

Lean Leadership: A Study on Lean Leadership Attributes

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Abstract: This study aims to investigate the key attributes of lean leadership that can mitigate barriers faced during the implementation of continuous improvement in the healthcare sector, with a focus on hospitals and clinics. The research is guided by the following question: How can lean leadership attributes contribute to overcoming barriers in lean implementation for problem-solving? To address this question, a systematic literature review was conducted following the PRISMA methodology, covering 54 articles published between 2016 and 2023 in the Science Direct, Emerald, and Scopus databases. The analysis identified 16 lean leadership attributes: persuasion, communication, analytical thinking, adaptability, strategic and goal-oriented vision, continuous improvement culture, training (coaching role), organizational climate oversight, resource management, accountability and commitment, leadership model grounded in self-confidence and self-awareness, resilience, customer focus, leadership model grounded in empathy, ethics/credibility, and delegation and empowerment. Concurrently, 10 major barriers were mapped: resistance to change, organizational culture, limited resources, ineffective communication, process complexity, impatience with delayed results, lack of employee/stakeholder involvement, lack of knowledge and training, lack of planning/conflicting priorities, and lack of top management support/commitment. The attributes were organized into three categories: communication skills, behavioral skills, and decision-making skills. The barriers were grouped into behavioral, structural, and capability-related types. The relationship between these groups resulted in three key premises: (i) Behavioral barriers can be mitigated by communication and decision-making skills; (ii) Structural barriers can be addressed by behavioral and decision-making skills; and (iii) Capability-related barriers can be overcome by communication and behavioral skills. The findings emphasize that developing specific lean leadership competencies is essential to creating an organizational environment conducive to cultural change, team engagement, and the sustainability of lean practices. Ultimately, the study contributes to bridging the gap between lean theory and practice by offering actionable insights for training healthcare managers capable of leading effective transformations.

Keywords: Lean leadership, Leadership attributes, Lean barriers, lean healthcare

1. Introduction

The literature highlights that the effectiveness of lean is conditioned by its strategic integration with management and organizational leadership processes, aiming to overcome barriers and foster continuous improvement (Aij & Teunissen, 2017; Dombrowski et al., 2013). Nevertheless, studies exploring the characteristics of lean leadership (LL) and its direct relationship with obstacles faced during implementation in healthcare settings remain scarce. Identifying which leadership attributes can mitigate these barriers offers practical guidance to managers and leaders in the sector, contributing to more effective and lasting implementations.

Through a systematic literature review (SLR), 15 attributes were identified and grouped into three categories: (i) communication skills, (ii) behavioral skills, and (iii) decision-making skills. Communication skills refer to those that influence interpersonal interaction, involving the ability to transmit and receive information. Behavioral skills affect interaction through patterns of behavior, including attitudes and habits. Decision-making skills relate to the capacity and methods used to make informed decisions (Unibra, 2023; Mundo Psicólogos, 2023).

Additionally, ten main barriers were identified and organized into three categories: (i) behavioral barriers, (ii) structural barriers, and (iii) capability-related barriers. The first refers to barriers linked to individual behavior, the second to environmental or organizational conditions, and the third to individuals' technical skills (Silva, 2023; Pereira, 2023; Oliveira, 2023).

Accordingly, this research seeks to answer the following question: How can lean leadership attributes contribute to mitigating the different barriers to lean implementation in problem-solving? To address this, the study aims to identify the main LL attributes and their relationship with barriers to lean sustainability, through the validation of three premises: (i) Premise 1 – behavioral barriers can be mitigated through communication skills combined with decision-making skills; (ii) Premise 2 – structural barriers can be mitigated through behavioral skills combined with decision-making skills; (iii) Premise 3 – capability-related barriers can be mitigated through communication skills combined with behavioral skills.

2. Leadership Attributes for Mitigating Barriers to Lean Implementation

Lean leadership (LL), aligned with the principles of lean thinking, is essential for overcoming barriers in the implementation of lean healthcare (LH), ensuring that its principles are embedded as part of the organizational culture rather than merely applied as tools (Aij & Teunissen, 2017; Mann, 2009; Tortorella et al., 2019; Costa & Godinho Filho, 2016). Leaders with effective communication skills—such as clarity, active listening, and persuasion—promote team engagement and alignment with institutional goals, which are fundamental for overcoming resistance to change (Trakulsunti et al., 2021; Choo et al., 2007).

Behaviors such as empathy, resilience, and commitment strengthen team motivation and facilitate the cultural adaptation required for continuous improvement (Solaimani et al., 2019; Hihnala et al., 2018). Decision-making capacity based on data, strategic vision, and patient-centeredness enables leaders to adjust strategies to mitigate organizational, cultural, and behavioral barriers (Aij & Teunissen, 2017; Baldassarre et al., 2018).

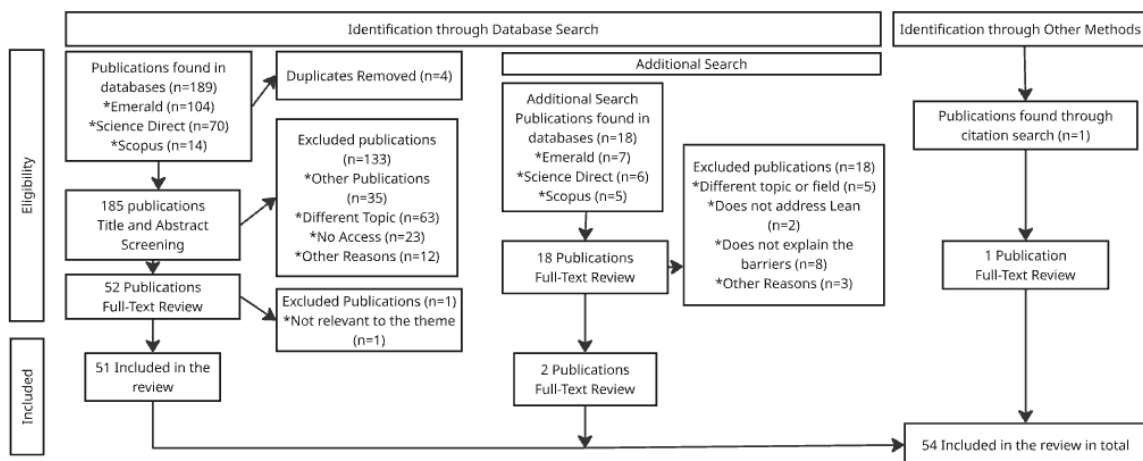
Thus, the development of these leadership attributes, combined with participative management and top management support, is essential for overcoming resistance and ensuring the sustainability of LH, fostering a culture of excellence and continuous improvement (Hallam & Contreras, 2018; Leite et al., 2020).

3. Research Methodology

The SLR is a method that uses secondary studies to analyze and synthesize the results of primary research, such as clinical trials, observational, or qualitative studies. Conducting a systematic review involves several steps, including defining the research question, searching and selecting studies, extracting and analyzing data, assessing methodological quality, and publishing the results (Galvão & Pereira, 2014).

To search for articles related to the attributes, the following query was used: “leadership and lean healthcare and empowerment and patient flow and hospital management and leadership attributes.” The search was conducted in the Science Direct, Emerald, and Scopus databases, covering the period from 2016 to 2023. This search initially returned 189 publications. Titles and abstracts were screened to verify the presence of at least two of the searched terms and relevance to the healthcare field. Book chapters, presentations, and unavailable publications were excluded. Considering only open-access articles, 51 studies were selected.

To further explore the barriers to lean implementation, an additional search was conducted using the same criteria, changing only the query to: “implementation barriers and lean leadership and lean healthcare and attributes, problem solving and hospital.” A total of 18 studies were identified, and after applying the same filters, 54 articles were analyzed, as shown in Figure 1.



Source: Authors

Figure 1: Article Selection Based on PRISMA Methodology

The analysis of the texts followed three complementary approaches: i) identification of terms directly related to attributes or barriers; ii) extraction of characteristics explicitly described by the authors; iii) interpretation of described situations that represented barriers or attributes, even if not explicitly named.

Data were organized in a spreadsheet to quantify the frequency of each barrier and attribute, accounting for multiple occurrences within a single article. Subsequently, the identified elements were grouped into three categories of attributes and three types of barriers. Based on this, three premises were formulated linking attribute categories to the mitigation of specific barriers.

To validate these relationships, a cross-analysis was conducted to measure how often attributes from a particular category were associated with their corresponding barriers.

4. Resultados

4.1 Atributos Para Implementação do LL

LH aims to optimize both care and administrative processes by eliminating waste and maximizing value for the patient (Costa & Godinho Filho, 2016; Hallam & Contreras, 2018). Its effectiveness depends on its adoption as an organizational philosophy, rather than the isolated use of tools, which often leads to implementation failure (Tortorella et al., 2019; Hihnala et al., 2018; Aij & Teunissen, 2017; Danese et al., 2018).

Table 1: Leadership attributes

	Attribute	Description	Articles
Communication Skills	Persuasion	Ability to influence and motivate the team to embrace change, resolve conflicts fairly, build trust, and foster collaboration across different areas.	1,2,3,4,5,6,7,8,10,14,15,16,17,18,19,20,21,22,24,25,26,27,29,30,31,33,34,35,38,39,40,42,43,44,45,46,48,50,51,52,53,54,56,58,59,60,61,62,64,66,67,68,69
	Communication	Skill in conveying information clearly and transparently, keeping everyone informed, actively listening, and providing constructive feedback.	1,2,3,4,5,6,7,8,10,14,15,16,17,18,19,20,21,22,23,24,25,26,27,29,30,31,33,34,35,38,39,40,42,43,44,45,46,48,50,51,52,54,56,58,59,60,61,62,63,64,66,67,68,69
	Organizational climate management	Ability to maintain a positive work environment, manage conflict and stress, value people, and promote well-being and inclusion.	1,2,3,4,5,7,14,15,16,18,19,20,21,23,24,25,27,29,30,31,33,35,38,39,40,42,43,44,45,46,50,51,52,54,56,58,59,61,62,66,68
	Resource management	Skill in efficiently using time, staff, and materials, ensuring necessary resources, prioritizing tasks, and supporting sustainability.	1,2,3,4,5,6,8,10,14,15,16,17,18,19,20,21,23,24,25,26,27,31,33,35,39,42,43,44,45,46,48,50,51,54,56,59,60,61,62,64,67
Behavioral Skills	Adaptability	Ability to adjust to changes, be flexible and resilient, and adapt strategies as new challenges arise.	1,2,3,4,5,6,7,8,10,14,15,16,17,19,21,22,23,24,25,26,27,29,30,31,33,34,35,38,39,40,42,43,44,45,46,50,51,52,54,56,58,59,60,61,62,63,64,66,67,68,69
	Continuous improvement culture	Commitment to innovation and the constant pursuit of improvement, promoting learning and efficiency at work.	1,2,3,4,5,6,7,8,10,14,15,16,17,18,19,20,21,22,23,24,25,26,27,29,30,31,33,34,35,38,39,40,42,43,44,45,46,48,50,51,52,54,56,58,59,60,61,62,63,64,66,67,68,69
	Training (coaching role)	Ability to guide, teach, and develop the team, fostering continuous learning and effective practices.	1,2,3,4,5,6,7,8,14,15,16,17,18,19,20,21,22,23,24,25,26,27,29,30,31,33,34,35,38,39,42,43,44,45,46,48,50,51,52,53,54,56,58,59,60,61,62,64,67,68,69
	Accountability and Commitment	Involves taking responsibility, maintaining ethical standards, being accountable, and being present in improvement processes.	1,2,3,5,6,7,8,10,14,15,17,19,20,22,24,25,26,27,29,30,31,33,35,39,42,43,45,48,50,51,52,54,56,59,60,61,62,63,64,68,69
	Leadership Model (Self-confidence/ Self-awareness)	Ability to know oneself, act with confidence, handle conflict, and value team contributions.	2,4,5,6,7,14,15,16,19,21,24,27,30,31,33,35,38,39,40,42,43,44,45,46,53,56,62,64,68,69
	Resilience	Ability to face challenges, remain calm under pressure, overcome obstacles, and keep the team motivated.	1,2,4,7,15,16,17,18,19,20,21,22,23,24,26,27,29,30,31,33,34,35,38,39,40,42,43,44,46,50,52,54,56,58,60,61,62,64,66,68,69
	Leadership model (empathy, ethics/ Credibility)	Demonstrates empathy, acts ethically, leads by example, and creates an environment of trust and respect.	2,3,4,7,15,16,17,18,19,20,21,23,24,25,26,27,29,30,31,33,34,35,38,39,40,42,43,44,45,46,50,52,53,54,56,59,60,62,64,66
Decis	Analytical thinking	Ability to observe, analyze data, identify problems, and make quick, evidence-based decisions.	1,2,3,4,5,6,7,8,10,14,15,16,17,18,19,20,21,22,23,24,25,26,27,29,30,31,33,34,35

Attribute	Description	Articles
		,38,39,40,42,43,44,45,46,50,51,52,54,56,59,60,61,62,63,64,67,68,69
Strategic/goal-oriented vision	Skill to set clear goals, plan long-term actions, and align efforts with the organization's objectives.	2,3,4,5,6,7,8,10,14,15,16,17,18,19,20,21,22,23,24,25,26,27,29,30,31,33,34,35,38,39,40,42,43,44,45,46,50,51,52,53,56,58,59,60,61,62,63,64,67,68,69
Customer focus	Keeping the patient at the center of decisions, always aiming to improve their experience and care.	1,3,4,5,6,7,8,10,14,15,17,18,19,21,22,23,25,26,31,34,35,39,40,42,44,46,48,51,54,59,60,61,63,67,68
Delegation	Knowing how to efficiently assign tasks, trust the team, and optimize the use of human resources.	2,4,15,16,19,21,23,24,25,27,30,31,33,34,35,38,40,42,43,44,45,46,50,56,59,60,62,64
Empowerment	Ability to make autonomous decisions and encourage the team to do the same, fostering ownership and initiative.	1,3,5,6,7,8,14,20,22,23,29,30,31,39,50,51,54,58,61,63,66,67,69

Source: Authors

In this context, leadership plays a central role in promoting engagement, alignment, and sustainability of lean practices (Choo et al., 2007; Mann, 2009). Effective leaders demonstrate commitment, active listening, clear communication, flexibility, and inspire trust. They also work directly on the gemba to facilitate cultural change and continuous improvement (Trakulsunti et al., 2021; Solaimani et al., 2019; Aij & Teunissen, 2017).

Based on the SLR, 15 leadership attributes were identified and grouped into three categories (Psicologia Online, 2023; Unibra, 2023; Mundo Psicólogos, 2023): i) Communication skills – persuasion, communication, climate and resource management; ii) Behavioral skills – adaptability, improvement culture, training, accountability, exemplary leadership, and resilience; iii) Decision-making skills – analytical and strategic vision, customer focus, delegation, and empowerment. Table 1 describes these attributes.

4.2 Barriers to Lean Implementation

Despite its benefits, lean implementation faces several barriers in hospital settings. Leite et al. (2020) highlight that these barriers can be organizational, cultural, technical, or behavioral, such as resistance to change, rigid hierarchical structures, lack of lean knowledge, and absence of a clear strategy.

Table 2: Barriers to lean implementation in healthcare settings

	Barrier	Description	Articles
Behavioral Barriers	Resistance to Change	Can arise from difficulty in abandoning established practices, fear of job loss, and complexity of organizational processes.	1,3,5,6,7,8,10,14,15,16,17,25,31,33,34,35,39,42,45,48,50,51,54,58,59,60,61,63,64,67,68,69
	Impatience with Delayed Results	Pressure for quick deliveries and a high workload make it difficult to dedicate the necessary effort to implement and sustain lean practices, compromising long-term projects.	3,14,15,17,18,25,31,33,42,50,51,59,60,61,68,69
	Lack of Employee/Stakeholder Involvement	The absence of active participation and incentives undermines team engagement and the effectiveness of lean initiatives.	1,3,5,6,8,15,24,25,31,33,34,39,50,51,54,58,59,61,68,69
	Lack of Support/Commitment from Top Management	The absence of active and committed leadership weakens lean actions, especially when external support or specialized consultancy is missing.	3,5,6,8,14,15,16,17,18,24,25,31,33,35,42,45,48,50,59,60,61,64,67,68,69
Infrastructure Barriers	Organizational culture	Rigid and innovation-resistant cultures hinder the adoption of lean principles, especially when there is little integration between departments.	1,3,5,6,7,14,15,16,17,18,24,25,31,33,35,39,42,44,45,48,50,51,54,58,59,60,61,63,64,67,68,69
	Limited resources	Bureaucracy and interdependence among areas make Lean application more difficult, requiring clarity and focus on projects.	1,3,5,6,7,8,10,14,15,16,17,18,24,25,31,33,34,35,39,42,44,45,48,50,51,54,58,59,60,61,63,64,67,68,69

	Barrier	Description	Articles
	Process complexity	Lack of time, staff, and investment prevents training and structural improvements, making it harder to consolidate lean practices.	1,3,5,6,8,14,15,17,18,25,31,33,35,39,42,45,50,51,58,59,60,61,67,68,69
Capability Barriers	Ineffective communication	Communication failures between hierarchical levels and departments cause misunderstandings and hinder the necessary alignment for lean implementation.	1,3,5,7,8,10,14,15,16,17,18,24,25,31,33,34,35,39,42,44,45,48,50,51,54,58,59,60,61,63,64,67,68,69
	Lack of Knowledge and Training	The lack of theoretical and practical training limits understanding and correct application of lean tools.	1,3,5,6,7,8,10,14,15,16,17,18,25,31,33,35,39,42,44,48,50,51,54,58,59,60,61,63,64,67,68,69
	Lack of Planning/Conflicting Priorities	The absence of a structured plan and misalignment between areas compromise the continuity of initiatives, making it difficult to sustain them in the long term.	3,5,6,7,15,16,24,25,31,33,42,50,59,61,67,68,69

Source: Authors

Baldassarre et al. (2018) and Trakulsunti et al. (2021) point out that resistance from healthcare professionals is one of the main difficulties. Other barriers include distance between units, fragmented communication, and excessive bureaucracy, especially in the public sector (Oliveira & Bye, 2020; Sales et al., 2021). Resistance from healthcare professionals remains a key challenge (Trakulsunti et al., 2021; Baldassarre et al., 2018). In the public sector, further challenges include distance between units, fragmented communication, and excessive bureaucracy (Oliveira & Bye, 2020; Sales et al., 2021).

Based on SLR, ten recurring barriers were identified and grouped by nature (Silva, 2023; Pereira, 2023; Oliveira, 2023): i) behavioral – resistance to change, impatience with results, lack of involvement and support from management; ii) infrastructure – organizational culture, complex processes, limited resources; iii) capability – ineffective communication, lack of training, and inadequate planning.

4.3 Relationships Between Attributes and Barriers

For the table analyses, two correlations were made: the first considers in how many different publications a direct or indirect relationship between attribute and barrier was found, relative to the total number of articles included in the SLR; the second is a global average to identify the most relevant attribute for each group of barriers.

4.3.1 Premise 1 – Behavioral barriers x communicative and decision-making skills

Barriers related to individual and collective behavior can be overcome by leaders who master communication and make decisions with clarity and purpose.

Table 3: Behavioral barriers x communicative and decision-making skills

Barriers Attributes	Number of times the barrier was identified:								
	Resistance to Change		Impatience with Dela. Res.		Lack of Employee/ Stak. Invol.		Lack of Top Management Support/Commit.		Overall Attribute Average
	Nº	(%)	Nº	(%)	Nº	(%)	Nº	(%)	
Persuasion	27	50,00%	15	27,78%	15	27,78%	18	33,33%	34,72%
Communication	27	50,00%	15	27,78%	15	27,78%	20	37,04%	35,65%
Organizational climate manag.	18	33,33%	12	22,22%	12	22,22%	12	22,22%	25,00%
Resource management	21	38,89%	13	24,07%	11	20,37%	17	31,48%	28,70%
Analytical vision	26	48,15%	15	27,78%	14	25,93%	19	35,19%	34,26%
Strategic/objective vision	24	44,44%	18	33,33%	13	24,07%	18	33,33%	33,80%
Customer focus	21	38,89%	13	24,07%	12	22,22%	14	25,93%	27,78%
Delegation	12	22,22%	9	16,67%	6	11,11%	10	18,52%	17,13%
Empowerment	15	27,78%	8	14,81%	11	20,37%	8	14,81%	19,44%

Source: Authors

The main attributes related to the communication skills group to mitigate behavioral barriers addressed in the literature were communication (35.65%), persuasion (34.72%), analytical vision (34.26%), and strategic/objective vision (33.80%). The most relevant for mitigating resistance to change were communication and persuasion; for impatience with delayed results: strategic/objective vision; for lack of employee/stakeholder involvement: communication and persuasion; and for lack of support/commitment from top management: communication.

4.3.2 *Premisse 2 – Structural barriers and behavioral and decision-making attributes*

Unfavorable structural conditions require leaders with proactive attitudes, systemic vision, and decision-making ability to promote improvements in the work environment.

Table 4: Infrastructure barriers x behavioral and decision-making skills

Barriers Attributes	Number of times the barrier was identified:						Overall Average
	Organizational Culture		Process Complexity		Limited Resources		
	Nº	(%)	Nº	(%)	Nº	(%)	
Adaptation	25	46,30%	27	50,00%	28	51,85%	49,38%
Continuous improvement culture	27	50,00%	29	53,70%	30	55,56%	53,09%
Training (coach)	26	48,15%	28	51,85%	28	51,85%	50,62%
Responsibility and Commitment	23	42,59%	25	46,30%	25	46,30%	45,06%
Leadership Model (Self-conf./Self-awar.)	8	14,81%	9	16,67%	9	16,67%	16,05%
Resilience	19	35,19%	19	35,19%	20	37,04%	35,80%
Leadership model (empat./ethics/credib.)	20	37,04%	20	37,04%	21	38,89%	37,65%
Analytical vision	26	48,15%	28	51,85%	30	55,56%	51,85%
Strategic/objective vision	24	44,44%	26	48,15%	28	51,85%	48,15%
Customer focus	21	38,89%	23	42,59%	25	46,30%	42,59%
Delegation	12	22,22%	12	22,22%	13	24,07%	22,84%
Empowerment	14	25,93%	16	29,63%	15	27,78%	27,78%

Source: Authors

The main attributes related to the communicative skills group for mitigating behavioral barriers addressed in the literature were continuous improvement culture (53.09%), leadership model (empathy/ethics/credibility) (51.85%), and training (coach) (50.62%). The most relevant for organizational culture were: continuous improvement culture; for process complexity: continuous improvement culture; for limited resources: continuous improvement culture and leadership model (empathy/ethics/credibility).

4.3.3 *Premisse 3 – capability barriers and communicative/behavioral attributes*

Lack of technical skills can be mitigated by leaders who communicate effectively and encourage continuous team development through example.

Table 5: Capability Barriers x Communicative and Behavioral Skills

Barriers Attributes	Number of times the barrier was identified:						Overall Attribute Average
	Ineffective Communication		Lack of Knowledge and Training		Lack of Planning / Conflicting Priorities		
	Nº	(%)	Nº	(%)	Nº	(%)	
Persuasion	30	55,56%	27	50,00%	13	24,07%	43,21%
Communication	30	55,56%	27	50,00%	13	24,07%	43,21%
Organizational climate management	20	37,04%	18	33,33%	10	18,52%	29,63%
Resource management	23	42,59%	22	40,74%	10	18,52%	33,95%
Adaptability	28	51,85%	26	48,15%	13	24,07%	41,36%
Continuous improvement culture	30	55,56%	27	50,00%	13	24,07%	43,21%

Training (coach role)	28	51,85%	25	46,30%	13	24,07%	40,74%
Responsibility and Commitment	25	46,30%	24	44,44%	9	16,67%	35,80%
Leadership Model (Self-conf./Self-awar.)	8	14,81%	5	9,26%	4	7,41%	10,49%
Resilience	20	37,04%	18	33,33%	9	16,67%	29,01%
Leadership model (empat./ethics/credib.)	21	38,89%	18	33,33%	11	20,37%	30,86%

Source: Authors

The main attributes related to the communication skills group to mitigate behavioral barriers, as identified in the literature, were communication (43.21%), persuasion (43.21%), and continuous improvement culture (43.21%). The most relevant attributes for ineffective communication are communication, persuasion, and continuous improvement culture; for lack of knowledge and training: communication, persuasion, and continuous improvement culture; and for lack of planning/conflicting priorities: communication, persuasion, continuous improvement culture, adaptation, and training (coach).

5. Discussion and Conclusion

Implementing lean in healthcare requires leadership capable of addressing diverse barriers. This study confirms that specific leadership attributes can mitigate or eliminate common obstacles to lean adoption. For behavioral barriers, key attributes include persuasion, communication, analytical thinking, and strategic vision. Infrastructure barriers are best addressed through a continuous improvement culture, role-model leadership (empathy, ethics, credibility), and coaching. Capacity-related barriers are influenced primarily by communication, persuasion, and a culture of continuous improvement.

Findings suggest that the synergistic combination of leadership attributes—not merely their individual effects—enhances the effectiveness and sustainability of lean initiatives, even when traits are not dominant. Investing in these competencies improves leaders' ability to manage implementation challenges while fostering a culture of continuous improvement and patient-centered care. The results offer practical guidance for recruiting, evaluating, and developing leadership.

Future research should empirically validate these findings by quantifying the impact of attribute development across healthcare contexts, considering both frequency and relative importance in mitigating barriers.

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