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Transformational Healthcare Leadership in Improving Tele-Health System and Safety Performance Sustainability in University Teaching Hospitals

Honorata Ratnawati Dwi Putranti

Suparno Suparno

Emiliana Sri Pudjiarti

Universitas 17 Agustus 1945 Semarang,
Semarang, Indonesia

Abstract

In developed countries, telehealth system applications are available in hospitals, hospital-based telemedicine centers, and rehabilitation centers. However, in contrast to developing countries, the telehealth system has not been implemented properly. Countries that implement telehealth systems experience different benefits, especially in developed countries. In developing countries, implementation remains challenging due to the requirement for literacy about the telehealth system itself in addition to using smartphone and tablet cellular technology for access. This research is motivated by concerns about the role of transformational leadership in providing a telehealth system to ensure the safety of medical personnel. The study adopts a quantitative approach with primary data collected at three major Indonesian university teaching hospitals—Gajah Mada Hospital, Diponegoro National Hospital, and Sebelas Maret Hospital—with medical personnel and administrative staff as the observation units. Hypothesis testing is conducted using Smart PLS 3.0. The study's results reveal that traditional health services remain problematic despite efforts to make long-term changes. This study aligns with previous research, emphasizing that strategic flexibility serves as a proactive and reactive strategy for effecting long-term changes in key aspects of a company fostering innovation processes that contribute to sustainable business growth.

Keyword: Sustainable Safety Performance, Transformational Healthcare Leadership, Tele-Health System Implementation, Safety Culture, Continuous Innovation

1. Introduction

The COVID-19 pandemic has exposed the unpreparedness of the health sector worldwide to respond to public emergencies, particularly in developing countries where the pandemic has wreaked havoc on a system already accustomed to shortages of facilities, funding, and resources. Ironically, despite a scarcity of medical personnel, services must persist, presenting physical and psychological challenges and a critical avenue for virus transmission (Rawashdeh et al., 2018). In countries like Indonesia, health services heavily rely on traditional and conventional approaches, lagging significantly behind the rapid growth seen in the digital sector. The pandemic underscores the importance of internet adoption and the digitization of health services through telehealth. Conversely, traditional healthcare

remains problematic; despite some long-term changes in Indonesia, it lacks safety measures and relevance in the pandemic era.

Previous research has indicated that 50 percent of the healthcare sector catalyzes change, while 40 percent is resistant, and 10 percent remains neutral (Gauld et al., 2012). The underdevelopment of digitalization in the health sector in developing countries can be attributed in part to the general public's limited utilization of modern health facilities, low disposable income for treatment, and a lack of leadership from stakeholders in transitioning health services from conventional to telehealth systems. The entrenched resistance to change arises from the deeply rooted hierarchical and bureaucratic framework inherent in the existing business model, hindering adaptability (Gittell & Douglass, 2012). Additionally, persistent cultural perceptions view conventional hospitals as the predominant market destination, obstructing the acceptance of innovative methodologies. Meanwhile, global pressures, customer demands, and IT changes necessitate the development of new and diverse healthcare approaches.

This situation has resulted in a gap in health services, compounded by increased demand due to Covid-19 and limitations in service distances. The emergence of telehealth services is posited as a practical solution, with the assumption that the digital-by-default approach is becoming the new norm for health services, offering the potential to act as a balancer and catalyst for change (Lieneck et al., 2020). However, the opportunity to implement a telehealth system is only advantageous if patients possess the skills to comprehend, navigate, and effectively address digital interface issues; otherwise, there is a heightened risk of health disparities stemming from the digital divide.

In the long term, the ability to innovate sustainably does not spontaneously arise; rather, it requires the construction of an integrated, holistic innovation system (Hassi et al., 2009). The volatile evolution of the healthcare environment and market turbulence prompts the question: has transformational healthcare leadership played a significant role in fostering innovation and ensuring sustainable safety performance? Since healthcare demands leaders capable of contributing to the development of a safety culture (Ayiei et al., 2020), leaders are considered a key factor in organizational success. Despite the accepted assumption that leadership influences safety performance, scholars acknowledge that leaders shape a safety climate in various ways (Bennis & Nanus, 2003). According to Bedgood (2019), transformational healthcare leadership encompasses at least four core competencies: performance improvement expertise, clinical expertise, operational expertise, and regulatory & accreditation.

Management's relation to safety is reflected in its support for implementing safety programs (Razali, 2018). Long-term safety performance is gauged by the efforts to mitigate risks and potential hazards to workers, encompassing negligence. Neal et al. (2000) assert that safety culture influences safety performance. The safety culture approach discerns how culture shapes work practices and underscores the significance of safety in all decisions. Conversely, a low safety culture positively contributes to unsafe service errors (Wu et al., 2007). Wu et al. (2007) identified a weak safety culture linked to elevated unsafe behavior and mortality rates. Their research emphasized the crucial relationship between suboptimal safety culture and increased death incidence, underscoring the importance of cultivating a strong safety culture for risk mitigation. Numerous studies on leadership (Lee et al., 2017) and safety culture converge on the idea that they impact high safety performance. However, the study by Quigley & Graffin (2017) diverges from Fitza's (2017) research, indicating that the CEO's influence on performance is not significant and is limited by random events. The research problem addresses how to enhance sustainable safety culture and performance and evaluates the effectiveness of transformational healthcare leadership and telehealth system implementation in fostering innovation and sustainable safety performance in hospital health services.

2. Literature Review

2.1 Sustainability in Safety Performance

Research on safety performance has gained increased interest, recognizing its strong association with work accidents (Mazlina Zaira & Hadikusumo, 2017). Safety performance, defined as work behavior relevant to safety, aligns with general work behavior (Griffin & Neal, 2000), encompassing actions supporting the security of workers, clients, the public, and the environment. While traditional healthcare companies often view knowledge transfer solely as part of leadership succession planning, the contemporary era emphasizes the broader struggle for high performance and transformative changes, exemplified by the adoption of ISO 9001:2015 certificates. This initiative extends beyond leadership succession, emphasizing aspects contributing to organizational excellence (Bedgood, 2019). Focal points include succession planning, communication flow, online e-learning, knowledge management system development, and reducing organizational turnover. Successful implementation relies on leadership competencies capable of driving transformative change (Burke et al., 2002), listing four crucial factors in safety performance: use of personal protective equipment, risk-reducing work practices, communication of hazards and accidents, and socialization of workers' rights and responsibilities.

2.2 Continuous Innovation and the sustainability of safety performance

Continuous innovation is an iterative process initiated by perceiving a new market based on technology, aiming for the development, production, and marketing necessary for the successful commercialization of the innovation (Hassi et al., 2009). The ability to innovate sustainably doesn't occur spontaneously; instead, it requires the establishment of a holistic and integrated innovation system. There are four levels of innovation progress. Hassi et al. (2009) further delineate some types of sustainable innovation: ad-hoc innovation as sporadic and unpredictable, well-planned innovation caught and planned by the company, organized innovation as a growth pillar through an innovation unit, and integrated innovation with a long-term innovation blueprint, policies, and information systems serving as enablers of innovation management. Given the provided information, the subsequent hypothesis is formulated:

H_1: Continuous innovation has a positive effect on the sustainability of safety performance.

2.3 Safety culture and the sustainability of safety performance

According to Chen et al. (2018), safety culture encompasses shared values, perceptions, attitudes, and behavioral patterns related to safety within an organization. It also involves a collection of policies, practices, and procedures implemented at all organizational levels to diminish employee exposure to occupational risks. This comprehensive approach reflects a notable level of dedication and concern toward preventing work accidents. The findings of Chen et al. (2018) and Hemamalinie et al. (2014) conclude that a low-quality safety culture will increase unsafe behavior and high mortality rates. A notable correlation exists between a subpar safety culture and a heightened occurrence of fatalities. Boniface (2016) emphasized that evaluating safety practices in construction firms highlights the crucial role of managers in cultivating a safety culture, framing it as a valuable investment.

Lee et al. (2017) emphasize that building a healthy and robust safety culture is crucial for ensuring the safety and security of employees. These findings underscore the paramount role of the human factor in preventing work accidents (Arzahan et al., 2022; Tengilimoglu et al., 2016). Various researchers, including Lee et al. (2017), have explored safety performance, and the study's results indicate that a positive safety culture positively influences the high safety performance of workers. From the information provided, we formulate the following hypothesis:

H2: Safety culture has a positive influence on sustainable innovation
H3: There is a positive effect of safety culture on the sustainability of safety performance

2.4 The consequences of Tele-Health System Implementation

The principles to be implemented in telenursing include enhancing the quality of health services, increasing access to health services, flexibly defining roles and responsibilities, minimizing the delivery of unnecessary information, and safeguarding the privacy and security of client information. The WHO has recommended Telehealth since 2007 as an IT and communication-based alternative for professionally addressing patient healthcare problems, covering diagnosis, treatment, disease prevention, observation, evaluation, and training—all geared towards advancing health. The utilization of telehealth has surged by over 150% in daily healthcare practices, particularly evident in routine visits in the US during the global COVID-19 pandemic (Gershon et al., 2000). Healthcare organizations are leveraging various technology applications, including mobile phone applications, remote patient monitoring (RPM) equipment, and health education services (Hofmann et al., 2017). Accordingly, the following hypotheses are proposed:

H4. Implementing tele-health system has a positive impact on sustainable innovation

H5. The implementation of the tele-health system has a positive effect on safety performance sustainability.

2.5 The role of transformational healthcare leadership

The primary challenge confronting all hospitals is enhancing safety performance and continually improving high-quality, safe, and compassionate healthcare services. As explained by Andi (2008), the application of safety leadership in health services is an endeavor to foster safety in the workplace, necessitating commitment and cooperation from all organizational elements, ranging from the top management to workers. According to Copper (2001), an effective leader is one who is proactive and caring, consistently monitors or evaluates the organization, utilizes communication to provide necessary resources, and eliminates organizational barriers. Skeepers and Mbohwa (2015) illustrate the impact of safety leadership and behavioral leadership on safety culture and performance within the construction sector.

Skeepers and Mbohwa (2015) stated that improved safety performance results from the implementation of an occupational safety and health management system grounded in leadership, effective communication, commitment, and employee training. The role of safety leadership in building work safety is crucial. Implementing work safety becomes challenging if the leader's commitment and involvement in interacting with workers are insincere. Empirical results supporting the connection between transformational leadership and enhanced task performance, as exemplified by O'Leary (2016), suggest that transformational leadership similarly influences safety-specific performance, encompassing adherence to rules and contributing to performance improvement.

H6: There is a positive effect of transformational healthcare leadership on sustainable innovation

H7: Transformational healthcare leadership has a positive effect on the sustainability of safety performance

3. Method

This study employs a quantitative approach with probabilistic sampling to gather information and data from respondents in university teaching hospitals, including Gajah Mada University Hospital in Yogyakarta, Diponegoro University Hospital in Semarang, and Sebelas Maret University Hospital in Surakarta. The units of observation encompass medical doctors, nurses, and administrative staff. The sample size, calculated using Yamane's (1967) formula ($n = N /[1+Ne^2]$), with a confidence level of 0.95 and a probability of 0.05 (p), resulted in a sample size of 334 respondents. For the qualitative

research component, Guest (2006) suggests homogeneous groups of around 12 participants to explore burnout, leading to the identification of 12 doctors, 12 nurses, and 10 administrative employees through semi-structured interviews.

The dimensions and operationalization of the transformational healthcare leadership concept are measured according to a study by Bedgood (2019), including performance improvement expertise, clinical expertise, operational expertise, and regulatory & accreditation. Safety culture leadership is measured according to a study by Jouni et al. (2009), encompassing commitment management, external communication, regulation adherence, and risk perception. Sustainability safety performance is measured based on studies by Inness et al. (2010) and Assensoh-Kodua (2019). Leadership is assessed according to the study, covering safety compliance, adherence to correct rules and procedures, use of safety or personal protective equipment, and safety participation, which involves supporting safety in the broader organizational context, such as aiding development.

This study conducted Confirmatory Factor Analysis (CFA) and hypothesis testing using Smart Partial Least Squares (PLS) through PLS software 3.0. The PLS analysis involved three stages: Outer Model, Inner Model, and hypothesis testing. Each stage contributes to a comprehensive examination of the research variables and their interrelationships using the PLS methodology.

4. Results

Within this study, the Partial Least Squares (PLS) analysis encompasses the examination of both the outer and inner models, involving assessments of convergent validity, discriminant validity, composite reliability, determinant coefficient (R2), t-statistics, parameter coefficients, and hypothesis testing. The validity of convergent measures, evaluating the strength of the correlation between the construct and the latent variable, is determined based on the loading factor value. The reflective indicator is considered valid if the loading value (λ) is 0.5 or higher. The results, as shown in Figure 1, indicate that all indicator variables have loading values (λ) of 0.5. Therefore, it can be said that all indicator variables are declared valid.
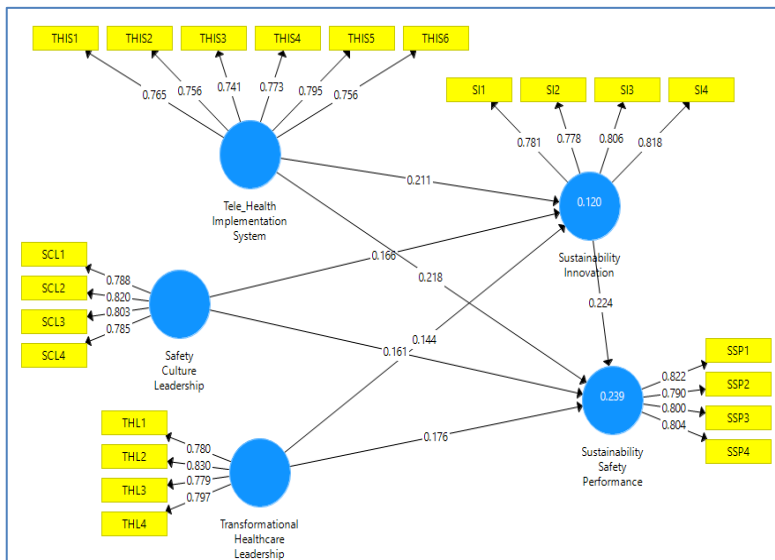

Figure 1. Outer loading
Source: Data Processing with SmartPLS, 2022

Table 1. Outer Loadings

No	Variable	Indicator	Loading Factor	Average Variance Extracted (AVE)
1	Safety Culture Leadership	SCL_1	0,788	0,639
		SCL_2	0,820	
		SCL_3	0,803	
		SCL_4	0,785	
2	Sustainability Innovation	SI_1	0,781	0,634
		SI_2	0,778	
		SI_3	0,806	
		SI_4	0,818	
3	Sustainability Safety Performance	SSP_1	0,822	0,647
		SSP_2	0,790	
		SSP_3	0,800	
		SSP_4	0,804	
4	Tele Health Implementation System	$THIS_1$	0,765	0,584
		$THIS_2$	0,756	
		$THIS_3$	0,741	
		$THIS_4$	0,773	
		$THIS_5$	0,795	
		$THIS_6$	0,756	
5	Transformational Healthcare Leadership	THL_1	0,780	0,635
		THL_2	0,830	
		THL_3	0,779	
		THL_4	0,797	

Source: Data Processing with SmartPLS, 2022

Table 2. Fornell-Larcker

	Safety Culture Leadership	Sustain-ability Innovation	Sustain ability Safety Performance	Tele Health Implementation System	Transformational Healthcare Leadership
Safety Culture Leadership	0,799	-	-	-	-
Sustainability Innovation	0,233	0,796	-	-	-
Sustainability Safety Performance	0,283	0,350	0,804	-	-
Tele Health Implementation System	0,308	0,273	0,341	0,764	-
Transformational HealthcareLeadership	0,015	0,162	0,231	0,073	0,797

Source: Results of Data Processing with SmartPLS (2022)

The next step is to examine discriminant validity testing, which is another method to test the validity with reflexive measurement indicators based on cross-loading with Fornell-Larcker. The results can be seen in Table 2. Utilizing the Fornell-Larcker method, the examination depicted in Table 2 indicates that the association between each item and its respective variable exhibits a higher value compared to the correlation with other variables. Consequently, all items are deemed suitable for subsequent phases of analysis. Internal Consistency Reliability testing in this study uses the construct reliability method with a Composite Reliability (CR) value. This test is used to determine whether the statement items in each variable are reliable. If the value of CR is 0.7, then the indicator used to measure the latent variable can be said to be reliable.

Table 3. Composite Reliability Test Results and Cronbach's Alpha

Variables and Dimensions	Composite Reliability	Cronbach's Alpha
Safety Culture Leadership	0,876	0,814
Sustainability Innovation	0,874	0,809
Sustainability Safety Performance	0,880	0,818
Tele Health Implementation System	0,894	0,858
Transformational HealthcareLeadership	0,874	0,808

Source: Data Processing with SmartPLS 3.2.9, 2022)

Furthermore, the analysis of Composite Reliability (CR) values in Table 3 reveals that the CR values for each variable meet the criteria, specifically being greater than 0.7. Consequently, all variables are deemed to possess high reliability, allowing for the continuation of the analysis process. Additionally, evaluations that must be carried out at the structural stage of the model include testing the coefficient determination (R-Square) and testing hypotheses. To find out whether the formative indicators have multicollinearity, the VIF value is assessed, with a VIF value between 5-10 indicating the absence of multicollinearity. The coefficient of determination (R^2) varies between 0 and 1 ($0 \leq R_2 \leq 1$). In this context, a higher R-square value, approaching 1, is considered indicative of improved performance (Ghozali, 2014). The R-Square value, derived from data processing, is presented in Table 4.

Table 4. Test Results of R^2

Variables	R Square	R Square Adjusted
Sustainability Innovation	0,220	0,210
Sustainability Safety Performance	0,339	0,327

Source: Data Processing with SmartPLS, 2022)

The coefficient of determination test aims to determine the contribution of the Safety Culture Leadership variable to Sustainability Innovation and Sustainability Safety Performance, which are 22.0% and 21%, respectively. The term f^2 or effect size is an alternative descriptor for the impact of modifying R square. Calculated using the formula ((original R_2 – R_2) that has been removed) / (1 - original R_2), the f square value elucidates the proportion of unexplained variance addressed by changes in R_2. According to Cohen's (1988) criteria, a value of 0.02 signifies a "weak" effect, 0.15 denotes a "medium" effect, and 0.35 indicates a "strong" effect (Garson, 2016).

Lastly, hypothesis testing was conducted. This research utilizes path coefficient values, t-statistics, and p-values for hypothesis testing involving 100 respondents analyzed through SmartPLS (Partial Least Squares) software, as evidenced by the bootstrapping results. The criteria applied in this study consider t-statistics > 1.96 or p-value < 0.05 (5%), indicating a significant impact between the independent variable and the dependent variable.

Table 5. Hypothesis Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Safety Culture Leadership → Sustainability Innovation	0,166	0,169	0,064	2,595	0,010
Safety Culture Leadership → Sustainability Safety Performance	0,161	0,166	0,067	2,390	0,017
Sustainability Innovation → Sustainability Safety Performance	0,224	0,218	0,065	3,444	0,001
Tele Health Implementation System → Sustainability Innovation	0,211	0,212	0,067	3,140	0,002

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Tele Health Implementation System → Sustainability Safety Performance	0,218	0,224	0,064	3,409	0,001
Transformational Healthcare Leadership → Sustainability Innovation	0,144	0,152	0,067	2,155	0,032
Transformational Healthcare Leadership → Sustainability Safety Performance	0,176	0,181	0,056	3,156	0,002

Source: Data Processing with SmartPLS, 2022)

5. Discussion

Hypothesis testing has been conducted in this study, which includes. Firstly, examining the influence of safety culture leadership on innovation and safety performance sustainability. Secondly, exploring the effect of sustainability innovation on sustainability safety performance. Thirdly, investigating the impact of the telehealth implementation system on sustainability innovation and the sustainability of safety performance. Finally, assessing how transformational healthcare leadership influences sustainable innovation and the sustainability of safety performance.

Hypothesis testing on the influence of safety culture leadership on sustainability innovation yielded significant results (β=0.266; p=0.010). This study elucidates that a higher level of safety culture leadership corresponds to increased sustainability in innovation. This finding aligns with prior research by Iqbal et al. (2021), which concluded that organizations demonstrating high and effective safety leadership also excel in overall operational performance. The demand for safety leadership lies in shaping leaders who prioritize and rely on exemplary factors. These empirical findings affirm the substantial impact of sustainable leadership on environmental innovation. Additionally, testing the hypothesis regarding the effect of safety culture leadership on sustainability safety performance also produced significant results (β=0.261; p=0.017). It can be inferred that greater flexibility in safety culture leadership correlates with elevated safety performance. This result supports the research of Read et al. (2011), where the study explains that the achieved improvements in sustainability business performance, with a safety leadership approach, are clearly evident through substantial cost savings in the millions of dollars.

This is because achieving improved sustainability performance requires adaptation and change in processes, products, management approaches, and policy orientations. Therefore, change is fundamental for organizations as they evolve on a sustainability trajectory. Continuously adopted innovations improve specific organizations and their entire supply chain sustainability trajectory, enabling them to achieve superior sustainability performance. Another finding from the research of Read et al. (2011) presents a Return on Investment (ROI) Analysis that demonstrates the commercial advantages and a strong business case for investing in a safety leadership culture.

Next is testing the hypothesis of the effect of sustainability innovation on sustainability safety performance; the results of this test also proved significant (β=0.324; p=0.001). This study explains that the longer the sustainability of innovation, the higher the sustainable safety performance. This test supports the research conducted by Inness et al. (2010), in which the research explained that safety is crucial for accident prevention scientifically with in-depth knowledge for the development of results and processes; research results can improve work safety standards at construction sites. Becheikh et al. (2006) also state that innovation is a driving force at various levels for companies, institutions, and governments.

The next hypothesis test is testing the hypothesis of the effect of the telehealth implementation system on sustainability innovation. In this test, it was found that the effect of the telehealth implementation system on sustainability innovation was proven to be significant (β=0.211; p=0.002). It can be explained that the more health services are implemented, the higher the innovation performance will be. The results of this test are consistent with those of Lundström et al. (2014), who

state that the use of telehealth can increase the capacity for individualized care, and more details and changes are constantly gained by providing healthcare professionals with more extensive information about a particular patient. Telehealth is especially useful in large areas with small populations, where the distance to the hospital can be very long, or in smaller areas with large populations, where the reach is very far.

The effect of the telehealth implementation system on the sustainability of Safety Performance is also proven to be significant (β=0.218; p=0.001), meaning that an implemented health service system will result in higher safety performance. The results of this hypothesis test support the research of Nadkarni & Herrmann (2010), which concludes that the implementation of a good system in the health sector allows hospitals to improve safety performance. System development is directly related to the attitudes and motivations of individuals reporting patient safety incidents. An open attitude towards reporting incidents by individuals is an indicator of internalizing patient safety culture in individual behavior.

The last test is the transformational healthcare leadership on sustainable innovation and the sustainability of safety performance. The hypothesis test of the effect of transformational healthcare leadership on sustainable innovation proved significant (β=0.244; p=0.032). The more transformational healthcare leadership, the higher the performance of sustainable innovation. Transformational leadership emphasizes the role of empowerment as a central mechanism for building commitment to organizational goals. In addition, Loe et. al. (1996) argue that transformational leadership is a transformative activity for subordinates by providing aspirations, identities, needs, preferences, and values to their subordinates to help them find their full potential. Then, the hypothesis test of the effect of transformational healthcare leadership on the sustainability of safety performance also proved significant (β=0.276; p=0.002). Transformative leadership is a process where a leader influences, encourages, and inspires ongoing organizational performance to achieve results aligned with the agreed vision and mission while being actively involved in the process. Leaders, serving as facilitators, directly engage in facilitating tasks, underscoring the importance of self-awareness for understanding and collaborating with team members in various tasks. The results of the hypothesis testing described above can be seen in Figure 2 to be understood more clearly and succinctly.
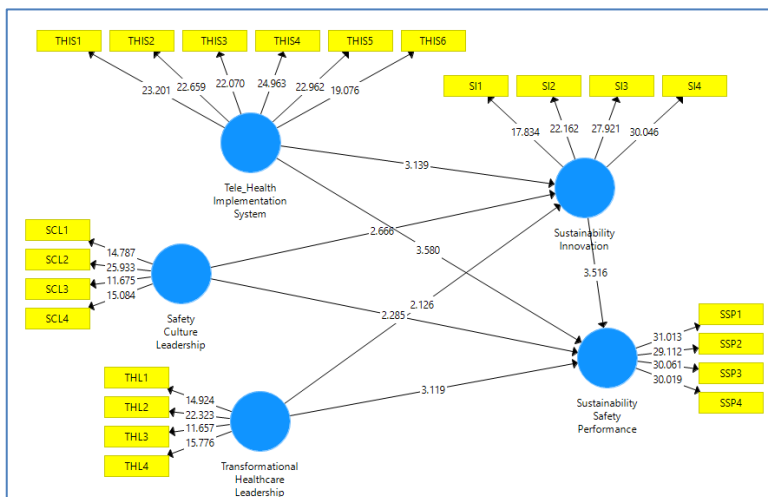

Figure 2. Full Model of Hypothesis Testing
Source: Results of Data Processing with Smart-PLS (2022)

Across industries, achieving sustainable performance and transforming business necessitates various components, with setting and achieving goals and knowledge transfer standing out as fundamental in any sector. In healthcare, the primary emphasis lies in attaining excellence in service, cost, and the quality of patient care in a sustainable manner. The concept of sustainability in practice is developing in the healthcare industry (Schulz et al., 2017). The principles of sustainability in the healthcare system are focused primarily on the components of capital management and efficient use of resources (Goh and Marimuthu, 2016). However, the significance of sustainability within healthcare can be heightened by adopting a dynamic approach that balances social, economic, and environmental development (Ament et al., 2012; Buffoli et al., 2013; Ramirez et al., 2013; Mendel et al., 2014). This perspective is evident in the evolution of the healthcare system, encompassing aspects like patient safety, service quality, and access (Astolfi et al., 2012; Greenhalgh et al., 2012).

Previous studies indicate that telehealth represents a cost-effective approach with a notable satisfaction index among both patients and medical practitioners (Ramirez et al., 2013; Mendel et al., 2014; Astolfi et al., 2012). Its applications encompass the dissemination of medical information, disease progression monitoring, information provision, and treatment facilitation. The problem that arises in some healthcare providers is that only organizations that are capable and have quality ensure long-term relevance. Another important element is achieving sustainable performance through the transformative role of health service leadership. When market turbulence and competition occur, transformative leaders must create innovative methods and steps to build well-implemented systems for the satisfaction of internal stakeholders, external customers, and potential partners, such as potential competitors and stakeholders in the healthcare industry (North, 2020).

Traditionally, many organizations view telehealth systems as a means of planning for leadership succession, but healthcare strives for sustainable performance and transformative change. This focus extends beyond mere leadership succession planning to include the development of knowledge management systems. These focus areas depend on the organization, but they are crucial to achieving sustainable performance to facilitate transformative change (Inness et al., 2010). The findings underscore that management commitment reflects both self-interest and a commitment to organizational safety. This commitment is demonstrated through compliance with health and safety regulations and the equal prioritization of safety issues in the tasks performed (Ament et al., 2012; Buffoli et al., 2013).

6. Conclusion

The study findings indicate a significant impact of safety leadership culture as a substantial antecedent variable on safety performance, mediated by sustainable innovation. This relationship is supported by variables related to the implementation of telehealth systems and transformational leadership in healthcare. These findings highlight that sustainability is inseparable from the successful implementation of a telehealth system and should be addressed as part of a comprehensive, sustainable process with a dynamic vision, starting from the design and planning phases.

The study reveals that driving high performance and business transformation necessitates diverse components, with goal-setting, target achievement, and effective knowledge transfer being foundational. In healthcare, the longevity of relevance is contingent on organizational capability and quality assurance. Another crucial element is achieving high performance through knowledge transfer within the organization. When market turbulence and competition occur, creating innovative methods for sharing knowledge with internal stakeholders, external customers, and potential partners, including competitors and the healthcare industry becomes necessary. Traditionally, many organizations view knowledge transfer as part of leadership succession planning. However, in healthcare, the focus extends beyond leadership succession planning to include the development of knowledge management systems. All these focus areas depend on the organization but are essential for achieving high performance capable of generating transformative change.

In healthcare, the main focus is to achieve excellence in service, cost, and quality of care provided to customers on an ongoing basis. The principles of sustainability in the healthcare system are focused primarily on the components of capital management and efficient use of resources. Nevertheless, the exclusive role of sustainability within the healthcare domain can be elevated by adopting a dynamic approach that considers a balanced perspective encompassing social, economic, and environmental development, as evident in the evolutionary trajectory of the healthcare system, particularly in aspects like patient safety, service quality, and accessibility.

The managerial inference drawn from this study is that achieving sustainability necessitates the presence of various prerequisites, such as organizational and governance support, proper financing, adequate technology and technological environment for health services, an active and targeted communication strategy with decision-making authorities in the health sector, a participatory, collaborative, and pluralistic management approach in many ways to support the success of the health sector, continuous training and development for medical professionals, and strong political leadership in the health sector. While the contribution to the body of knowledge is the development of digital technology, the human factor is actually important. The world in which humans live and work is not fixed. Technology can be adapted to suit human strengths and limitations.

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