

Leaders' behavioural change throughout a hospital's lean implementation

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Abstract

This article empirically examines the relationship between leadership behaviours and the implementation level of Lean Healthcare (LH). At three points in time, with a six-month interval between each point, we surveyed and interviewed 12 leaders from a Brazilian public hospital adopting LH. Our findings indicate that leaders who actively adopt LH practices also demonstrate more task- and relations-oriented behaviours, whereas low LH adopters may drop their display of those behaviours over time. This finding parallels with Kübler-Ross's change curve that describes how an individual's confidence, morale and effectiveness levels may vary as a change process, such as LH implementation, unfolds.

Keywords: Lean healthcare, Leadership, Behavioural change.

Introduction

Studies trying to understand the determinants of the successful adoption of Lean Manufacturing (LM) practices have increased significantly over the last few years (e.g., Shah & Ward, 2003; Marodin & Saurin, 2013; Netland et al., 2015; Tortorella et al., 2015). LM has been adopted in several sectors and its implementation involves various challenges (Danese et al., 2018; Nordin et al., 2012). To succeed, the literature emphasizes the importance of an underlying LM culture, which is considered a fundamental element for its long-term sustainability (Hines et al., 2004; Bhasin & Burcher, 2006). Leaders are fundamental for establishing such a culture (Shook, 2010; Marodin & Saurin, 2015a; Alagaraja, 2014); they have the responsibility of influencing individuals and guiding them to achieve strategic and operational objectives.

According to House et al. (2004), LM implementation creates expectations regarding leaderships' behaviours. Mann (2009) reinforces that twenty percent of the effort in the lean transformation process relates to the implementation of practices and tools, while eighty percent focuses on changing leaders' behaviours, including cooperation, delegation and high motivation of personnel (Emiliani, 2003; Angelis et al., 2011; Pamfilie et al., 2012). Further evidence suggests that in order to implement a change

process successfully, such as LM, organisations need to have transformational leaders at the top (Suresh et al., 2012) who emphasise the desired behaviours toward the expected culture and outcomes, which must be carried out by leaders in middle management ranks (Emiliani, 2008; Van Dun et al., 2017). Among others, also Gelei et al. (2015) investigated which leadership behaviours contribute to successful lean implementation.

LM has been particularly widely integrated into the management of healthcare organisations over the last ten years. Lean Healthcare (LH) (Young et al., 2004; Kim et al., 2006; Graban, 2011) is a means for delivering higher quality and more efficient care (Trisolini, 2002). Therefore, to enable patients and healthcare organisations to reap the benefits from LH implementation, proper leadership behaviours must be demonstrated accordingly within the usual highly-complex healthcare context. Thus, the research question of this study is: *How do leaders' behaviours change throughout the lean implementation in a healthcare organisation?*

A longitudinal study was conducted to identify not only how leaders' behaviours change as lean practices are implemented in a healthcare organisation, but also with variations in practice adoption throughout the LH implementation journey. Our results integrate change management theory into the field of operations management.

Literature review

Lean healthcare

A challenge when describing lean implementation is that there is no consensus on how to define lean, since its principles can be expressed and understood in several different ways (Souza, 2009; Pettersen, 2009). Although Liker's (2004) and Womack et al.'s (1990) descriptions of lean have been cited frequently, they have been criticised for not paying attention to human resources in a lean organisation (Hines et al., 2004). Shah and Ward's (2007) definition does include employee involvement in problem solving, but they do not address decentralized participation in decision-making, which is also an important aspect in the healthcare context.

The difficulty in implementing LH successfully and thereby achieving long-term benefits can be further explained by the discrepancy between an organisation's strategy and the actual change (Sull, 2007). Such a strategy-to-performance gap usually occurs during LH implementation due to the primary focus on technical aspects and short-term results, rather than on developing sociocultural factors that support the change process (Kaplan et al., 2014). A more holistic change approach is thus required in order to obtain long-term improvements in the core processes (Mazzocato et al., 2010).

Establishing a LH organisation means lean practices must be part of a comprehensive management system that is supported by committed leaders (Kaplan et al., 2014; Mann, 2009; Steed, 2012). However, only a few empirical studies looked at the specific leadership behaviours that positively affect successful LH implementation (Almeida et al., 2018; Crema & Verbano, 2013; Holden, 2011). Table 1 consolidates the most frequent lean practices evidenced in the literature. As these practices have been found across different industry sectors, they may be representative of LH implementation.

Lean leaders' behaviours

As noted before, leadership is a critical variable for successful LH implementation (e.g., Young et al., 2004; Jimmerson et al., 2005; Womack et al., 2005; Souza & Pidd, 2011; Steed, 2012; Kaplan et al., 2014; Samuel & Novak-Weekly, 2014). Mann (2009) suggested that leaders are not only responsible for making strategic plans but also for guiding the actual organisational transformation towards a lean enterprise. Managers' support and commitment are also seen as key factors for enabling staff to improve their

Table 1 – Most cited lean practices

Lean practices	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	Agreement
1-Flexible manpower	X		X			X		X	X	X	X		X	X	X	67%
2-Pull system	X	X		X		X	X	X	X	X	X	X		X	X	80%
3-Takt time	X	X		X		X		X				X		X	X	53%
4-Continuous flow	X	X		X		X	X	X	X	X	X	X		X	X	80%
5-Material supply	X	X	X	X			X	X	X	X	X	X		X	X	80%
6-Zero defects	X	X			X	X	X	X	X	X				X	X	67%
7-Quality assurance	X	X	X	X				X	X	X				X	X	60%
8-Product/process quality planning	X		X	X	X			X	X	X		X		X	X	67%
9-Standardized work	X	X		X	X		X	X	X	X	X	X	X	X	X	87%
10-Production levelling	X			X	X	X	X	X	X	X	X	X		X	X	80%
11-Maintenance system	X	X		X		X	X	X	X	X	X	X		X	X	80%
12-Workplace organisation	X	X					X	X	X	X	X	X	X	X	X	73%
13-Goal oriented teams	X					X	X			X	X		X	X	X	53%
14-Cross functional work		X		X	X					X	X			X		40%
15-Problem solving methods	X		X		X	X	X	X	X	X	X	X	X	X	X	87%
16-Policy deployment			X	X		X				X	X		X	X		47%
17-Small group activities				X	X					X				X		27%

(1) Shah and Ward, 2003; (2) Doolen and Hacker, 2005; (3) Treville and Antonakis, 2006; (4) Shah and Ward, 2007; (5) Furlan et al., 2011; (6) Stone, 2012; (7) Moyano-Fuentes and Sacristán-Díaz, 2012; (8) Marodin and Saurin, 2013; (9) Stentoft and Vagn, 2013; (10) Netland and Ferdows, 2014; (11) Bhamu and Singh Sangwan, 2014; (12) Jasti and Kodali, 2015; (13) Bortolotti et al., 2015; (14) Netland et al., 2015; (15) Marodin et al., 2015.

Table 2 – Most cited lean leadership behaviours (adapted from De Almeida et al., 2018)

Behaviours	Main orientation
1-Demonstrating commitment and support	Relations
2-Showing modesty and openness	Relations
3-Acting as a role model	Relations
4-Developing and training employees	Relations
5-Empowering employees	Relations
6-Creating a learning environment	Relations
7-Celebrating and recognizing success	Relations
8-Intellectual stimulation	Relations
9-Committing to self-development	Task + Relations
10-Visiting the work floor (<i>gemba walk</i>)	Task + Relations
11-Getting and giving information	Task
12-Formulating and communicating goals and objectives	Task
13-Monitoring and evaluating	Task
14-Visibly applying lean	Task
15-Experimenting	Task

processes and obtain sustainable results (Grove et al., 2010; Crema & Verbano, 2013). But it remains unclear what such leader support may entail in a healthcare setting.

Some regard strong, charismatic relations-oriented leadership as necessary for successful LH implementation (Grove et al., 2010). At ThedaCare, for instance, the change from autocratic, task-oriented leadership to relations-oriented behaviours such as mentoring, facilitating, teaching and supporting was seen as a determining factor for their success (Toussaint & Berry, 2013). Healthcare leaders must create a shared vision that inspires followers, encourages desirable behaviours and fosters an organisation’s capacity for change (Oxtoby et al., 2002). However, LH inherently also requires leaders to focus on task improvement (Birken et al., 2012).

In order to retrieve healthcare-specific behaviours associated with an effective lean leader, we performed a systematic literature review (see for a full documentation: Tortorella et al., in press). Twenty-seven studies were selected and content-analysed. Table 2 highlights the fifteen most cited lean leadership behaviours constituting both task- and relations-oriented behaviours. Despite the growing body of knowledge on the topic, none of these studies analysed how leadership behaviours might shift throughout different stages of LH implementation. Following Liker (2004) and Liker and Meier (2006), our aim was to investigate whether people gradually start to change their behaviours and mindsets as new workplace practices are introduced.

Method

A longitudinal, mixed-methods study was conducted among ten hospital-based leaders who led the lean initiatives within their departments. The research expands upon the study of Tortorella et al. (in press) by presenting additional analyses.

Sampling

We selected individual leaders from a public hospital that had started implementing LH two years prior to this study and had collaborated with our previous research. Hence, the respondents' work context was similar, including organisational culture and hospital-wide support for LH implementation. The leaders had a middle managerial position as this is a key role for innovation in healthcare organisations (Birken et al., 2012). The final sample consisted of twelve leaders. Most respondents were nurses (33%) and 42% of them had up to five years of leadership experience. The majority (92%) were older than 30 years and led teams with more than five members (58%).

Data collection procedure

The data was personally collected from each leader at three points in time, with a six-month interval between each time. The first questionnaire was conducted in June 2017 (t_1), the second one in December 2017 (t_2) and the last in July 2018 (t_3). The printed questionnaires were completed by the leaders during individually scheduled meetings. This procedure avoided non-response bias.

We also collected qualitative data by conducting semi-structured interviews with each respondent. When building theory, augmenting quantitative data with qualitative data is usually encouraged, since it helps to check and explain results (Voss et al., 2002). The approximately thirty-minute interviews occurred at each questionnaire appointment in order to complement the information gathering.

Measures

The first part of the questionnaire collected the respondent's demographic information. The second part measured the degree of adoption of the 17 lean practices listed in Table 1 since it represents the level of LH implementation within each respondent's department. Previous studies suggest that the evaluation of pre-defined practices can be considered as an effective approach to identify the organisation's maturity level regarding lean implementation (e.g., Shah & Ward, 2007; Netland & Ferdows, 2014; Marodin et al., 2015). A five-point Likert scale was applied to each item, whereby '1' denoted no evidence of implementation and '5' referred to full implementation. The final part was a self-assessment of the respondent's task- and relations-oriented behaviours based upon the adoption frequency of the fifteen behaviours of lean leadership displayed in Table 2. The respondents indicated on a Likert scale ranging from 1 (never adopted) to 5 (always adopted), how frequently they demonstrated each behaviour. All the Cronbach's alphas were satisfactory (lean practices: 0.969; task- and relations-oriented behaviours: 0.999 and 0.809, respectively).

Data-analysis

We first clustered the data according to the adoption level of lean practices. Thus, we considered LH implementation to be a single dimension based upon the total scores of each respondent at a specific moment of data collection (t_1 , t_2 and t_3). The consolidation of a holistic set of practices into one single lean dimension is a common approach (e.g., Marodin et al., 2016). The respondent's total scores were regressed on each of the time intervals using ordinary least square (OLS) regressions, resulting in unstandardized

coefficients associated with each of the twelve respondents (see Table 3). Based upon the unstandardized coefficients' median (15.5), we determined the high lean adopter (HLA) respondents whose coefficients were greater than the median, i.e., a more pronounced growth in terms of LH practices adoption during the study. In turn, low lean adopters (LLA) were the ones whose coefficients were lower than the median and presented a slower increase in their LH practices adoption levels. We also standardized the coefficients in order to find the leaders with the strongest LH adoption, i.e., above 1.0. They showed a big leap in terms of LH practices and, hence, were denoted as extremely high lean adopters (EHLA). Five respondents were categorized as LLA, four were all grouped into as HLA and only two respondents were considered to be EHLA. One respondent was excluded from the database since the standardized coefficient value was not significant.

Table 3 – Coefficients from the OLS regression for each respondent and group identification

Respondents	Unstandardized coefficients	R ²	Standardized coefficients	Group
r ₃	1.00	0.250	-2.28	Excluded ^b
r ₂	9.50	0.986	-0.90	LLA ^a
r ₅	14.00	0.879	-0.17	
r ₆	11.00	0.989	-0.66	
r ₇	14.00	0.879	-0.17	
r ₁₂	15.00	0.871	-0.01	
r ₁	16.00	0.988	0.16	HLA ^a
r ₄	19.00	0.944	0.64	
r ₈	17.50	0.956	0.40	
r ₁₀	16.50	0.999	0.24	
r ₉	22.50	0.980	1.21	EHLA ^a
r ₁₁	24.50	0.961	1.54	

Notes: ^a Coefficients were significant at 5%. ^b Coefficient was not significant.

Subsequently, we calculated the means for the level of LH adoption as well as the task- and relations-oriented behaviours of each group of respondents (EHLA, HLA, LLA). Table 4 shows the group means at each point in time. The behaviours (dependent variables) of each group were plotted separately in a scattered graph against their respective means for LH implementation (independent variables). Based upon a curve fitting with interpolation, we verified the mathematical function that best fitted the data points in order to visualise the data (Arlinghaus, 1994; Hauser, 2009). Using Microsoft Excel, the fitted curves were extrapolated beyond the range of the inputted data in order to understand the possible trend of these behaviours better with respect to extensive LH implementation. The interview data were transcribed and content-analysed.

Table 4 – Behaviours and lean practices means according to each moment of data collection

Momen t	LLA			HLA			EHLA		
	LH adoption	Task-oriented	Relations-oriented	LH adoption	Task-oriented	Relations-oriented	LH adoption	Task-oriented	Relations-oriented
t ₁	1.64	3.07	3.27	1.72	3.54	3.50	1.18	2.67	2.67
t ₂	1.84	3.50	3.64	2.68	3.92	3.75	2.97	3.75	3.44
t ₃	3.13	4.40	4.40	3.75	4.46	4.42	3.94	4.42	4.28

Results

Figures 1 and 2 show the results of both the relations- and task-oriented behaviours within the LLA, HLA and EHLA groups. Polynomial curves were found for all three respondent groups where R² equals to 1. Using the obtained mathematical functions, we extrapolated the data in order to identify and sketch a behavioural pattern. Both relations- and task-oriented behaviours appear to have similar trends as LH implementation evolves, regardless of their group. Although HLA and EHLA show similar curves, EHLA leaders have more accentuated relations-oriented behaviours in

the long term than HLA ones. The same pattern is not observed for task-oriented behaviours. These outcomes suggest that leadership behavioural changes are actually more prominent in the long run. This result is somewhat aligned with D'Andreamatteo et al. (2015) who suggested that changing leaders' behaviours is time-consuming and cannot be significantly shifted in the short-term. The EHLA findings also support Van Dun et al.'s (2017) and Tortorella et al.'s (2017) conclusions that effective lean middle managers demonstrate relations-oriented behaviours more frequently.

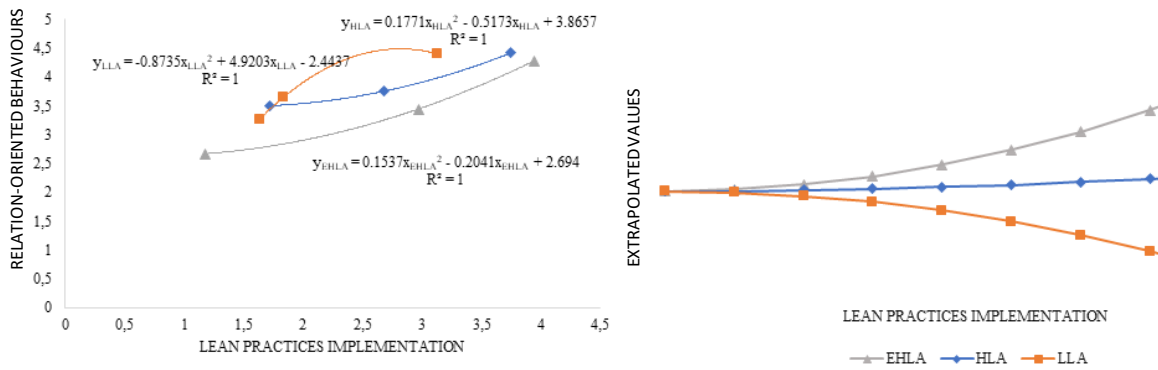


Figure 1 – Leaders' relations-oriented behaviours according to lean practices implementation

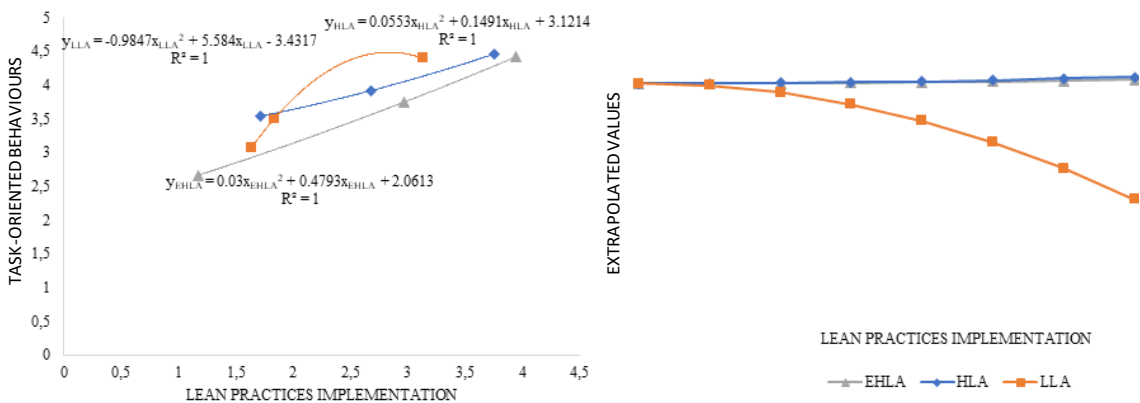


Figure 2 – Leaders' task-oriented behaviours according to lean practices implementation

Additionally, the results indicate that leaders who fully embrace LH implementation (i.e., EHLA and HLA) tend to adapt their behaviours towards both a task- and relations-orientation with more-or-less the same intensity. These leaders may be able to situationally adopt different kinds of behaviours. An explanation for such variations among the respondent groups was found in the interview data (see Table 5). The EHLA and HLA leaders indicated that their followers were really committed to LH implementation and embraced the lean culture of continuous improvement. They also argued that, as implementation advanced, they as leaders acquired new, valuable change and managerial skills. In turn, the leaders who implemented lean practices (LLA) poorly complained about the lack of senior management support during the implementation process and their difficulties in engaging their followers in continuous improvement activities. This shows the rather poor relationship between LLA leaders and their followers as well as their higher-level leaders.

Overall, our findings of the perceived leadership behaviours throughout the LH implementation show parallels between the change curve theory developed by Kübler-Ross (1969) and later enhanced by Zell (2003), Hazen (2008) and Rosenbaum et al. (2018). It is widely accepted in the change management literature that the levels of an

individual's confidence, morale and effectiveness vary as a change process unfolds (Elrod II & Tippett, 2002). Five change stages are suggested, beginning with denial and anger, moving towards bargaining for support, depression and, finally, acceptance. On the one hand, the LLA leaders' behavioural variation in our study can be associated with the denial and stages, respectively: After the initial high expectations of LH, these leaders are still struggling to accept and comprehend the behavioural requirements for a successful LH implementation. On the other hand, EHLA and HLA leaders, who are rapidly implementing LH practices, seem to overcome those initial change stages towards the acceptance stage, which gives them the confidence to explore new behaviours thereby becoming active change agents.

Table 5 – Examples of LLA, HLA and EHLA comments throughout the study

Respondent's group	t_1	t_3
LLA	<i>"I think the most important thing for lean implementation to succeed is the support, engagement and commitment of the management. In general, senior managers tend to base strategies, budgets and daily decisions solely on numbers, without developing a personal and first-hand knowledge of what goes on in the frontline."</i>	<i>"When I started implementing lean at the hospital, my first intention was to schedule some trainings so that my employees could start to implement lean practices. I soon realized that the change process in practice is very different from theory. In fact, only two of my followers actually implemented lean."</i>
HLA	<i>"Managers implementing LH will experience resistance. People feel criticized and some get angry. That is why I always try to keep the dialogue open, asking what they think the solution should be and why change causes so much trouble. I give room for criticism and objections in order to understand people's views."</i>	<i>"During LH implementation I concluded that it was impossible to improve things by myself. I needed to get everyone on the bus."</i>
EHLA	<i>"As a manager, I like to set goals and motivate my employees by emphasizing that all of them can influence the change process but have to take responsibility."</i>	<i>"To convince my employees of the benefits of LH implementation, I had to change my own mindset. In order to reduce people's resistance, I started to spend more time on the work floor and stimulated them to participate more during the improvement meetings. I realised that I needed to set the example if I wanted to engage my employees in the change process."</i>

Conclusion

This research describes the perceived behaviours of leaders over the course of one year, within a public hospital adopting LH, but our findings may apply to a wider population. Our results offer insights into the entailed changes within LH implementation, indicating that leader behaviours may (or must) shift as LH advances in maturity. In fact, our findings indicate that the effect of LH implementation on the leadership behavioural shift can be underpinned by the change curve theory (Kübler-Ross, 1969); i.e., leaders who embrace the necessary change and are positioned at the exploring or acceptance stages of the change curve are more likely to demonstrate both task- and relations-oriented behaviours. In turn, hospital's leaders who struggle with implementing lean practices could be positioned at the denial and anger stages. Over time, leaders are likely to adopt both task- and relations-oriented behaviours intensively. However, as LH implementation evolves it requires significant changes in leadership behaviours whereby effective LH leaders are likely to demonstrate more prominent relations-oriented behaviours than those who are less active in adopting LH practices.

Senior healthcare managers in organisations interested in LH transformation can use our findings to understand their middle managers' behaviours better as the implementation evolves. Furthermore, by identifying the leaders who are making smaller leaps in LH implementation, senior management can anticipate necessary countermeasures to develop and enhance their soft skills, thus enabling a smoother and less conflicting change. Additionally, our study indicates that it is necessary to have a

reasonable combination of different leadership behaviours (task and relations) to enhance the chances of a successful LH implementation; although relations-oriented behaviours seem to be more prominent in the long-term. This fact is especially important for healthcare middle managers, whose intense technical background usually lack leadership aspects that might enhance their daily-routine management.

This study's small sample size limited any sophisticated data analysis techniques to give more robust empirical evidence. Moreover, extending the data collection period would have enabled better inference about the leader behavioural changes derived from LH implementation that typically take (more) time. Therefore, future research should not only increase the number of respondents, but also improve the data collection to gather more information on both leadership behaviours and LH implementation throughout the change process. Such studies could verify the validity of our outcomes, enriching the insights into theory and practice.

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