complex. The two are interrelated, since a company may need to implement green practices to maintain its competitive advantage (Khan et al., 2019). However, it should be mentioned that there are counterexamples that show the adverse effects of implementing some types of sustainable practices. For example, sales and profitability have been negatively affected by the adoption of no-smoking policies (Zhang et al., 2019). A number of works explore the relationship between green practices and corporate performance. These papers generally find support for such a relationship (Xie et al., 2019). Another research on the relationship between green practices and sustainable performance, found that environmentally friendly products may not be profitable because the cost of implementing them exceeds the benefits (Dieste et al., 2019). There are some seminal studies in this area that explore the relationship between green practices and corporate performance. Silvester et al., (2019) found a positive and statistically significant relationship between adopting green practices and financial performance in retail banks. So that it is hypnotized that:

H2: There is a positive relationship between green practices and sustainable performance

Mediating role of lean-green synergy between safety management and sustainable performance relationship:

Sustainable performance is an outcome, a goal to be achieved by organizations. It is not enough for organizations to practice sustainable behavior in order to be successful; achieving sustainability should indeed be one of the organization's primary goals (Palomo-Campesino et al., 2018). The concept of sustainable performance has been applied in many sectors such as automotive, public health and aviation, with services such as consulting firms and utilities (Suganthi, 2019). A study conducted by a consulting firm shows that organizations need to manage not only their operational risks but also internal risks or vulnerabilities (Seman et al., 2019). These internal risks could be of a more political nature, so it is essential to ensure a solid and effective risk management structure to avoid the risk of political interference (Hussain et al., 2018). A research work on lean-green synergy concept shows that the strategic planning of green economy is a key factor to successfully achieve sustainability in business (Longoni et al., 2018). The coordination between organization's strategic plans and its operational plans is essential (Cankaya & Sezen, 2018). Another research on integration of lean and green manufacturing shows that there is a significant improvement in environmental performance and production efficiency in the industry (Mousa & Othman, 2020). The study also highlights

the importance of complementarity of lean management system and green management system (Zaid et al., 2018). The mediating role of lean-green synergy between safety management and sustainable performance relationship gives support to the integration of lean and green manufacturing in many sectors through safety management (Iranmanesh et al., 2019).

Lean-green synergy is a concept that conceptualizes the relationship between approaches to sustainability, i.e. green management and lean manufacturing, with the aim of identifying an optimal design that aims at achieving sustainability (Hammou et al., 2022). The framework identifies three dimensions of approach to sustainability: green management, lean manufacturing, and safety management (Singh et al., 2021). The framework also indicates the role of safety management as a means for sustainable decision making in organizations due to its close connection with lean-green synergy and risk reduction (Abobakr et al., 2022). So that it is hypothesized that:

H3: Lean-green synergy mediates the relationship between safety management and sustainable performance.

Mediating role of lean-green synergy between green practices and sustainable performance relationship:

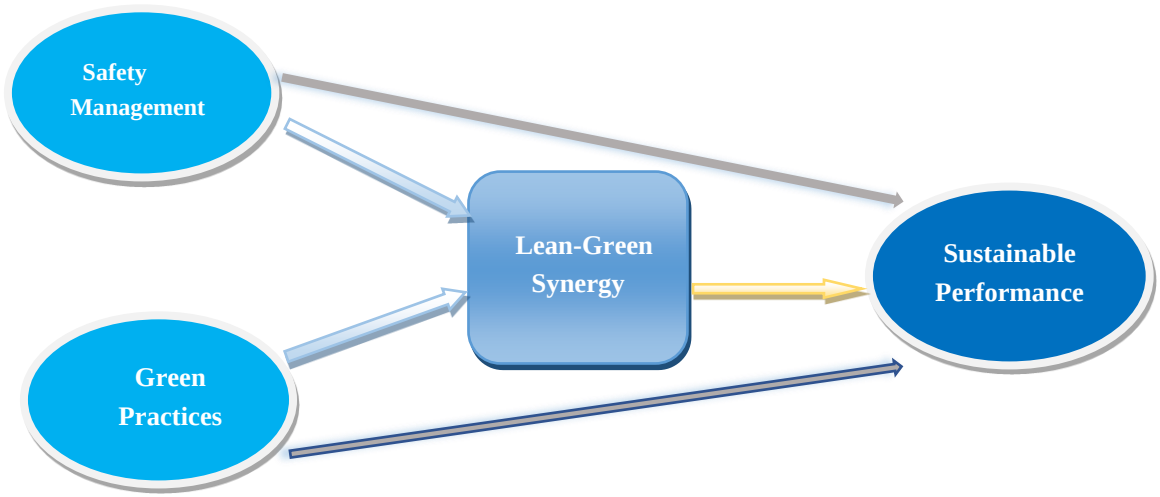
Green practices have been recognized as an important component of corporate sustainability strategy, but it is an open question whether their impact on performance is significantly positive or negative (Abualfaraa et al., 2019). Lean companies have also been aligned with sustainable and green practices, with some studies claiming that lean organizations have stronger long-term financial performance and higher customer retention rates (Hassan & Pasha, 2022). A comprehensive literature review found that there is limited evidence about the relationship between lean management principles and environmental or social performance outcomes (Agyabeng-Mensah et al., 2020).

According to the Thekkoote, (2022), lean manufacturing can be considered as a green manufacturing. lean-green synergy was discussed as a possible mediating factor to improve the performance of companies of future (Cherrafi et al., 2018). Green practices can be achieved by green management, systematic, strategic and operational strategies (Bhattacharya et al., 2019). It is important to highlight that independently, both lean and green practices are not sufficient to address all environmental problems; in parallel alignment, these two approaches can more effectively achieve sustainable development objectives (Afum et al., 2021). Lean-green synergy is proved to be a powerful tool for sustainable performance (Waqas et al., 2022). This synergy contributes to increase lean efficiencies and reduce waste. In addition, lean-green

synergy can promote financial performance and customer loyalty. So that it is hypothesized that:

H4: Lean-green synergy mediate the relationship between green practices and sustainable performance.

Figure 1: Conceptual Model



3. Methodology

The research methodologies used include a survey. The study is descriptive in nature. The data used in this study have been collected by the author by visiting different healthcare organizations. The data for this research were collected through questionnaire survey. Survey design is considered the most appropriate to measure respondents' perceptions in a study because the researcher can gather data from the dispersed population. Data is collected from the sample, and opinion is formed about the entire population (Kerlinger and Lee, 2000). We based our findings on research of a selected sample of people who are working in the healthcare sectors of Pakistan.

The sample size was calculated as 204 for this study using the Raosoft ® online sample size calculator. As a result, the "Simple Random Sampling" technique is used for sampling. The data is being analyzed by using simple statistical instruments, like frequencies and percentages, and descriptive statistical techniques like mean and standard deviation. The descriptive statistical technique is done by using SPSS software. In this study, we have used PLS (partial least squares) and IBM's Statistical Product and Service Solutions (IBM SPSS). All hypotheses have been checked using smart PLS. The measurement model (outer model) was used to find the relationship between constructed and related items. For measurements, this study has used different reliability tests. The structural model path coefficient, t-value, p-value and standard deviation have been used to see the significant level of each variable. Moreover, it has described R squared, which is useful for checking the significance of the

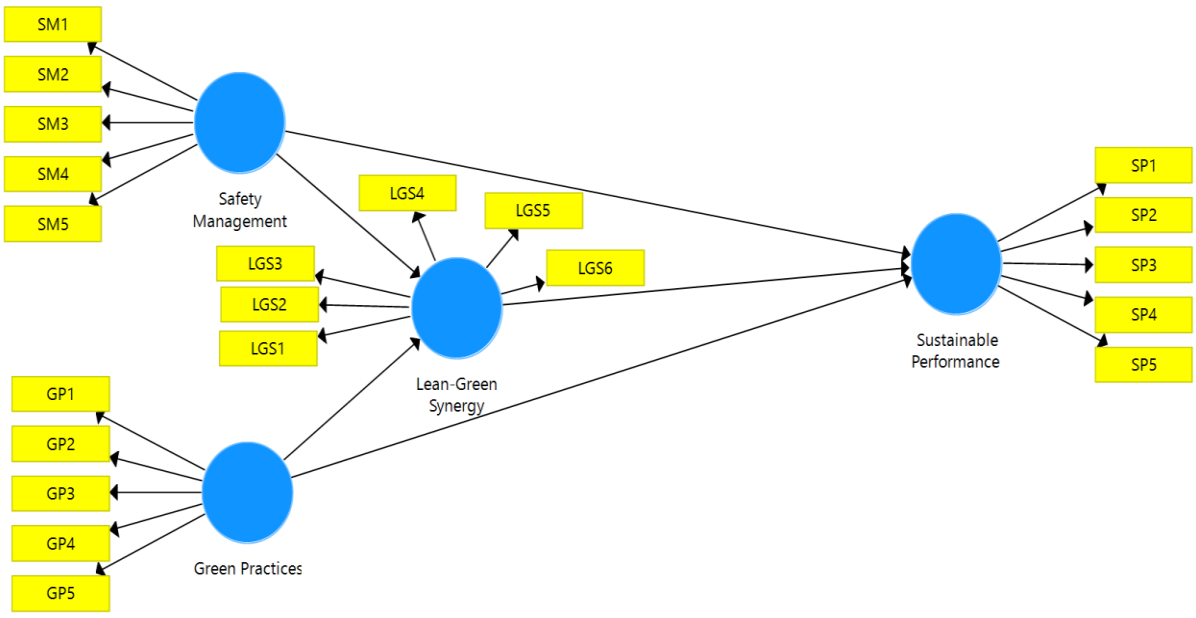
model overall. Established scales are used in the development of the questionnaire for data collection. This study used a 5-point Likert scale. The safety management constructs comprised five questions adapted from (Hurst, N, at al 1996). The green practices construct comprised five questions adapted from Lai, K. H, et al (2013), by using Five-point scale. The Lean-green synergy constructs comprised six questions adapted from (Abreu, M, et al 2013). The sustainable performance construct comprised five questions adapted from Bai, C, et al (2012), by using Five-point scale (1= "strongly disagree", 5= "strongly agree").

4. Result and Discussion

Assessment of Model:

In this analysis, a trajectory model was developed, and experiments were carried out using the statistical tool SMART PLS 3.0. In communication-related fields and behavioral research for casual relationships, we used partial least squares-PLS, a type of structural equation modelling (SEM). The casual model was estimated using PLS-SEM. PLS-SEM provides flexible, broad, and adaptable casual modelling capabilities (Wetzels et al., 2009). Part of the structural equation modelling and PLS-Path modelling allow for the evaluation of the hierarchic model in order to obtain more computational parsimony and less model complexity (Hair Jr et al., 2014). In this analysis, 204 samples were presented. The external or measurement model stated the relationship between structures and related objects, whereas the structural model described the relationships between structural elements, as shown below.

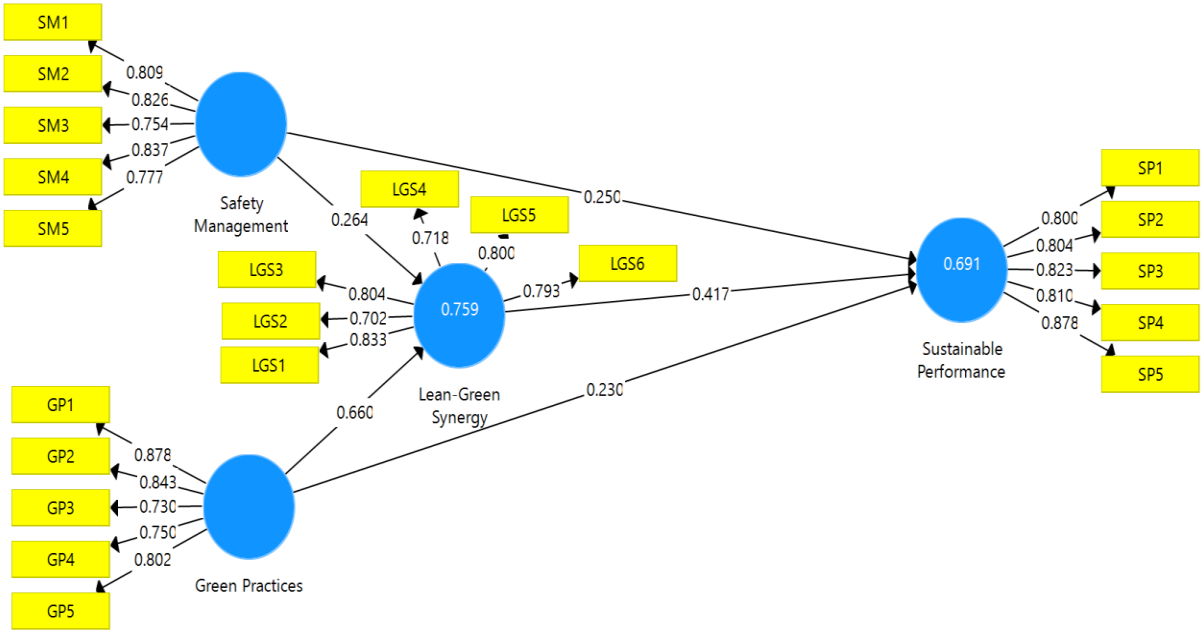
Figure 2: Variable structural model



Measurement model:

Data collection was conducted using the questionnaire for this analysis. Initially, reflective models for their reliability and validity should be tested, we use PLS-algorithm (Fig. 3). Accordingly, all metrics have external loads of over 0.70, similar to our estimation of their reliability (Fig. 3).

Figure 3: PLS Algorithm



Reliability and validity analysis:

The Cronbach's alpha, Factor loadings and CR findings verified the calculation model's reliability. Convergent validity and discriminatory validity are used to determine the validity of the model. AVE and CR have determined the formula's converging validity, both CR and AVE values must be above 0.7 and 0.5, respectively. A criterion was used to test the model's unequal validity (Fornell & Larcker, 1981). This approach demonstrates that the house has a greater variation than any other structure in its metrics. To measure this, each building's AVE value is required above the highest squared correlation with the other building. Cross loadings were used to verify the discriminating validity of the model. Sometimes seen to be more liberal, each indicator's loading in its construction is higher than the cross-loading of each house (Henseler et al., 2009). This study's data analysis is carried out as a reliability and validity analysis, with Cronbach's alpha and factor loadings used to calculate reliability measurements. Factor loadings are used to validate the calculation model's accuracy, which has been tested on 204 people. Cronbach's alpha is also used to calculate converging validity for each variable. Cronbach's alpha should be greater than 0.7 and 0.5 for each variable with a sample size of 204, respectively, to calculate converging validity (Considine et al., 2005). If the value is less

than or equal to Cronbach's alpha, the model does not meet the minimum construction standard.

Discriminant Validity:

Table 1 shows the convergent and discriminating validity of the measurement scale to assess its reliability. To achieve the discriminating validity of the following variables, the researchers calculated the square root of the AVE for all variables that exceeded the inter-correlation of the model developed with alternative forms (Fornell & Larcker, 1981; Sander & Teh, 2014). To test the discriminant construct validity, we used two methods. First, we examined the indicator cross-loading, which revealed that there was no higher loaded indicator on any opposite item. Second, we applied Fornell & Larcker, (1981) concept, which states that the construct's value must be greater than the sum of all AVE correspondences with all other constructs. All of the variables' AVE values should be greater than 0.70 diagonally. Table 1 shows that all of the values were greater than the required criteria, indicating that the entire construct used in this study is reliable. All of these methods of analysis clearly demonstrate the discriminating validity of the vast majority of constructions.

Table 1: Discriminant Validity

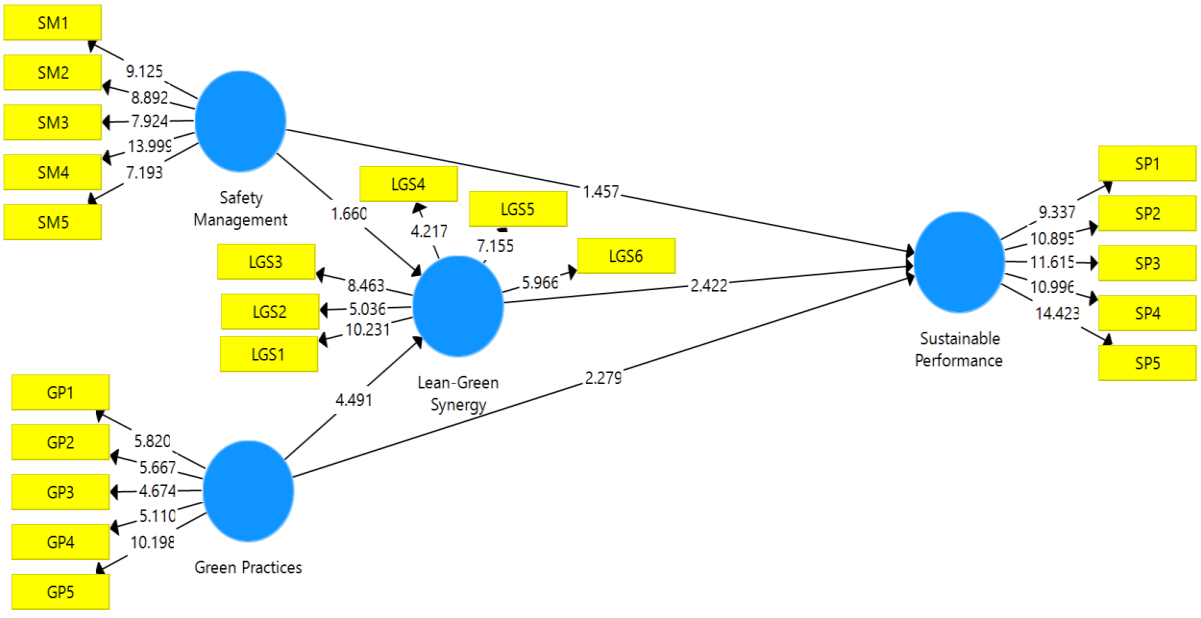
	SM	GP	LGS	SP
Safety Management	0.782			
Green Practices	0.875	0.790		
Lean-Green Synergy	0.888	0.871	0.808	
Sustainable Performance	0.948	0.950	0.969	0.764

The structural model research focused on higher-ordered skill sets that demonstrate discriminant validity when compared to all other constructs (Hair et al., 2013). The evaluation of the measurement model reveals that all construct measures are accurate and reliable. We evaluated the structural model results in light of these findings, focusing on the theoretical relationship between all of the constructs. First, the predictive model's validity index was used to determine the strength of each relationship. This method was successful in predicting the relationships between two constructs (Hair Jr et al., 2014). This finding indicates that the model has a high predictive validity. Second, this model description was used to describe the three-way conceptualization suggested by Barber & Stewart (2014). They identified that these constructs are interrelated and therefore can be considered as a single construct. Third, using hierarchical regression we examined whether all variables in a model were associated with each other when predicting outcome variables. The results of the hierarchical regression analysis demonstrated that the latent variables explained a substantial proportion of the variance in outcomes.

Testing hypothesis:

The path-coefficient value is consistent with the values varying in the range from -1 to +1, with an outstanding positive relationship demonstrated by a value of a path-coefficient "closer to +1" and a clear negative relationship showing the value of a path-coefficient value that is "closer" to -1." Although near-1 or +1, path coefficients are almost always statistical, standard errors have to be accomplished by PLS-bootstrapping in order to measure for significance (Helm et al., 2010). At a confidence level, "path coefficients are accepted as significant if the P value (p) is < 0.05." (Berkman et al., 2012) which means that statistically at a 0.05 confidence level the path-coefficients are significant and therefore accounted for in the stepwise regression model. The values of path coefficients in the current analysis reflect a positive association between systems. By using the Smart-PLS 3.0, we have carried out an SEM study, running a PLS and PLS-bootstrapping method for checking all hypotheses. We also integrated and linked latent variables into the model. To test the significance and coherence of residuals, the PLS-bootstrapping method was used. PLS-bootstrapping was used to determine the significance of path coefficients, with p values less than 0.05 considered significant (Hair et al., 2010). When the improvement in the goodness-of-fit index (GFI) is greater than 0.90 and the adjusted goodness-of-fit index (AGFI) is greater than 0.80, the overall model is accepted. During our regression procedure, we discovered that all estimation equations represented a good model fit because they were accepted by SmartPLS 3.0 software and had values within an acceptable statistical significance range, as recommended by Berkman et al., 2012

Figure 4: PLS-Bootstrapping



To determine the robustness of our results, we used the traditional bootstrap method. The model is fitted on cross validation data sets, and testing is performed on both holds out models and non-hold out data sets. The value of R corresponds to the standard error square root variance in the estimation procedure, i.e., the higher the value of R, the greater the estimation dispersion. Availably as our results suggest, that all the hypotheses have p-value = 0.000 as shown in the table below. So that we can say that all the hypotheses are accepted.

Table 2: Hypothesis relationships

Hypothesis	Path coefficients	t-value	p-value	Expected impact	Decision
H_1	0.257	3.743	**0.000*** **	+	Supported
H_2	0.447	3.353	**0.000*** **	+	Supported
H_3	0.191	1.531	**0.000*** **	+	Supported
H_4	0.439	2.525	**0.000*** **	+	Supported

Discussions

The data showed that both safety management and green practices have a positive effect on sustainable performance and also lean-green synergy mediate the relationship between them in the health care organizations. However, green practices had a substantially larger effect on sustainable performance than safety management alone. Moreover, both safety management and green practices significantly affect certain organizational factors such as revenue or operating margin, but only sustainability is found to be significantly affected by organizational factors collectively. The results highlight the need for an integrated approach that incorporates these two types of approaches in order to deliver sustained improvements in sustainability over time. In the health care organizations, they should develop or integrate the safety management process as well as green practices in order to meet their Goal of sustained improvement in performance. To make sustainability effective, they should consider the two approaches in order to integrate them and to achieve their expectations. The findings shows that safety management activities have a positive and significant effect on sustainable performance. According to agencies in the healthcare industry, there are two approach that they choose to achieve their goals. One is safety management, which emphasizes the importance of safety in healthcare. Secondly, Lean-green synergy has been used to achieve the goals of sustainable performance by our study with great success in the health care sector. Our findings show that both measures have a strong and significant impact on health care organizations over time but green practices have a larger effect on sustainability than safety measures alone. This means that organizations need to ensure that all efforts are made towards improving safety as well as green practices.

5. Conclusion

The results of the study illustrated a number of insights. Firstly, safety management and green practices are two significant factors that contribute to sustainable performance, and this relationship is mediated by lean-green synergy. Secondly, it identified that both safety management practices and green practices contribute directly to sustainable performance and these contributions are not equal. Green practices had a substantially larger effect on sustainable performance than safety management alone, whereas within the construct of lean-green synergy, only sustainability was found to be significantly affected by organizational factors collectively. An integrated approach that incorporates both safety management and green practices is required to achieve sustainable performance in the healthcare sector. If a balanced approach is adopted, the health care industry can improve economic viability while at the same time addressing the environmental and social impacts of their operations. The industry needs to ensure that both safety management activities as well as green practices are undertaken simultaneously and continuously. We have found that green practices have a substantially larger effect on sustainable performance than safety measures alone. This indicates that programs need to focus on the improvement of green performance in addition to safety.

Practical Implications

The results showed that both safety management and green practices have a positive effect on sustainable performance, and this relationship is mediated by lean-green synergy. The results also indicate that both safety management practices and green practices contribute directly to sustainable performance and these contributions are not equal. The findings provide insights to the field of environmental management in the health care sector in terms of the role both product stewardship (green) and process stewardship (safety) play in developing a sustainable approach to environmental awareness that enables health care organizations to meet their objectives relating to economic viability, sustainability, safety, quality and regulatory compliance. Sustained improvements in performance are possible through the adoption of an integrated holistic approach to environmental management.

Limitations and future directions

To expand on the findings in this research, it will be necessary to explore whether safety management or green practices contribute more to sustainable performance or whether they are equally important factors. This can be done by examining other important variables that may affect sustainable performance such as organizational culture and leadership style. Future research should also consider different industry sectors so that results may be generalized to wider contexts. Further research is also needed when considering different sizes of organizations.

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