SUSTAINABILITY OF LEAN IN SOUTH AFRICAN PUBLIC HOSPITALS

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ABSTRACT

One of the initiatives by South African public hospitals to improve the level of service was the introduction of Lean. The introduction of Lean in South Africa followed the global trend of Lean applications in healthcare, which has been steadily climbing since 2000. Several public hospitals have implemented Lean in specific areas or sections, and these implementations have shown early positive results. However, the Lean implementations have faced a higher failure rate over time. This failure rate could be attributed to a lack of information or a knowledge gap on what causes Lean implementations not to be sustainable. This paper aims to explore information on what affects the sustainability of Lean in public hospitals. Interviews were conducted with practitioners involved with Lean in public hospitals. Through interviews, 44 factors were explored and synthesised into 13 themes.

Keywords: Lean, factors, public hospital, sustainability, healthcare, interviews, themes

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1 INTRODUCTION

1.1 Background

The South African government introduced National Health Coverage in 1997 as a new reform to deal with the bad state of the country's public healthcare [1]. The district health system model was introduced as part of National Health Coverage where through it, primary healthcare became the foundation of healthcare policy [2]. Primary healthcare, as a social justice philosophy, together with legislative, policy and resource-allocation measures were aimed at achieving transformation and improving population health [2]. These new policies and initiatives have not made a significant improvement in the overall performance of the country's health system [2]. Skills gaps in management, leadership and stewardship have led to poor implementation of these good policies that are meant to transform the public health system [3]. As healthcare institutions realise the necessity of improving quality and eliminating waste, Lean healthcare became a strong initiative to adopt [4].

Healthcare entities have adopted Lean as an operations management model that can simultaneously improve quality and productivity, provided that the tools and concepts are successfully applied [5]. The implementation of Lean healthcare in South Africa is still in its early stages and underdeveloped [6]. The majority of the literature only mentions the use of Lean healthcare and its early successes without providing empirical evidence to evaluate its long-term effectiveness and sustainability [7]. This lack of empirical evidence is not unique to South Africa but it is an international concern as mentioned by Henrique et al [8] that Lean has been widely adopted and reported in healthcare however there is a scarcity of literature that reports on Lean sustainability in the long term even though the low success rate of Lean implementation in healthcare is widely reported. Costa and Godinho Filho [9] mention the shortage of Lean healthcare literature that explores the barriers and lessons learned to sustain the process changes through a Lean journey in healthcare.

1.2 Purpose of the study

This paper seeks to use interview processes to gather information from practitioners in South Africa on factors affecting the sustainability of Lean healthcare in South African public hospitals. This paper addresses the research question: What is the practitioner's perspective on factors affecting the sustainability of Lean healthcare in South African hospitals?

2 LITERATURE REVIEW

2.1 Lean Healthcare in South Africa

The organisational structures and culture entrenched in the public healthcare system pose challenges to Lean implementation in public hospitals [10]. According to Nwobodo-Anyadiegwu [11], corporate governance, mismanagement, lack of visible leadership, inadequate support, and limited resources are the main challenges faced by Lean Healthcare.

Available literature mentions some challenges related to Lean implementations in public healthcare. Kruger [12] encountered resistance from staff during the implementation of Lean. Staff perceived Lean to be invasive and lacking significance to them individually. Additionally, there was a lack of belief in Lean methods, and unions believed that Lean would lead to job loss [12]. Price [13] implemented Lean in a hospital to reduce waiting times and improve patient satisfaction. The project revealed that the average visit took 4 hours and 44 minutes, with only 41 minutes spent on value-added activities.

However, Lean has proven effective in improving the performance of selected areas and has the potential to do even more [13]. Lean implementation in one South African hospital demonstrated that Lean can improve staff morale, patient flow, and waiting times [11]. Price [13] proposed an alternative solution to better manage the flow of patients in hospitals during

her Lean implementation project. By levelling the demand throughout the day, waiting times were reduced by 18% to solely based on the commitment of staff and stakeholders, without any additional funds [13]. Naidoo [14] discovered that Lean implementation led to improved staff satisfaction and motivation. Staff felt that things were improving in their department, communication improved, and attitudes toward teamwork significantly improved. Practical Lean training, support and incentives for staff participation, an internal resource dedicated to Lean, a computerised record management system, addressing clinical staff shortages, and infrastructural maintenance are some of the interventions necessary for successful Lean implementation [11]. Literature mentions challenges, and success stories associated with implementing Lean in South African public hospitals. There is, therefore, a definite argument for pursuing Lean healthcare in South Africa to address the increasing demand and requirements for improved quality with constrained resources and circumstances.

2.2 Sustainability of Lean Healthcare in South Africa

Lean Implementation is senseless without including long-term sustainability goals [15]. Lack of sustained improvements wastes resources, creates stakeholder resentment, and demotivates staff [16]. There are no official or trusted reports on the success and failure rates of Lean implementations in South African healthcare organisations [17]. Furthermore, there is a lack of empirical data to demonstrate how Lean implementation can be preserved and sustained in the long term [10]. This lack of evidence highlights the need for more research on Lean management in healthcare, particularly in underdeveloped countries like South Africa, which face unique challenges compared to developed countries [10]. Given the current local challenges of limited resources and poor prospects for economic growth, efforts must be made to improve healthcare management based on the philosophy of achieving more with less [18].

The future of Lean in healthcare is to develop structures, mindsets and systems which ensure that the significant existing investment in Lean is sustained. To achieve long-term sustainability, management must be committed to a determined Lean journey [11]. A planned approach should be taken to formulate sustainability goals and strategies that align with the organisation's strategic objectives [6]. Sustainability should not be seen as a final destination, as this approach can hinder early or sufficient sustainability planning but should be prioritised earlier in the adoption process [17]. Routinisation and institutionalisation are fundamental processes for sustainability [17]. However, to make sustainability a routine component, there is a need for greater clarity on the hindrances to sustainability and their causes [17].

3 RESEARCH METHODOLOGY

This study’s research focus is to explore the factors affecting the sustainability of Lean healthcare in South African public hospitals. A constructivism paradigm was used to understand the phenomenon through interaction with the research participants [17]. This study followed a phenomenological approach, focusing on understanding the meaning of people's experiences [19].

A qualitative research method in a form of semi-structured interviews was used to explore participants' social and cultural perspectives by providing freedom to express themselves without limitations [19]. This method also facilitated the discovery or elaboration of information deemed important by participants, but may not have been previously considered relevant by the research team [20]. The semi-structured interview protocol involved asking key questions to determine the areas to be explored but also allowed the interviewer or interviewee to deviate and delve deeper into an idea or response [20].

3.1 Data Sampling

In this study, purposeful sampling was employed using a set of inclusion criteria. Additionally, snowball sampling was utilised to expand the participant pool. Interviews were conducted until the point of saturation was reached, meaning that no new information was being provided and the researcher was satisfied that the data collected was sufficient to achieve the study's objectives.

Participants had to satisfy the following inclusion criteria:

- Academics, consultants, and practitioners involved with Lean healthcare in South African public hospitals.
- Must know and understand Lean healthcare, and Lean implementation in healthcare.
- Must have first-hand experience and information on Lean healthcare
- Must have been personally and practically involved in Lean healthcare in South African public hospitals

In total, nine participants were interviewed. Table 1 displays the profession and experience of each interview participant.

Table 1: List of interview participants' profession and experience

Interviewee No.	Profession	Field	Lean healthcare Experience	
1	Consultant	Engineering	15 years	Has implemented Lean in both private and public hospitals
2	Healthcare	Medical	10 years	Government employee who has been involved with Lean implementation in Gauteng province public hospitals
3	Academic/ Consultant	Engineering	10 years	Lecturer who has implemented Lean in more than 5 public hospitals
4	Academic	Engineering	6 years	Lecturer who has provided classes about Lean and consulted with public hospitals on Lean implementations
5	Academic	Engineering	5 years	Lecturer who has provided classes about Lean and consulted with public hospitals on Lean implementations
6	Consultant/ Healthcare	Medical	20 years	Has implemented Lean in both public and private hospitals, obtained master's degree in Lean healthcare

7	Healthcare	Medical	10 years	CEO of the hospital, been involved with one hospital, has received international training and exposure to Lean healthcare
8	Academic/ Consultant	Business Management	20 years	Pioneer of Lean implementations in South Africa implemented Lean in more than 5 public hospitals, internationally recognised Lean specialist
9	Consultant	Business management	15 years	Has implemented Lean in both public and private hospitals, obtained PhD in Lean healthcare

The healthcare experience of all interview participants ranges between 5 and 20 years with an average of 12 years. All participants have a minimum of a master's degree in their field of study which includes medical, engineering and business administration fields. The participants met the inclusion criteria set for the study and their professional diversity helps to enrich the findings for this study.

3.2 Reliability and Validity

The interview questions, process, and analysis were clearly outlined to avoid interviewer bias. Interview questions (refer to Appendix 1) were open-ended and shared with interviewees in advance. During the interview process, the interactions with participants were standardised and recorded. After each interview, the researcher reflected on the data collected to evaluate the quality of information received. Each interview data was coded independently. The interviewer spent sufficient time engaging with the data before coding. Findings were described in detail with evidence provided to support any claims made. To eliminate participant bias, all participants were invited in their respective capacities and spoke on their behalf. The extensive engagement of participants in the field also helped address concerns about validity. The sample of participants adequately represented different sectors involved in Lean healthcare. All participants worked for different employers or ran independent and unrelated consulting companies.

3.3 Analysis

In this study, the thematic coding analysis approach was utilised. Statements related to sustainability issues were identified from each interview data and assigned codes. All the coded statements or lines were extracted into a spreadsheet. Each similar coded lines were grouped, repetition was eliminated, and 118 distinct coded lines remained. The 118 coded lines were aligned according to their meaning and language and rephrased into a total of 44 factors. The 44 factors were synthesised and grouped related to the common subject they are addressing, resulting in 13 analytical themes as shown in Table 2.

Table 2: Synthesised interview themes with corresponding participants

No.	Theme	Extracted Factors	Participants
1	Long-term philosophy	Continuous process	1, 5, 6
		Lean thinking	1
		Lean understanding	4, 5, 6
2	Lean alignment	Lean adaptation	3, 4, 7, 9
		Lean Integration	5, 6, 8, 9
		Language adaptation	1, 3, 4, 7, 9
		Organisational readiness	3, 4, 5, 6, 7
		Strategic alignment	3, 5, 9
3	Implementation Phase	Staff engagement	3, 4
		Implementation plan	1, 2
		Implementation process	1, 2, 4, 6, 9
4	Leadership	Change management	3, 4, 6, 7
		Gemba walk	2, 3,4, 6, 7,8
		Leadership involvement	6, 8
		Leadership quality	2, 7, 8, 9
5	Commitment	Leadership commitment	2, 3, 4, 5, 6, 8, 9
		Long term commitment	1, 2
		Personnel commitment	1, 2, 4, 5, 6, 7, 8, 9
6	Training	Coaching and guidance	5, 6, 7
		Lean training	1, 2, 6, 8, 9
		Personnel training	2, 3, 4, 7
7	Teamwork	Collaboration	3, 6, 7, 8, 9
		Integrated teams	3, 4, 6, 9
		Multi-disciplinary approach	2
		Personnel involvement	2
8	Support	External support	1
		Lean champions	1, 4, 6, 7, 8
		Personnel support	2, 5, 6, 7
		Resources	2, 5, 7, 9
9	Motivation	Acknowledgement and recognition	2, 6
		Perception	7, 9
		Personnel benefits	2, 3, 4, 5, 6 8, 9

		Personnel involvement	2, 6
		Staff morale	2
		Success stories	3, 6, 7, 9
10	Communication	Open communication	5, 6, 9
		Visual Communication	6
11	Management	Lean tools	3, 5, 6, 7, 8
		Management competence	3
		Performance management	2, 3 5, 6, 7, 8
		Staff engagement	2, 3, 6, 7, 8
12	Empowerment	Staff empowerment	2, 5, 6, 7, 8
13	Healthy competition	Creating competition	6, 7
		Benchmarking	2,7,8

4 FINDINGS

The thirteen themes with corresponding 44 factors as per Table 2 are analysed individually in this section.

4.1 Long-term Philosophy

Long-term philosophy is at the core of Lean's objectives. It is important for hospitals to fully understand and embrace the long-term philosophy before implementing Lean (P4, P5, P6). By doing so, they can avoid treating Lean as a quick-fix project with a short-term endpoint (P1, P6). Instead, Lean should be seen as a continuous improvement process that enhances performance over an extended period (P5). This long-term philosophy cultivates a Lean thinking mindset (P1), which encourages the maintenance and continuous improvement of achieved fixes. The goal is to establish a new current state and baseline, enabling the organisation to strive to reach even higher performance levels. This creates an ongoing cycle of improvements, leading to the sustainability of Lean. The application of Lean as a long-term philosophy transforms the entity's vision and strategic planning, strongly emphasising the continuous improvement process. This process, driven by Lean thinking, is what ultimately leads to sustainability [8].

4.2 Lean Alignment

Lean alignment broadly encompasses the incorporation of Lean philosophy and principles into a healthcare organisation's activities, visions, and strategies. Lean alignment establishes an environment conducive to institutionalising Lean and fostering a new Lean-based organisational culture (OC) (P5). Lean, a concept originating from the Japanese automotive industry, needs to be adapted to fit the healthcare context during the implementation phase (P1, P3, P4, P7). Before implementing Lean, it is important to thoroughly understand the hospital environment and culture (P3, P4, P5, P7). Lean alignment entails aligning the hospital and its culture, preparing them for the significant organisational and process changes that Lean implementation brings. Aligning the OC with the Lean-based strategic plan is crucial for the hospital to achieve its sustainability goals and objectives (P3, P5, P9).

Lean organisation needs to be dynamic and be able to adjust accordingly (P3, P7) because Lean alignment should be continuous to ensure ongoing success and effectiveness (P3, P7). Lean alignment is essential during the implementation phase and the ongoing adaptation to

new Lean developments (P7). By successfully aligning Lean with the organisational structure, and defining new strategic directions, goals, and objectives, the implementation process becomes more successful and the long-term sustainability of Lean is ensured.

4.3 Implementation Phase

During the implementation phase, sustainability issues are addressed because successful implementation leads to sustainability (P1, P2). It is essential to prioritise sustainability during this phase, as many hospitals have seen initial success with Lean practices but failed to sustain those achievements, leading to regression to the original state [8]. Proper planning, execution, and monitoring are necessary during the Lean implementation phase (P2). The implementation phase should include a well-thought-out plan with a set of steps that must be strictly followed (P1, P2). This is important to ensure that the implementation team does not neglect any steps that could undermine sustainability in the future [8]. It is crucial not to impose the implementation but rather engage staff to gain their buy-in (P4). Forcing Lean onto staff can create resistance and result in them participating only because they have to, without genuine interest (P3).

4.4 Leadership

The importance and role of leadership were emphasised throughout the interviews. Leadership approach, availability, commitment and buy-in to Lean were mentioned as key to the long-term sustainability of Lean (P1, P2, P4, P5, P6, P7, P8, P9). Leadership is advised to lead by walking around (Gemba walk) against leading by objectives (P6). Leadership to participate in Lean activities by doing the Gemba walk (P3, P4, P7, P8) because the Gemba walk provides them with an opportunity to meet with all staff from different organisational levels where things happen to see the problems for themselves and deliberate on solutions going forward (P6, P8). The quality and competence of leadership determine the extent to which Lean can be sustained. Humble and positive leadership instils confidence in the organisation (P2, P7, P8). Respect for people includes the development of leaders who understand Lean and teach it to others. Leadership should adopt an engaging approach towards staff instead of imposing themselves.

4.5 Commitment

Leadership and government buy-in, commitment, and vision are essential for Lean sustainability (P3, P4, P5, P6, P9). Government commitment to authorise and fund the Lean project assures hospitals of the necessary resources to initiate and maintain Lean implementation. Leadership commitment to Lean is key to sustainability, as a project is more likely to be sustained with leadership support (P9). Management and staff buy-in to Lean implementation affect sustainability (P1, P2, P4, P5, P6) because the unsuccessful implementation can result from workforce behaviours, including a lack of trust and commitment displayed by management [22]. Ensuring consistent daily use of Lean methodologies to solve problems and improve the medication process requires a commitment to Lean (P2), [23].

4.6 Training

Training equips staff with the necessary knowledge and skills to sustain Lean practices. Training introduces a culture of continuous learning within the organisation (P4), facilitating the transformation from the existing culture to a new Lean culture during the implementation phase. Prioritising training is necessary to promote continuous improvement (P3, P7), as all personnel should undergo training in Lean concepts as part of an ongoing learning process [8]. Training not only enhances Lean knowledge over time but also empowers staff (P6), as the benefits of Lean can only be realised when individuals possess the necessary skills and

capabilities to perform their tasks effectively [24]. Lean training is essential in helping hospital staff understand the Lean philosophy and align it with the hospital environment (P1). Lean training forms the foundation of Lean implementation by teaching individuals to identify waste (P1). Coaching and guidance, integrated into the training process, contribute to sustainability by breaking down silos (P5, P6, P7) and promoting collaboration and teamwork. Continuous intervention and on-the-job training (P4) address the erosion of knowledge that can occur due to staff movement [25].

4.7 Teamwork

Teamwork describes the quality of interactions within teams, beyond the work tasks and the quality or effectiveness of the tasks themselves. Teamwork assists hospitals by promoting collaborative efforts to achieve sustainability. The collaboration between teams helps leaders break down silos and hierarchies in hospitals (P3). Collaborative efforts among all involved parties lead to increased legitimacy, ownership, and accountability (P2). The creation of multidisciplinary teams, in an attempt to implement Lean solutions affects sustainability (P2). A multidisciplinary approach brings together knowledge and skills from different sections or professions that can be used to achieve sustainability goals. Multidisciplinary teams also help to improve staff's understanding of other sections they do not work in. Management must not impose themselves but rather gain staff buy-in and integrate into the teams (P4). Management must create integrated teams across different sections (P3, P6, P9). Failure to integrate different teams is a major reason some teams resist change and adopt the new working culture [26]. Sustainability science mentions that sustainability challenges are not only about identifying problems but also about moving towards solutions using an integrated, comprehensive, and participatory approach [27].

4.8 Support

The support theme focuses on the factors that provide material assistance to the sustainability of Lean. This study demonstrates that support from management, organisation, external resources, and staff is essential for sustaining Lean. A supportive culture creates an environment where employees can freely express their skills and creativity, take initiative, explore, and achieve results [25]. Support should come from the government for cooperate sponsorship (P6), (P7). Management to provide resources required based on demand (P2), (P5), (P7), (P9). Hospitals are advised to select enthusiastic champions dedicated to promoting and implementing Lean (P4). Champions must be developed to be problem solvers and deployed in the organisation to take responsibility for Lean projects (P1, P6, P8). Support from external consultants provides the knowledge that organisations should utilise to sustain Lean (P1). External consultants guide and impart Lean knowledge to staff (P1). Hospitals should understand that external consultants are there on a short-term basis to train, guide, and implement Lean, but the long-term sustainability of Lean (a philosophy) depends entirely on internal staff with management support (P1, P5, P6).

4.9 Motivation

The motivation theme comprises factors that affect the willingness or courage of personnel to execute duties in pursuit of Lean sustainability. Motivation was theorised as an intensifier or attenuator of Lean activities because motivators can either have a positive or negative influence on Lean actions [28]. Staff perception of Lean and its effectiveness affect sustainability because staff may see Lean as extra work (P7, P9) if not informed correctly. Employee engagement, including unions, to sell the benefits of Lean and alleviate fears, manages the perception of Lean (P3). Management should control the perception of Lean at the implementation phase so that Lean can be accepted by staff and motivated to participate. An engaging environment where staff engage in free will with motivation to make a difference without punitive consequences but an opportunity to learn motivates staff to express

themselves and suggest solutions to eliminate waste (P2). Motivation comes from sharing and showing success stories of Lean to promote the benefits of Lean (P3, P6, P7, P9). It is a source of motivation for staff to maintain Lean intervention and achieve sustainability. Recognition and rewards induce motivation (P2, P6). Staff benefits include growth in the organisation, job security, and achieving targets through the use of Lean motivation to sustain Lean (P6, P8, P9). The essence of motivation factors is to ensure that people are engaged and drawn into Lean by what Lean can do for them.

4.10 Communication

The communication theme examines the impact of open and visual communication on the sustainability of Lean in public hospitals. Effective communication contributes to a smooth flow of information among patients and staff, including feedback for both parties (P5). Open and purpose-driven communication regarding Lean philosophy assists organisational leaders in conveying the value and purpose of Lean to the entire organisation (P5, P6, P9). Hospitals should prioritise understanding Lean philosophy (P4, P5, P6) because when it is deeply ingrained in the mindset and philosophy of the organisation, sustainability becomes achievable. Visuals, such as pictures, are an effective means of communication (P6) because they simplify and enhance understanding of change processes within projects on a single sheet [8]. Visual management boards display performance indicators, work standards, sustainability assurance notes, and goals to be achieved (P6, P7, P8). For communication to positively impact the sustainability of Lean in healthcare, it should be accurate, precise, timely, usable, sufficient, and accessible (P5, P6, P9). Communication is not solely about the content being conveyed but also how it is delivered. Communication is a crucial link between the organisation, individuals, and the concept of Lean. It is important that communication is inclusive and does not discriminate against any individuals within the organisation.

4.11 Management

The management theme revolves around the competence managers must possess to sustain Lean. Lean sustainability requires management that utilises Lean tools, engages staff, and effectively manages performance as mentioned in interviews. However, the medical orientation of most healthcare managers often leads them to interfere in surgical matters, rather than focusing on operational management (P3). This lack of operational management skills negatively impacts Lean sustainability, and results in the neglect of operational issues that management should prioritise instead of interfering in medical matters (P3). Management is crucial in ensuring the correct utilisation of Lean tools throughout the journey. Improvement and problem-solving activities follow a structured approach, which includes defining the problem, goals, current state, root causes, future state, implementation, standardisation, and control (P3, P6, P8). Furthermore, management influences sustainability by ensuring documented work standards, monitoring adherence to those standards, and continuously striving for the best way to perform tasks (P7). The documentation of work standards is essential for sustainability, ensuring that any changes remain in place (P8). Management must measure performance, analyse it, and provide feedback to staff, as feedback is a powerful driver for improvement (P5, P6, P8).

4.12 Empowerment

The empowerment theme focuses on empowering staff to play a meaningful role in sustaining Lean in public hospitals. Hospitals need to allow staff to drive Lean implementations (P2, P8) because sustainable Lean implementation occurs when staff are empowered to fully participate in the initial implementation step, where a Lean healthcare culture is developed [29]. During the implementation phase, developing a Lean culture involves encouraging and empowering staff throughout the hospital as staff empowerment is a key mechanism for the sustainability of Lean interventions (P5). Staff empowerment serves as motivation for them to

perform better (P3). The staff empowerment theme is interconnected with the motivation theme to sustain Lean.

4.13 Healthy Competition

The theme of healthy competition focuses on promoting healthy competition among staff, sections and departments within hospitals (P6, P7). Competition programs should be developed to encourage staff participation in Lean continuous improvement projects and should include recognition and rewards for the winners. Rewards and recognition **systems motivate** staff to continue implementing Lean in organisations (P2, P6). The theme of healthy competition aligns with the themes of motivation and teamwork in the pursuit of Lean sustainability. Benchmarking allows staff members or teams to learn from what others are doing (P2, P7, P8). Understanding what other teams are doing helps break down silos and improves the quality of interactions between staff members or teams. Breaking down silos and fostering interactions among staff members are factors that contribute to the sustainability of Lean (P6, P9).

5 DISCUSSION

The findings showed that factors in their respective themes provide information that can assist public hospitals in sustaining Lean implementations. The themes will be presented in one picture for ease of reference and usability. The themes are grouped into the Sustainability Foundation, Concepts of Lean, People, and Organisational Culture, as shown in Figure 1. These groupings are referred to as the pillars of sustainability. Sustainability, as defined in sustainability science, involves transitioning towards solutions through the adoption of an integrated, comprehensive, adaptive, and participatory approach [27]. This study has discovered that to achieve sustainability, these pillars must be integrated into a coherent system to sustain Lean. Each pillar of sustainability will be discussed below:

Pillar 1: Sustainability Foundation. The implementation phase lays the foundation and significantly influences the sustainability of Lean implementations in public hospitals. The implementation phase is the initial step in ensuring the sustainability of Lean healthcare. Sustainability in this context refers to the extent to which Lean healthcare practices continue to function even after the implementation process has been completed [30]. The progress made through Lean improvements is the current state and the foundation for further enhancements to achieve even higher performance levels. The effectiveness and success of the implementation phase rely on following a detailed plan for implementing Lean (P1, P2). This plan is informed by first understanding the concept of Lean and organisation and subsequently aligning Lean practices with the organisation's goals and objectives (P3). People within the organisation play a crucial role in shaping the quality of the implementation phase as they drive the implementation of Lean principles. The organisational culture is transformed into a Lean culture during the implementation phase. Some of the themes from the three pillars of people, the concept of Lean, and organisational culture do not only contribute to sustainability but form part of the essential ingredients during the implementation phase.

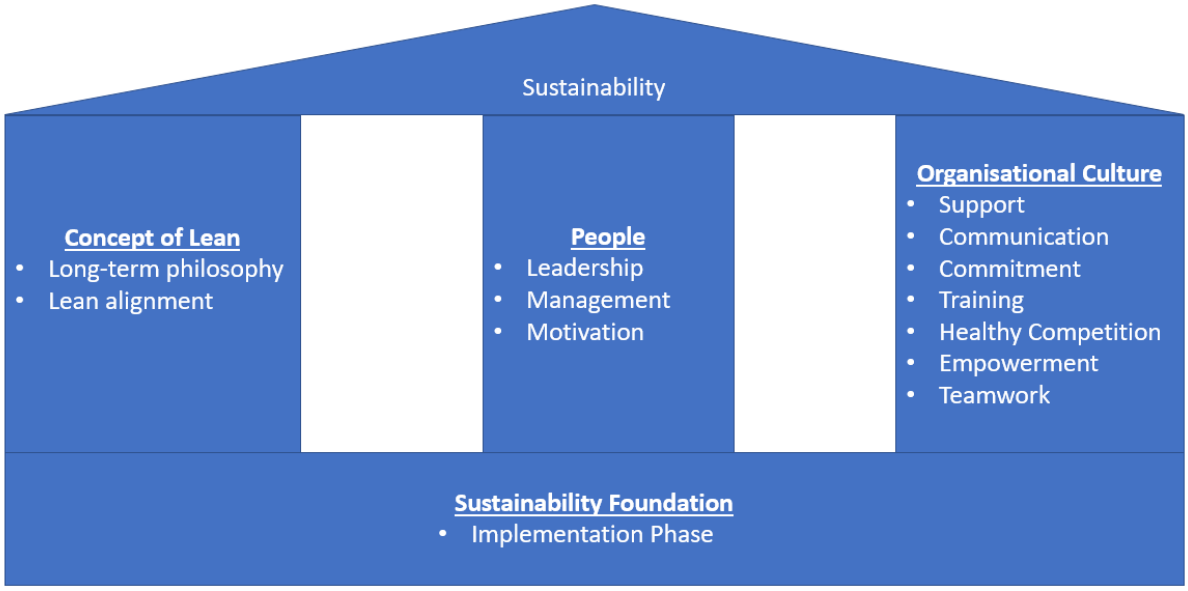

Figure 1: Illustration of the thirteen themes (created by author)

Pillar 2: Concepts of Lean. Lean alignment and the long-term philosophy are concepts of Lean that are interconnected and interdependent, but they were isolated in this study to be understood separately. Both concepts of Lean discuss the understanding and compatibility between Lean and healthcare organisations. Concepts of Lean establish the relationship between Lean and healthcare organisations, and this relationship should be established in a way that the program and people are emotionally connected [31]. Lean brings significant changes to the organisation and its culture, introducing new ways of thinking, planning, and achieving goals (P1). The long-term philosophy is not about achieving specific results at a particular time in future, but rather about the mentality and culture of continuously improving the level of performance (P1). Lean, as a philosophy, introduces a new strategic direction requiring the organisation to be prepared in advance and ready for implementation (P9). Sustainable Lean implementation requires that Lean be first understood and aligned with the organisation because technologies that do not align with the process or enable activities of the people will not lead to any progress [24]. To achieve maximum benefits in any way, there is simply no shortcut to understanding the long-term philosophy and aligning Lean with the organisation [32].

Pillar 3: People. Leadership, management, and motivation are the three people-based themes that impact the sustainability of Lean implementations in public hospitals. Leadership, management, and motivation themes are essential aspects of people's behaviour, roles, and responsibilities in achieving Lean sustainability in public hospitals. These themes highlight the importance of having competent individuals to sustain Lean initiatives. To successfully implement Lean principles, it is crucial to have skilled individuals who can perform their tasks at the right time [24]. This requires the organisation to align the skills, practices, and organisational characteristics of its employees to sustain Lean practices [24]. To achieve sustainability, an organisation must create a cohesive system that integrates people, organisational characteristics, and Lean principles in a mutually supportive manner, as noted by Liker and Morgan [24]. Drotz and Poksinska [33] emphasise that factors such as employee roles, behaviour and engagement, and leadership significantly contribute to the sustainable implementation of Lean principles.

Pillar 4: Organisational Culture. Support, communication, commitment, training, healthy competition, empowerment, and teamwork are seven organisational-based themes that affect the sustainability of Lean implementations in public hospitals and represent the characteristics of the transformed Lean organisational culture. Lean implementation brings new dimensions

to how things are done, which requires cultural changes. The establishment of a Lean culture is just as important as Lean principles, techniques, processes, and tools for successful implementation [22]. The broader sociocultural and organisational context has a significant impact on the translation of Lean from policy to practical implementation [34].

6 CONCLUSION

Factors affecting the sustainability of Lean in healthcare were explored from experienced practitioners who have been involved in Lean implementations in South African public hospitals through interviews. Factors were grouped into themes and were analysed to highlight the essence and intentionality of factors affecting sustainability. This study provided research information that South African public hospitals can use to sustain Lean implementations.

6.1 Limitations and Recommendations for Future Research

The phenomenon researched by this study is the sustainability of Lean healthcare: A practitioner's perspective. The study was limited to South African public hospitals, and there is room to expand it to include private hospitals and other healthcare centres including primary healthcare centres.

This study was limited by how much Lean has been implemented in South Africa. The spread of the Lean implementation will provide more experience and perspectives that practitioners would have about sustainability.

The study was limited to a practitioner's perspective, so there is room to include hospital staff to get first-hand information from implementers. There is also an opportunity to involve patients as beneficiaries of Lean value creation to provide their perspectives.

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Appendix 1: Interview Questions

Introductory questions

Please introduce yourself and give a short overview of your experience in Lean healthcare

- What was your role?

How many years of experience do you have in Lean healthcare?

- Do you have any Lean-specific training?

Please summarise your involvement in Lean healthcare

Research Questions

Note: Please answer according to your own experience.

1. What would be the highs and lows of your Lean healthcare involvement?
2. What is your view on Lean healthcare sustainability?
3. What would be the factors that you think positively affected the sustainability of Lean healthcare?
4. What would be the factors that you think negatively affected the sustainability of Lean healthcare?
5. What would be your advice on Lean healthcare sustainability?
6. What would be your conclusion on Lean healthcare sustainability?
7. Do you have anything more to say about the study or this interview?

Closing remarks