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LEADING LEAN SIX SIGMA

Research on Leadership for Operational Excellence Deployment

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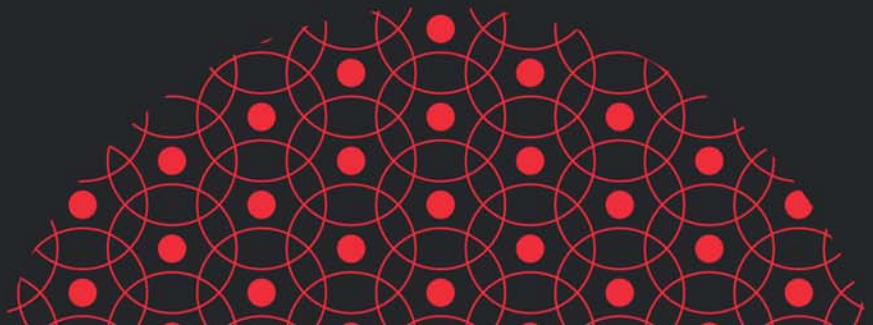

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ABOUT THE AUTHORS

Alessandro Laureani is an Operational Excellence leader, certified Lean Six Sigma Master Black Belt, Project Management Professional and Agile Practitioner, who has been active in the Lean Six Sigma field since 2005. He has led successful Operational Excellence programmes in large multinational corporations. He is also a keynote speaker and a published author in the field of Operational Excellence and continuous improvement. He earned a degree in Statistics from the University of Rome 'La Sapienza', an MBA from the UCD Michael Smurfit Graduate Business School in Dublin and a PhD from the University of Strathclyde in Glasgow. The research conducted for his PhD, on the topic of Leadership and Lean Six Sigma, forms the basis of this book.

Jiju Antony is recognized worldwide as a leader in Lean Six Sigma methodology for achieving and sustaining process excellence. He is a Professor of Quality Management and Director of Process Improvement at the School of Social Sciences at Heriot-Watt University, Edinburgh, Scotland. Professor Antony has been researching on the topic of Six Sigma and Lean Six Sigma since 2001 and published over 200 journal, conference and white papers as well as 4 books on these two topics alone with more than 23,000 citations H-index of 78, which is considered to be the highest in the world on the topic of Operational Excellence. He is the founder of the International Conference on Six Sigma and is also the founder of the International Conference on Lean Six Sigma for Higher Education. He is the Editor-in-Chief of the *International Journal of Lean Six Sigma*, Associate Editor of the *Total Quality Management & Business Excellence* journal and Associate Editor of the *TQM Journal*.

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PREFACE

Operational Excellence (OPEX) is an important business strategy for many organizations, and over the last couple of decades Lean Six Sigma has become one of the most popular and proven business process improvement methodologies (Antony, Snee, & Hoerl, 2017).

The term 'Lean Six Sigma' was first introduced in the literature in 2000 (Timans, Antony, Ahaus, & Solingen, 2012) and since then has received increased interest and grown in popularity, both in small-sized and medium-sized manufacturing businesses (Kumar, Antony, Singh, Tiwari, & Perry, 2006) and in large organizations, such as Motorola, General Electric and Honeywell (Laureani & Antony, 2012; Timans et al., 2012).

Despite its success in some organizations, others are struggling to turn Lean Six Sigma into a success, citing a lack of leadership, changing business focus, internal resistance and availability of resources as the main impeding factors (Timans et al., 2012).

Brewer and Eighme (2005) mentioned committed leadership as a necessary ingredient, among others, for the successful deployment of Lean Six Sigma in organizations and Snee (2010) identified leadership as a much needed requirement for successful Lean Six Sigma deployment that is critical for sustained improvement.

However, in the vast Lean Six Sigma literature, studies examining the impact of leadership are lacking: a lot of the literature has focussed more on the technical side of Lean Six Sigma, on its tools and techniques, leaving leadership and the cultural impact aside.

Overall, the role of effective leadership in Lean Six Sigma deployment deserves further investigation; this book is the result of research conducted to investigate the impact of organizational leadership on Lean Six Sigma deployments and hopes to extend and refine our understanding of Lean Six Sigma and leadership, identifying the traits a leader needs to display to increase the chances of successful deployment.

The book is organized into eight chapters (Table 1):

Table 1. Structure of the Book.

Chapter 1	Provides an introduction to leadership and Lean Six Sigma
Chapter 2	Illustrates the most important leadership traits identified from the research as the most conducive to a successful Lean Six Sigma deployment
Chapter 3	Examines the role of the organization leader and her/his behaviours
Chapter 4	Outlines the importance of employees' engagement and how to get everyone involved in Lean Six Sigma deployment
Chapter 5	Discusses different stages of a deployment (launch, manage, sustain) and how leadership can help in each phase
Chapter 6	Provides a guide to strategy deployment, in particular the 'Hoshin Kanri' model, and its application in the Lean Six Sigma context
Chapter 7	Covers the integration of innovation, Agile and Lean Six Sigma and how leadership can facilitate these integrations
Chapter 8	Introduces the Leadership Dependency Model from the research and discusses some of the emerging Lean Six Sigma trends in the context of leadership

We hope this book, and the research it contains, will help in developing a better understanding of how different leadership traits impact Lean Six Sigma deployment and will help to assess the dependency on leadership when embarking on a Lean Six Sigma journey.

We also hope the book can be of assistance to anyone in a leadership position, about to embark on a Lean Six Sigma deployment or in the middle of it, showing what types of traits are needed to support such deployment in a practical way, based on the organization size and industry sector. The dependency model introduced should help organizations to self-assess their preparedness for Lean Six Sigma and act accordingly to close any gap.

ACKNOWLEDGEMENTS

This book is based on research conducted, over a number of years, to fulfil the requirements for a PhD degree at the University of Strathclyde, Glasgow.

We are grateful to all the professionals in many different industries, from around the world, that have agreed to participate in this research and have given their time either by responding to the initial questionnaire or following up with in-depth interviews.

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Finally, we would like to express our gratitude to our families for their encouragement and patience as the research and the book stole countless hours away from family activities.

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INTRODUCTION TO LEADERSHIP FOR LEAN SIX SIGMA

This first chapter contains two parts: first, a brief history of Lean and Six Sigma showing the fundamental differences between the two most powerful operational excellence (OpEx) methodologies and why the integrated approach is superior to using Lean or Six Sigma alone in problem-solving contexts; in the second part, we introduce leadership as a critical success factor (CSF) for deploying and sustaining Lean Six Sigma in organizations and cover the more common leadership styles used in the literature (e.g. Servant Leadership, Transformational Leadership, Transactional, Visionary, etc.…). For each leadership style, a brief description, together with strengths and weaknesses in the context of Lean Six Sigma, is outlined, together with practical examples of success and failure.

1.1 INTRODUCTION TO LEAN SIX SIGMA

The term 'Lean Six Sigma' first appeared in 2000 as a way to describe the integration of Lean and Six Sigma philosophies (Sheridan, 2000). Lean Six Sigma is a methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed and invested capital (George, 2002).

Lean and Six Sigma have followed independent paths since the 1980s, when the terms were first hard-coded and defined:

- *Lean* is a process improvement methodology used to deliver products and services better, faster and at a lower cost. Womack and Jones (1996) defined it as 'a way to specify value, line up value-creating actions in the best sequence, conduct those activities without interruption whenever someone requests

them, and perform them more and more effectively. In short, lean thinking is lean because it provides a way to do more and more with less and less – less human effort, less human equipment, less time, and less space – while coming closer and closer to providing customers with exactly what they want'.

- *Six Sigma* is a data-driven process improvement methodology used to achieve stable and predictable process results, reducing process variation and defects. Snee (1999) defined it as 'a business strategy that seeks to identify and eliminate causes of errors or defects or failures in business processes by focusing on outputs that are critical to customers'.

While Lean addresses efficiency, doing things right the first time, Six Sigma addresses effectiveness, doing the right things for customers. The term 'Lean Six Sigma' was first introduced in the literature in 2000 (Timans, Antony, Ahaus, & Solingen, 2012) and since then has received increased interest and grown in popularity, both in small and medium-sized manufacturing businesses (Kumar, Antony, Singh, Tiwari, & Perry, 2006) and in large organizations, such as Motorola, General Electric and Honeywell (Laureani & Antony, 2012; Timans et al., 2012). Sreedharan and Raju (2016) found 45 different definitions of Lean Six Sigma in the literature, spread across many industrial sectors and countries, with most organizations referring to Lean Six Sigma as a synergy of Lean and Six Sigma techniques.

Snee (2010) defined Lean Six Sigma as 'a business strategy and methodology that increases process performance resulting in enhanced customer satisfaction and improved Bottomline results', arguing that it was not productive to debate whether Lean or Six Sigma was more applicable to solve specific issues, while focussing instead on how to combine them best to address the problem at hand.

Lean Six Sigma uses tools from both toolboxes in order to get the best of the two methodologies, increasing speed while also increasing accuracy; accordingly, literature findings from both Lean and Six Sigma are applicable to Lean Six Sigma, as the Lean Six Sigma toolbox is essentially the sum of the Lean and Six Sigma respective toolboxes. Case studies in the literature have identified a number of benefits for organizations in implementing Lean Six Sigma (Chen & Lyu, 2009; Vinodh, Kumar, & Vimal, 2012), with Albliwi, Antony, and Lim (2015) listing the following:

- Increased profits and financial savings
- Increased customer satisfaction
- Reduced cost

- Reduced cycle time
- Reduced inventory
- Improved quality
- Increased production capacity

Timans et al. (2012) suggested the following CSFs for Lean Six Sigma:

- Linking to customer
- Vision and plan statement
- Communication
- Management involvement and participation
- Personal Lean Six Sigma experience of Top Management
- Development of the project leader's soft skills and supply chain focus

The concept of Lean Six Sigma as an integrated strategy is still being developed in the literature, and many of the documented benefits and CSFs mirror the ones from Lean literature and Six Sigma literature, respectively. Since its early inception in 2000, a number of academics have developed integrated approaches (Pepper & Spedding, 2010; Snee & Hoerl, 2007; Thomas, Rowlands, Byard, & Rowland-Jones, 2008), while others have focused on a framework for successful integration of Lean and Six Sigma (Alsmadi & Khan, 2010; Bendell, 2006; Hardeman & Goethals, 2011; Salah, Rahim, & Carretero, 2010), to reap the benefits from both and apply the learning from each methodology.

Overall, there is a noticeable increase in the popularity of Lean Six Sigma in the industrial world, particularly in larger organizations in Western countries (e.g. the USA, the UK and the Netherlands) and some small and medium-sized manufacturing enterprises (SMEs) in developing countries such as India (Albliwi et al., 2015), even though the theoretical foundations are still developing (Pepper & Spedding, 2010).

1.2 INTRODUCTION TO LEADERSHIP

The importance of leadership has often been emphasized in the area of quality management. Nevertheless, little has been espoused regarding the theoretical mechanisms by which leadership and Lean Six Sigma are related.

Definitions of leadership abound in the literature: in 1991, 54 leadership experts from 38 countries agreed on a common definition of leadership as 'influencing, motivating, and enabling others to contribute toward the effectiveness and success of the organizations of which they are members' (House, Javidan, & Dorfman, 2001).

Most of the leadership literature can be organized within the five leadership theories (Kanungo, 1998; Yukl, 2006) illustrated in Table 1.1:

Table 1.1. Main Leadership Theories.

Theory	Description
Behavioural perspective identifies two clusters of leaders' behaviour: people-oriented and task-oriented (Northouse, 2004; Yukl, 2006).	Task-oriented leadership focuses on achieving goals, setting clear processes and issuing deadlines to ensure all team members remain focused on the delivery at hand, developing a structured workplace with clearly defined priorities and schedules. In contrast, people-oriented leadership focuses on building lasting relationships with employees, creating the right environment and culture for them to thrive, feel appreciated and be motivated to work at their best possible level.
Contingency perspective says effective leaders adapt their styles to the situation.	Leaders' behaviour may depend on the situation at hand (Kerr, Schriesheim, Murphy, & Stodgill, 1974), requiring a rational understanding of the situation and an appropriate response, rather than a charismatic leader with a large group of dedicated followers (Hersey & Blanchard, 1988).
Competency perspective tries to identify the traits of effective leaders.	Ilies, Gerhardt and Le (2004) suggested the following personality traits as being important for an effective leader: emotional intelligence, integrity, drive, motivation, self-confidence, intelligence and knowledge of the business.
Transformational perspective says that leaders create and communicate a vision.	Burns (1978) defined transformational leaders as agents of change, creating, communicating and modelling a vision for the team or organization, inspiring followers to follow that vision, as such a transformational leader could affect both current performances and the future development of an organization.

Source: Created by Author.

From these, we could identify ten leadership styles (Table 1.2):

Table 1.2. Main Leadership Styles.

Leadership Style	Description
Affiliative	Promotes harmony among the leader's followers and helps to resolve any conflict. An affiliative leader builds teams to make sure that their followers feel connected to each other, value people and their feelings, put less emphasis on accomplishing tasks and goals and more on the emotional needs of employees, emphasizing harmony. Typically, the followers will receive much praise from this style of leader; however, poor performance tends to go unchecked (Goleman, Boyatzis, & McKee, 2002).
Bureaucratic	Bureaucratic leaders emphasize procedures and historical methods regardless of their usefulness in changing environments, attempting to solve problems by adding layers of control, and their power comes from controlling the flow of information (Weber, 1905). This type of leadership is often observed in the Public Sector or civil Service sectors, where the State's administration is run.
Participative	Involves subordinates in goal setting, problem-solving, team building and so on, but retains the final decision-making authority (Lewin, Lippitt, & White, 1939). Two practical modes of participation are the motivational model and the exchange-based model: the first suggests that increasing the degree to which subordinates participate in decision-making may increase performance through enhanced motivation (Sashkin, 1976); the second suggests that when employees are treated well by their superiors, they are more likely to reciprocate by showing high levels of work performance (Blau, 1964).
Level 5	The Level 5 leader sits on top of a hierarchy of capabilities and builds enduring company greatness through a combination of personal humility plus professional will (Collins, 2001a). Level 5 leaders routinely credit others, external factors and good luck for their company's success, but when results are poor, they blame themselves. They also act quietly, calmly and determinedly, relying on inspired standards, not charisma, to motivate. They also select great successors for themselves, wanting their organization to be even more successful in the future (Collins, 2001b).
Servant	A servant leader acts as the steward of the resources of a business or other organization, and teaches leaders to serve others while still achieving the goals set by the business (Greenleaf, 1977). Servant leaders begin with the natural feeling of serving first, to ensure that others' 'highest priority needs are served first' (Greenleaf, 1970, p. 4).

Table 1.2. (*Continued*)

Leadership Style	Description
Six Sigma	Advocates a higher standard of leadership effectiveness through the foundational principles of Six Sigma and is a model anyone can aspire to regardless of whether the company uses Six Sigma or not (Pande, 2007). The combination of stability (balance) and responsiveness (flexibility) makes a Six Sigma leader. Rather than focussing on traits like charisma, the core of Six Sigma leadership is about practical skills and principles that can be applied to create and sustain success in organizations (Pande, 2007).
Transactional	Leader sets clear objectives and goals for followers, as well as use either punishments or rewards in order to encourage compliance with these goals (Burns, 1978). Practical application is the management by exception (Bass, 1985), along with the introduction of contingent rewards on achieving results (Goodwin, Wofford, & Whittington, 2001) to motivate followers.
Transcendent	The transcendent leader, an evolution of the servant leader, focuses on building trust within the organization and offers a more inclusive and consensual decision-making process in the organization, emphasizing the environment and sustainability impact of the business (Gardiner, 2006).
Transformational	The leader identifies necessary change, articulates a vision that is appealing, challenges assumptions, takes risks and solicits followers' ideas, creates a vision to guide the change through inspiration and executes the change with the commitment of the members of the group (Bass, 1985). It is often considered the style closest to the ideal organizational leadership needed to successfully deploy Lean Six Sigma in an organization.
Visionary	Leaders articulate where a group is going, but not how it will get there, setting people free to innovate, experiment and take calculated risks (Goleman et al., 2002). House (1977) and House and Podsakoff (1994) argued that visionary leaders exude passion and self-confidence, engage in self-sacrificial behaviour, promote a collective identity, model desirable behaviour, establish high expectations for followers and express confidence that followers can achieve them.

Source: Created by Author.

Finally, Table 1.3 summarizes the leadership traits from the literature review for each of the ten leadership styles; each style embodies a different set of traits, with some traits recurring across different styles.

Table 1.3. Leadership Traits by Leadership Styles.

Traits	5-Level	Affiliative	Bureaucratic	Participative	Servant	Six Sigma	Transactional	Transcendent	Transformational	Visionary
1. Ambitious for the organization, not themselves	X				X					
2. Approachable	X	X		X	X			X		
3. Challenge the status quo						X			X	X
4. Charisma									X	
5. Clarity	X					X	X			
6. Climate of trust		X		X				X		
7. Consensus				X	X			X		
8. Consistency	X					X				
9. Contingent reward							X			
10. Empathetic		X								X
11. Enthusiasm	X							X	X	X
12. Exchange							X			
13. Facilitating dialogue and deliberation				X		X		X		
14. Flexibility	X					X				

Table 1.3. (*Continued*)

Traits	5-Level	Affiliative	Bureaucratic	Participative	Servant	Six Sigma	Transactional	Transcendent	Transformational	Visionary
15. Global perspective						X		X		
16. Goal orientation	X					X	X			
17. High level of control			X				X			
18. Individual consideration									X	
19. Inflexible			X							
20. Inspiration									X	X
21. Integrity/ honesty	X				X			X		
22. Intellectual stimulation									X	
23. Manage by exceptions							X			
24. Micromanaging			X							
25. Open-minded						X		X		
26. Participation		X		X	X			X		X
27. Personal humility/modesty	X									