

Leadership Behaviours for Lean Six Sigma: Jordan as A Case Study

Abstract

Purpose This paper aims to identify leadership behaviours in the manufacturing sector in Jordan that enable successful Lean Six Sigma implementation.

Design/methodology/approach – Qualitative data were collected through 27 interviews to identify the leadership behaviours that facilitate Lean Six Sigma, and a focus group to categorise the aspects by grouping them into themes. A grounded theory approach was used on the filed study. The processes of constant comparisons helped in identifying the relevant aspects of leadership behaviours and integrating specific aspects into themes; these processes were iteratives. Therefore, this research project relies on the grounded theory methodology to collect and analyse the data. The researcher also used a focus group to categorise the aspects by grouping them into themes. In that, the aspects were grouped around core categories.

Findings After analysing the data, thirty-six aspects have emerged. The data analysis processes helped in discovering the aspects of leadership that support the use of Lean Six Sigma in the manufacturing sector in Jordan. The aspects were developed through an iterative process of analysis until the saturation level was reached. Eight themes that influence the successful use of Lean Six Sigma emerged: (1) Training and development; (2) Continuous improvement and development; (3) Communication; (4) Empowering employees; (5) Motivating employees; (6) Managing qualities and operations; (7) Employees engagement and involvement; and (8) Supporting culture.

Originality/ value

Scholarly studies in this field are scarce especially in developing countries, so identifying the leadership behaviours can help researchers in creating a theory of leadership behaviours for Lean Six Sigma. Furthermore, practitioners of Lean Six Sigma can take into account these behaviours as a crucial to the effective use of Lean Six Sigma. They can encourage leaders to follow and adopt these behaviours in organisations which can help in developing desirable behaviours among leaders to reaching advanced levels in using Lean Six Sigma. Thus, the Lean Six Sigma journey can become smoother by addressing the issues that face practitioners during the different phases of implementing Lean Six Sigma.

Key words

Leadership, Behaviours, Jordan, Grounded theory, Lean Six Sigma, Implementation.

Paper type

Research paper

Introduction

Lean Six Sigma mainly focuses on enhancing the quality and productivity of businesses (Singh and Rathi, 2019). The term Lean Six Sigma was introduced for the first time in the literature around 2000 (Antony *et al.*, 2012; Snee, 2010). Lean Six Sigma is “a continuous improvement methodology that aims to reduce the costs of poor quality, improve the bottom-line results and

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3 create value for both customers and shareholders” (Albliwi *et al.*, 2014, p. 1014). Applying
4 Lean and Six Sigma brings many benefits for organisations and they complete each other
5 (Salah *et al.*, 2010). However, practitioners and organisations implementing Lean Six Sigma
6 face inhibiting and impeding factors. For example, Timans *et al.* (2012) found the main
7 impeding factors: internal resistance, availability of resources, changing business focus, and
8 lack of leadership. In addition, some researchers (e.g. Pepper and Spedding, 2010; Richard,
9 2008) pointed out that Lean Six Sigma implementation in organisations usually takes a long
10 time; this is a challenge that faces top management in organisations.
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18 When organizations determine the critical success factors for Lean Six Sigma, they can
19 emphasise their activities on these factors to achieve the desired success; therefore, identifying
20 these factors is important to achieve success (Laureani and Antony, 2012, 2018). Moreover,
21 Lande *et al.*, (2016) point out the importance of understanding and using these factors to speed
22 up the implementation of Lean Six Sigma. Implementing Lean Six Sigma is needing many
23 factors to do it effectively. However, there was a great attention from researchers studying the
24 critical success factors for Lean Six Sigma, but few studies focused on the leadership
25 behaviours which plays a vital role in the successful implementation of Lean Six Sigma (Bijl
26 *et al.*, 2019). Companies must have the right leader to encourage and motivate employees and
27 create a suitable continuous improvement culture to benefit from Lean Six Sigma
28 implementation (Laureani and Antony, 2018). Leadership plays a vital role in Lean Six Sigma
29 implementation. Thereby, leadership is the main success factor for the successful Lean Six
30 Sigma implementation. Thus, this study focuses on one of the vital success factors, which is
31 leadership and studies the leadership from the behavioural lens and perspective. However, the
32 paper introduces leadership behaviours that facilitate Lean Six Sigma operations.
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Jordanian manufacturing firms are concerned about implementing and using Lean Six Sigma
in their organisations to get its benefits (Alkunsol *et al.*, 2019). Alkunsol *et al.* (2019) found a
strong relationship between Lean Six Sigma and business performance; in other words,
implementing Lean Six Sigma can improve all organisations performance in the
pharmaceutical industry in Jordan. Furthermore, Ghaleb *et al.* (2014) demonstrated that Jordan,
as a developing country, showed concern in Lean Six Sigma; the most used factors are time,
cost, and defects. Therefore, this considerable amount of publishing can be considered evidence
of the maturity of using Lean Six Sigma in the Jordan industry. Also, some of these studies,
e.g. (Al-jawazneh, 2015; Nimeh *et al.*, 2018; Shrafat and Ismail, 2019; Suifan *et al.*, 2019),
point out the Lean manufacturing and bundles used in Jordan and positively affect the industry,

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3 while others, e.g. (Alkunsol et al., 2019; Ghaleb *et al.*, 2014) prove the positive influence of
4 using Lean Six Sigma in Jordan. However, this study focuses on identifying leadership
5 behaviours from the manufacturing sector in Jordan and associated these behaviours around
6 certain themes.
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10 11 **Literature review**

12 Reviewing the existing literature revealed that leadership behaviours play a vital role in the
13 successful implementation of Lean Six Sigma. Therefore, leaders should adopt certain
14 behaviours to maintain advanced levels of Lean Six Sigma operations. For instance, Alnadi
15 and McLaughlin (2021) identified seven key aspects and leadership behaviours from the
16 literature that enable Lean Six Sigma implementation. However, although the literature shows
17 sufficient cases of successful implementations of the Lean Six Sigma, it is still that many
18 organisations face obstacles to getting the benefits of Lean Six Sigma (Noronha *et al.*, 2022).
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25 Moreover, management and leadership play a vital role in increasing productivity; the team
26 leader style and behaviour significantly affect subordinates' productivity, whereas leadership
27 style inspires and stimulates subordinates to achieve the needed performance (Naoum, 2016).
28 Also, Naoum points out the motivational factors that play a role in changing employee
29 behaviour and increasing job satisfaction, which in turn increases output. However, Hiyassat,
30 Hiyari and Sweis (2016) showed that financial incentives, trust and communication between
31 employees and management are the main factors that increase productivity.
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37 *Leadership behaviours*

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39 Leadership behaviours: what leaders do and how these behaviours influence followers and
40 predict effectiveness (Stogdill and Coons, 1957). Thus, leadership behaviour is what leaders
41 do and how they act (Northouse, 2016). As Yukl (2012) reported, over the half past century
42 (20th), thousands of studies have been conducted on leadership behaviour; a wide variety of
43 results in these studies make it hard to compare and integrate the results. Leadership has been
44 observed as an influence process between leader and followers (McCauley, 2010). This
45 influencing on process happens mainly through the leadership behaviours (Derue *et al.*, 2011),
46 which are an observable activities of the individual that can be objectively described (Bruvold,
47 1972). Leaders usually might use some tools and tactics to utilise (exert) their influence (Bass
48 and Bass, 2009).
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57 There was great attention from researchers studying the critical success factors for Lean Six
58 Sigma, but few studies focused on the leadership behaviours which play a vital role in the
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3 successful implementation of Lean Six Sigma (Bijl *et al.*, 2019). Companies must have the
4 right leader to encourage and motivate employees and create a suitable continuous
5 improvement culture to benefit from Lean Six Sigma implementation (Laureani and Antony,
6 2018).
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10 *Lean Six Sigma*

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13 Lean activities rely on a set of management practices, tools, or techniques that specifically aim
14 to improve production activities (Rotter *et al.*, 2019). *Lean management* is the necessary
15 activity to sustain and facilitate Lean manufacturing implementation (Mann, 2009). Leaders
16 that follow Lean practices through standard work provide the mechanism to sustain the change.
17 Visuals, accountability, task assignments, and leader stander work are managerial elements that
18 make a closed-loop system that creates a process focus and results in process improvement
19 (Mann, 2005).
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26 According to Hadian and Rahimifard (2019), Six Sigma is classified in both business and
27 statistical sides. On the statistical side, Six Sigma refers to having less than 3.4 defects per
28 million opportunities. On the business side, Six Sigma represents a business strategy to reduce
29 waste, reduce quality costs, improve profitability, and improve all processes to satisfy or
30 exceed the customer's needs (Hadian and Rahimifard, 2019). Despite looking at Six Sigma as
31 a technical approach to process control, the wider philosophy behind the technical and
32 statistical side of Six Sigma should be considered; thus, organisations should take care to
33 manage people properly or train employees (Pepper and Spedding, 2010).
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41 Lean Six Sigma evolved through Lean manufacturing production system integration with the
42 Six Sigma improvement approach (Drohomeretski *et al.*, 2014). This integration between Lean
43 manufacturing and Six Sigma emerged to ensure high quality, speed, to decrease cost and
44 achieve zero defects, which in turn increase customer satisfaction (Alsmadi *et al.*, 2012;
45 Pamfilie *et al.*, 2012). Moreover, these authors point out that this integration focuses on
46 removing waste by applying Lean and identifying the production process variation through Six
47 Sigma. According to Antony *et al.* (2012), this integration helps an organisation to achieve
48 better performance than applying each method in isolation.
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55 However, many studies (e.g. Aij and Teunissen, 2017; Laureani and Antony, 2017) indicate
56 that effective Lean leaders spend considerable time in communicating and problem-solving.
57 Aij and Teunissen (2017) point out that effective leaders both communicate information and
58 listen carefully to subordinates, which helps in building trust and gaining more information.
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3 According to Achanga et al. (2006), the most significant factor for successfully implementing
4 Lean practices is leadership and management commitment in SMEs. Researchers highlight the
5 link between leadership and commitment to success in quality improvement programs (Gamal
6 Aboelmaged, 2010; Martínez-Jurado and Moyano-Fuentes, 2014; Waldman *et al.*, 1998).
7 Strong leadership traits and a supportive management style are necessary to Lean success
8 (Achanga *et al.*, 2006). Effective leadership seeks to stimulate employee skills and knowledge.
9 Lean management includes a set of technical aspects; these aspects are not fully adopted unless
10 the socio-cultural aspects (organisational culture and behaviours) are addressed during Lean
11 implementation (Tortorella *et al.*, 2018). Therefore, leaders are vital to demonstrating the
12 expected behaviours to handle socio-cultural issues that may inhibit Lean management
13 implementation (Liker and Convis, 2011; Mann, 2009).
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23 However, Poksinska, Swartling and Drotz (2013) suggested that many of leadership practices
24 and behaviours displayed by Lean leaders can be categorised as transformational leadership.
25 Indeed, in the literature, there has been a connection made between transformational leadership
26 style and Lean leadership (van Assen, 2018; McLachlin, 1997; Sosik and Dionne, 1997). van
27 Elp, Roemeling and Aij (2022) confirm this view that the transformational leadership style is
28 closely linked to the successful Lean Six Sigma implementation.
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34 Tortorella, van Dun and de Almeida (2019) focused on analysing leadership behaviour
35 variation over time, either task-oriented or relation-oriented, without identifying each bundle's
36 specific behaviours. Furthermore, Camuffo and Gerli (2018) identified a group of management
37 behaviours from the literature that creates value in the Lean environment, and then conducted
38 descriptive statistics and correlation analysis to know the level of adoption of these
39 management behaviours in Lean operations. In light of that, Tortorella, van Dun and de
40 Almeida (2019) and Camuffo and Gerli (2018) did not identify new behaviours from the field
41 study; they just relied on previous literature and measured the intensity and presence of these
42 leadership behaviours. However, van Dun, Hicks and Wilderom (2017) and Aij, Visse and
43 Widdershoven (2015) used methodologies that have some limitations; in light of that, the
44 perceived result did not give explanations for the behaviours that were identified.
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53 Studies that are similar to this research project are scarce. However, a few studies have begun
54 focusing on leadership behaviours and Lean Six Sigma. For instance, Camuffo and Gerli (2018)
55 and Loh, Mohd Yusof and Lau (2019) identified a group of management behaviours from the
56 literature that creates value in Lean implementation. However, only a limited number of studies
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3 have tried to identify leadership behaviours by conducting field studies (Aij *et al.*, 2015;
4 Goodridge *et al.*, 2015; Tortorella *et al.*, 2019).

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6 However, limited studies were found in the literature that focus on leadership behaviours and
7 Lean Six Sigma. The role of leaders' behaviours have since been highlighted as critical for
8 effective Lean Six Sigma (Mann, 2009; Tortorella *et al.*, 2019; Womack and Jones, 2003).
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10 Indeed, the relationship between leadership and Lean Six Sigma has been examined in many
11 studies. The literature reveals that the successful implementation of Lean Six Sigma depends
12 on specific leadership styles (Alnadi and McLaughlin, 2020; Tortorella *et al.*, 2016) and,
13 therefore, researchers have studied leadership styles and Lean Six Sigma.
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19 However, there are some challenges that leaders still face in implementing Lean Six Sigma
20 effectively. This issue may be because leadership behaviours are still not clearly identified and
21 need more research to become a well-established discipline with some explanations.
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23 Regardless of the importance of leadership behaviours, few researchers have investigated the
24 effective leadership behaviours for Lean Six Sigma. Thus, the current study follows the first
25 studies linking leadership behaviours and Lean Six Sigma together.
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31 **Methodology**

32 This study adopted the Grounded Theory methodology and, in turn, collected and analysed
33 data according to this methodology by using the elements of: theoretical sensitivity, coding,
34 constant comparison, memo writing, theoretical sampling, and theoretical saturation. Grounded
35 theory aims to generate theory from data rather than testing hypotheses to verify prior theories
36 (Corbin and Strauss, 2015; Greener, 2008). Furthermore, grounded theory aims to elicit new
37 understandings about relationship patterns between individuals and how these relationships
38 and interactions build truth (Glaser and Strauss, 1967). However, coding is a key process and
39 element in founded theory. After collecting data, the researcher starts coding data (Bryman,
40 2016). While a researcher assigns an analytical term to a fragment of data, coding represents
41 or summarises the meaning of that data (Charmaz, 2017). The researcher use codes that
42 symbolise or summarise the meaning of data, coding can be related to data (such a line,
43 sentence or paragraph in an interview transcript) (Saunders *et al.*, 2019). Moreover, the
44 researcher uses constant comparison to create categories from the data; this includes coding
45 and analysing data simultaneously (Taylor and Bogdan, 1998). Constant comparison aims to
46 check for similarities and differences, promote consistency when coding data, and help the
47 process of analysis (Strauss and Corbin, 1998). In that, constant comparison aid in reducing
48 and grouping data and codes into meaningful categories (Moghaddam, 2006). Suddaby (2006)

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3 pointed out that grounded theory on going iterations of data collection and analysis that produce
4 several ambiguous categories that over time reduce to fewer, and become clearer conceptual
5 structures. This iterative analytic technique helps to determine if and how data are similar or
6 different from codes. The researcher decided to adopt mainly Strauss and Corbin approach,
7 which suggested two levels of coding: open coding and integration coding (Corbin and Strauss,
8 2015). Overall, open coding breaks data into units or concepts that stand for the interpreted
9 meaning of raw data. While, selective coding is integrating categories around a core category
10 to develop a grounded theory (Corbin and Strauss, 2015). Grounded theory avoids adopting a
11 priori codes from existing theory (Saunders *et al.*, 2019).

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19 **However, since this study adopts grounded theory methodology, the transferability of**
20 **research findings should consider both geographical and industry sector factors.**
21 **Geographically, findings may vary due to cultural, economic, and regulatory differences.**
22 **Industry sector factors, such as unique processes or customer demands, can also affect**
23 **the applicability of findings. It is important to assess the relevance and adaptability of**
24 **research findings to specific contexts before applying them in different geographical**
25 **locations or industry sectors. In that, the generalisation of the findings is limited due to**
26 **both geographical and industry sector factors.**

32 *1 Data collection tools*

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34 After being aware about the procedures of data analysis; this section provides an overview
35 about collecting data. The researcher has adopted three tools for collecting data, namely
36 interviews, focus groups, and observations. The following sections clarify these tools.

39 *1.1 Interviews*

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41 Since the research methodology and method for this study are grounded theory and qualitative
42 research, the **authors** used interviews as a tool for collecting data. The interviews help the
43 researcher explore points of interest and clarify and confirm meanings. In turn, the researcher
44 can get valid and reliable data relevant to research questions and objectives (Saunders *et al.*,
45 2019). Moreover, the researcher chooses this tool in order to get information from and develop
46 **understanding** about interviewee behaviours, beliefs, and experiences (Rowley, 2012). An
47 *unstructured interview (in-depth)* allows the researcher to explore deeply and open up new
48 dimensions and insights. The researcher asks participants about particular instances in their
49 organisation, in turn, the interviewee **responds** by explaining their actions and motives in a
50 specific instance (Easterby-Smith *et al.*, 2018). Therefore, the researcher can understand the
51 reasons behind specific behaviour and the underlying causes of events. The researcher uses
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3 open-ended questions, which helps in discovering the aspects of the workplace (Creswell,
4 2013).

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6 Collecting data from various industries helps in having a distribution of types of organisations;
7 in turn, the researcher did not focus specifically on one sector (Strauss and Corbin, 1998). The
8 main target was to collect rich data to discover aspects since this study is an exploratory study;
9 this helps in having an in-depth explanation about what leaders do to facilitate Lean Six Sigma
10 (Corbin and Strauss, 2015). The participants could talk as much they wanted without
11 interruption. The questions that were asked were:

- 12 • Tell me about an example (situation) when you have seen Lean Six Sigma operations
13 work well?
- 14 • Tell me about an example (situation) of when Lean Six Sigma operations have not
15 worked well?

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17 These questions were followed up with How and Why questions, to build on participants'
18 answers and to obtain clear explanations about what was happening. The participants could
19 choose which question they wanted to answer first.

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21 The researcher is aware of being unbiased while conducting the interviews, whereas the
22 researcher avoided the questioning process to influence the participants' responses. According
23 to Easterby-Smith *et al.*, (2018), open questions may avoid bias occurrence. Since the in-depth
24 interview aims to understand the underlying meaning and interpret the meaning that people
25 attach to the situation (*ibid*). The researcher should take into consideration some practical
26 issues in conducting interviews. These issues are as follow: obtaining trust, being aware of
27 social interaction, using the suitable language and attitude, getting access (permission to
28 conduct the interviews), choosing the location of the interviews, and recording interviews
29 (Easterby-Smith *et al.*, 2018). These interviews are triangulated with other tools: focus groups
30 and observations. The following sections are providing descriptions for these tools.

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1.2 Focus groups

A *focus group* is a tool used to collect data that involves a discussion between a small group of participants about a particular topic (Wilkinson, 2003). The researcher uses the focus group once the topic to be explored is accurately defined. In this tool, the role of the researcher is to facilitate the discussion among participants rather than lead the discussion (Carson *et al.*, 2001; Krueger and Casey, 2015). The main advantage of a focus group is allowing participants to hear others views, which stimulate participants to respond as the discussion develops. Using a focus group helped in that the participants refined the factors, named categories, provided data

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3 related to each category, and suggested leadership behaviours. Further benefits of using focus
4 groups are efficient since it saves time and money for obtaining data from different participants
5 (Krueger and Casey, 2015).
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8 *1.3 Observations*

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10 Since this study is exploratory concerning what leaders do and how they interact, a suitable
11 way to discover that is by listening and watching them do it. This tool involves the following
12 processes: the systematic viewing, recording, description, analysis and interpretation of people
13 behaviours in a given setting (Saunders *et al.*, 2019). *Observation* is a method of watching,
14 paying attention to, and recording activities, events, and conditions (Schensul *et al.*, 1999).
15 Observation methods can be structured observation or participant observation. *Structured*
16 *observation* is useful for gathering quantitative data that focus on the frequency of actions,
17 “what rather than why”. In comparison, *participant observation* is useful for gathering
18 qualitative data that concerns discovering the meanings that people attach to their actions
19 (Angrosino and Rosenberg, 2011). *Participant observation* involves fieldwork description of
20 behaviours, interpersonal interactions, and actions of observable human experience (Taylor,
21 2005). Observations were accomplished during the data collection and helped in data analysis
22 and drawing and interpreting the findings. The researcher used this tool to triangulate with what
23 was found from interviews. In turn, this is another way of looking at what is going on. Instead
24 of leaders talking, the researcher observes leaders interactions. The researcher is a third party
25 observer, simply observing simple manifestation. The researcher determines if that support
26 what from analysis or it is different. This valuable data may confirm the researcher’s hearing
27 or maybe open up something quite interesting.
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41 **However, the specific criteria used to select participants for interviews, focus groups, and**
42 **observations included selecting individuals who have relevant knowledge or experience**
43 **related to Lean Six Sigma implementation from different managerial levels. For example,**
44 **for the interviews, the authors followed a snowballing technique in which each**
45 **interviewee asked to identify a suitable person who can provide insight on this topic**
46 **(Towers *et al.*, 2020). The decisions made in selecting individuals for interviews, focus**
47 **groups, and observations can have a significant impact on the results. By choosing**
48 **individuals with relevant knowledge or experience, diverse perspectives, and valuable**
49 **insights, the data collected becomes more comprehensive and representative. Moreover,**
50 **these decisions will potentially affect the validity and generalizability of the results.**
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59 A simple example to explain Grounded Theory in this study context. The authors started
60 by collecting data from leaders through interviews and observations. Then, we analyze

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3 **this data by coding it and discover patterns and common concepts. Based on these**
4 **patterns and concepts, we developed themes that explains and describes the successful**
5 **implementation of Lean Six Sigma, grounded in the actual data. This is the idea behind**
6 **Grounded Theory, where the theory is developed based on real data and observations.**
7 **For illustration, in the data collection process of this study, we went to the field with no**
8 **prior theory, but rather we asked them open-ended questions (Saunders, Lewis and**
9 **Thornhill, 2019; Towers et al., 2020). The coding shown in the analysis section clarify that**
10 **interviews data were coded according into thirty-six emerging sub-themes, which were**
11 **finally abstracted to eight theoretical dimensions as shown in Figure I.**

12 *2 Rigour*

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The audio-record of the interviews was converted into text (transcripts). The researcher translated the transcripts from Arabic into English. In order to validate the translation, the researcher randomly chose thirty-five percent of the interviews and asked different translators to review the translations. This double-check of translations increases reliability. Moreover, participants' validation was used to check what the researcher collected and analysed from the interviews. Researchers in social science seek to check the quality of data collection methods and use inter-rater reliability to make judgements (Gwet, 2008). This assessment is helpful in making the analysis of qualitative data more reliable. In addition, inter-rater reliability is used to check the reliability and validity of the collected data (James *et al.*, 1984). This assessment includes re-analysis of a representative sample of the transcripts by an independent person and then comparing that person's results with the researcher's results (Gwet, 2008). Furthermore, in order to increase consistency during research stages, the researcher wrote memos to promote stability in the way data has been coded, analysed and interpreted. Three sources were used for triangulations were interviews, observations, and focus group which Triangulation helps in improving the research validity and reliability or evaluation of findings (Golafshani, 2003).

47 **Findings**

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This study aims to conduct a field study to identify leadership behaviours from the manufacturing sector in Jordan that facilitate the effective use of Lean Six Sigma. First of all, the author presents some key information about data collection and analysis. The data collection and analysis processes are divided into two main phases. The first phase regards revealing the leadership behaviour aspects that influence the use of Lean Six Sigma in Jordan, while the second phase shows the aggregation and grouping of these aspects to develop themes that were grouped by the focus group. The data are collected from nine manufacturing

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3 companies; 27 interviews were conducted to discover leadership behaviours. These interviews
4 generated the main leadership aspects; using NVivo 12 software made the analysis accurate
5 and effective. The data did not add new information or explanations for developing categories
6 or aspects. Thereby the saturation level was realised after the last three interviews; **the**
7 **saturation level refers to the point at which data collection and analysis no longer yield**
8 **new insights or information (Charmaz and Belgrave, 2018).** In-depth interviews were
9 conducted in the field study. The interviewees chose a suitable time and place for conducting
10 the interviews. The sample was chosen from all levels in organisations, namely, shop level,
11 supervisory level, and senior level. Table I shows the distribution of participants on these
12 levels. This sampling process helps in achieving a comprehensive picture from different
13 perspectives, whereby employees talk about leaders and leaders talk about themselves, which
14 produced a holistic picture and rich data. This helps in exploring different aspects of the social
15 phenomena under study (Starks *et al.*, 2007).
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28 **Insert table I here**
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30 The researcher selected organisations from the manufacturing sector in Jordan despite the size
31 of the organisations. There was diversity in the organisations' size and industry types. Some
32 organisations work in the pharmaceutical, textile, food, and electrical industry. See Table II,
33 which clarifies how many companies studied in each sector.
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38 **Insert table III here**
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40 The industries in the previous table (IV) participated in the study to provide essential data for
41 this research project. The organisations' industries mentioned in the previous table show the
42 wide variety of manufacturing companies.
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45 The researcher stopped conducting interviews after the 27th interview, where the saturation
46 level was achieved. Observations took place by recording and taking notes of important events
47 (Coghlan and Shani, 2018). The duration of interviews ranged from 30 to 65 minutes. The ice-
48 breaker was to facilitate the discussion and make the participants feel relaxed. The aspects of
49 leadership behaviours are clarified in the following sections.
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54 *1 Exploring the aspects of leadership behaviours that influence the use of Lean Six Sigma*

55 Since this study is an exploratory study, after conducting the data analysis, 36 aspects of
56 leadership behaviours were developed. The data analysis processes helped in discovering the
57 aspects of leadership that influence the use of Lean Six Sigma in the manufacturing sector in
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Jordan. The aspects were developed through an iterative process of analysis until the saturation level was reached; **the saturation level refers to the point at which data collection and analysis no longer yield new insights or information (Charmaz and Belgrave, 2018)**. The emergent aspects list shows descriptions for each aspect of leadership behaviours.

1. Obtaining ideas from employees

Leaders can conduct meetings or use a suggestion box, or ask employees to hear from them. So, employees may suggest something to improve the processes. Any worker can make a comment or speak to suggest ideas. These ideas aim to improve processes and eliminate waste. After employees present or submit ideas, the management studies them to decide if the submitted ideas are applicable or not. As well as the management studying the benefits and disadvantages of the idea, the management discusses the decision with employees.

2. Giving training on Lean Six Sigma

Organisations train employees to be competent in using Lean Six Sigma tools. Employees can gain knowledge about Lean Six Sigma philosophy and how to use specific Lean Six Sigma tools through training programmes.

3. Management support and commitment

Management shows determination for this project. Management is very committed to providing support, such as time, money, effort, and equipment. Management embraces the project in turn; management provides support to overcoming obstacles.

4. Sharing information with employees

Leaders give employees necessary information about processes' performance and update employees on any information related to operations. Leaders ensure circulation of the information among departments. Leaders can make information available to employees through Visual management, like information boards, dashboards, and Andon lights (traffic light system), which provides information to employees faster and is permanent. Each employee has to read these instructions. Management repeats the information in a different way, such as meetings and emails. Instructions might be related to processes, machine operation or maintenance.

5. Making employees feel part of the change

The processes of making employees involved in Lean Six Sigma operations and make them interested in focusing and participating in Lean Six Sigma. An important point is to make workers feel that they are a part of this implementation and change. Thus, employees become focused mainly on their work in using Lean Six Sigma philosophy.

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3 6. Conducting meetings in a short frequency
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5 During meetings with employees, leaders can discuss ideas for improvements, identify
6 problems that employees face, learn from mistakes, and share information and
7 experiences.
8
9

10 7. Review and follow up processes
11

12 Leaders are responsible for tracking the processes through the data. They review and
13 follow up tasks and analyse data and statistics related to processes control and make
14 sure that nothing could hinder the work. Also, employees should pay attention to the
15 machine's alert in the event of a mistake or bottleneck in the process.
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19 8. Taking actions to solve problems
20

21 Solving problems is one of the essential ways to improve processes and eliminate waste.
22 Leaders are responsible for discovering problems and identifying the root cause of
23 a problem. This may include developing a statement to describe the problem. Creating
24 the necessary and required solutions to addressing issues through conducting meetings,
25 coaching, and feedback. Leaders can use some techniques to solve and manage issues,
26 such as root cause analysis.
27
28
29

30 9. Giving employees financial rewards
31

32 Leaders work on motivating employees through financial reward. The presence of
33 incentives helps in having motivated employees. Leaders give financial rewards when
34 employees discover problems, provide solutions, submit useful ideas, make a good
35 performance, and efficiently use Lean Six Sigma tools.
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39 10. Raising employees' awareness about Lean Six Sigma
40

41 Employees should know and understand the benefits and importance of using Lean Six
42 Sigma, which would benefit organisational goals. They should also know and
43 understand how they can use the Lean Six Sigma in their work. In turn, leaders explain
44 the benefits of using Lean Six Sigma, which includes increasing customer satisfaction,
45 reducing time and cost, increasing productivity, and growth in revenue.
46
47
48

49 11. Employees think in a way to eliminate waste
50

51 Organisations identify the desired goals and values, such as removing waste. Leaders
52 make the employees concern in Lean Six Sigma philosophy. In turn, employees
53 understand the required behaviour. This changes employees' behaviours. For instance,
54 there is an ingrained culture among employees to discover problems and remove waste.
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58 12. Evaluating employees' competencies
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3 Having the necessary skills and ability is vital to accomplish a specific job efficiently.
4
5 The availability of competent workers increases productivity and reduces defects.
6
7 Leaders evaluate the employees' competences to know the gap between their
8 capabilities and the required competences to perform the work.
9

10
11 13. Leading employees to serve organizational goals

12 Embracing organisational goals and seeking to achieve them. Employees should be
13 committed to organisational goals by giving time and energy to a specific job. Thus,
14 employees are committed to using Lean Six Sigma. They feel that they are responsible
15 and play an important role in increasing productivity or discovering problems. So, they
16 have feelings towards the company that they are part of this company and that when
17 they do work in the right way, this would serve the company.
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22
23 14. Giving training to acquire new skills

24 Developing employees to be more competent and skilful, in turn, employees become
25 more able to perform in their work. Also, they can get a better understanding of their
26 tasks and duties. Some employees may have a few gaps in knowledge or skills; training
27 programmes fill these gaps through teaching them new skills. These skills make the
28 employees more competent in doing their work.
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32
33 15. Monitoring employees

34 Monitoring employees is to follow up on tasks that employees work on and know what
35 is going on in the workplace. Monitoring employees also enables leaders to know
36 employees' performance and watch any mistakes on the shop floor. Thus, employees
37 can improve their performance and correct mistakes. A supervisor comes to observe,
38 notice, and watch employees to ensure that the products meet the required
39 specifications.
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46 16. Visiting the shop floor

47 Leaders make a tour of the shop floor, which enables the leaders to be involved with
48 employees, solve problems, and demonstrate care and recognition.
49

50
51 17. Setting up plans that facilitate Lean Six Sigma

52 Leaders put clear objectives that the employees have to achieve; daily production plan
53 for production, plan work that shows what the team will do, and how to change the
54 process. Also, management develops strategies and sets priorities that facilitate the
55 implementation of Lean Six Sigma.
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59 18. Commendation
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3 Group of words or statements that leaders say or give to employees as a result of doing
4 something admirable or valuable, such as submitting ideas, doing something that saves
5 time or cost, or added value for customers.
6
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9 19. Accountability for the employees

10 Holding employees responsible for accomplishing something and for achieving goals
11 and job tasks. Employees should feel that each one is responsible, as well as they should
12 be aware of their obligations and that they play an important role.
13
14

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16 20. Having a good relationship with employees

17 Leaders' attitudes play a vital role. Leaders should maintain a good relationship with
18 employees by being humble with employees, by socialising, and being interested in
19 them. Showing concern for the employees' social side and providing support for them,
20 and placing great concern for employees' needs to make them feel they are part of the
21 organisation.
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25
26 21. Identifying and assigning clear responsibilities

27 Leaders delegate responsibilities to employees and set a clear responsibility for each
28 employee. This makes each employee have clear responsibilities and tasks; in turn,
29 employees can be responsible for accomplishing their work efficiently. Employees also
30 can manage specific operations and processes without necessarily being supervised.
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35 22. Developing trainers to enable training in the organisation

36 Some organisations do not have the competencies to perform training related to Lean
37 Six Sigma. Therefore, they ask an external trainer to give training or an external
38 consultant who supports this implementation. Leaders should bring in experienced
39 trainers to train some employees; this is called Training of Trainers (ToT). In turn, these
40 employees can be trainers in the future.
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44
45 23. Analyz data to do comparisons and improvements

46 The existence of real data and being committed to recording it enables leaders to
47 compare and analyse how the performance progressed and how it changed. Also,
48 leaders become knowledgeable on where to focus and what needs improvement.
49 Leaders get many benefits from this data, such as knowing employees' productivity and
50 process efficiency.
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55 24. Establishing team for standardized work

56 Having standardized work is considered as a core for continuous improvement. This
57 standardized work might include precise work sequence, standard inventory, and
58 documentation of the current process, which depends on collecting and recording data
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3 in order to make the work flow smoothly. Leaders create teams that facilitate
4 standardized work. The team members should work together to maintain the
5 standardized work in the organisation.
6
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8 25. Enabling employees to make suitable decisions
9

10 Leaders give employees authority about decision making. So leaders delegate
11 employees to take actions related to quality and reduce production waste.
12

13 26. Considering Lean Six Sigma as a new way of thinking
14

15 Leaders should not consider Lean Six Sigma as only a new initiative or a box of tools.
16 Rather, they must see Lean Six Sigma as a way of thinking that is embraced and used
17 in work, even if this work is not related to production. Lean Six Sigma becomes part of
18 their work and the work of their employees. They should also ensure that everything is
19 interconnected and directed towards a common goal, and all departments should try to
20 achieve it.
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25 27. Coaching
26

27 The activity of training employees is targeting one employee especially or a few
28 individuals. Coaching helps employees in improving their skills and performance,
29 which teaches them how to solve problems. Leaders meet with an employee to discuss
30 his/her progress and to provide and guide employees to acquire and improve their skills.
31 Leaders use examples and visual tools to support employees in different situations and
32 show the way.
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38 28. Promoting preventive machine maintenance
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40 Maintenance should be conducted regularly on machines to reduce the possibility of an
41 unexpected breakdown. In turn, machines can work continuously and efficiently.
42

43 29. Delegating power and authority
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45 Employees need the power and authority to manage activities. There should be a
46 balance between the delegated responsibilities and powers. Authority should be well
47 defined and shared. Management should not interfere with employees' authority.
48
49

50 30. Encourage learning
51

52 When employees make a mistake, management should avoid blaming or saying
53 someone did something undesirable, in order to encourage learning. Creating an
54 environment that supports learning, considering any mistake and issue as opportunity
55 for improvement.
56
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58 31. Convincing employees
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Leaders should act in a way to convince employees about change and to embrace Lean Six Sigma philosophy and tools.

32. Establishing a retention programme for qualified employees

When employees leave the business, an organisation suffers from a lack of trained and qualified employees. In turn, this turnover is considered as a potential threat of knowledge loss. In turn, leaders seek to keep qualified employees within the organisation though providing a competitive salary, personal development and growth, and recognition.

33. Put the right employee in the right place

Management changes the location of the worker from one place to another regularly until it finds the best employee to perform the work efficiently; employing each one in work according to his/her abilities. Grouping specific employees in the same team; in turn, they can work together which increases their productivity.

34. Seeking to bring new and advanced machines

Management should seek to buy advanced and smart machines that are faster, more efficient, and more reliable. Old machines are more likely to consume energy and have breakdowns.

35. Seeking to get customers' feedback

Organisations should focus on achieving customers' requirements and consider customers' opinions about products that enable organisations to enhance and improve products. Leaders identify what adds value for customers and seek to fulfil customers' needs.

36. Resolving team conflict to enhance cooperation

Some employees do not want or are unable to cooperate and work with others in an organisation. So, they want to disrupt work related to others because they are jealous or have conflicts with some employees. Leaders try to solve issues among team members to enhance cooperation.

Some of the leadership aspects are mentioned repeatedly in a large number of interviews, while some aspects appeared in a few. The aspects that appear in the following figure (I) show a list of the developed aspects that were obtained from data analysis processes. These findings reflect the factors that influence Lean Six Sigma operations in the manufacturing sector in Jordan. The researcher sorted the aspects according to the number of occurrences in data analysis by depending on NVivo software, see Figure I.

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Insert figure I here

The chart displays these factors in descending order, where each bar represents an aspect of leadership behaviour, and the height of the bar represents its frequency. By visually representing the data, the Pareto chart helps managers quickly identify the "vital few" aspects that have the greatest influence on the Lean Six Sigma. These vital aspects are: obtaining ideas from the employees, giving training on Lean Six Sigma, management support and commitment, and sharing information with employees. However, the least impactful aspects are: put the right employee in the right place, seeking to bring new and advanced machines, seeking to get customers' feedback, and resolving conflict to enhance cooperation. This would allow managers to prioritize their efforts and resources to focus on addressing the most critical aspects in achieving Lean Six Sigma implementation.

2 Second phase of data collection and analysis

2.1 Emerged themes

The researcher used a focus group to categorise the aspects by grouping them into themes. In that, the aspects were grouped around core categories. The processes of data collection and analysis generated fundamental themes that facilitate the use of Lean Six Sigma in the manufacturing sector in Jordan. The following table (VVIVII) highlights participants' characteristics, i.e. those who took part in the focus group workshop.

Insert table VIIIIXX here

The researcher provided the aspects with descriptions to the participants, in paper format. The aspects were also presented through a data projector to facilitate grouping them into themes. The participants started by reading the list of aspects and their descriptions and agreed that there were three themes **but at the end of the workshop the number of themes reached eight**. Next, they started to categorise the aspects into the three themes, having a quick discussion about which aspect belonged to which theme. Participants started reviewing each aspect to ensure it was related, or not, to that theme. They tried to ensure a high level of agreement between them. Participants in the focus group gave descriptions for each theme, and these clarified the reason for grouping some aspects into a specific theme. The descriptions also gave a clue why these aspects were relevant to that theme. Participants described *Training and Development* as "the process of making employees competent in using Lean Six Sigma and able to conduct their work efficiently." Moreover, participants agreed about the description

1
2
3 for the *Continuous improvement and development* theme. It is described as “management
4 should continuously improve processes and develop operations in the organisation and shop
5 floor and consider employees’ ideas to provide the best value for customers.” Furthermore,
6 participants described the *Communication* theme as an “essential theme to exchange
7 information between management and employees from all levels that aims to improve work
8 and convey information to conduct work efficiently.” *Empowering employees* is described by
9 participants as “enabling employees by giving the necessary power and supporting employees
10 by making information and resources available for them.” Moreover, *Motivating employees* is
11 described as “providing incentives to stimulate employees, making them efficient in their work
12 and using Lean Six Sigma effectively.” *Managing quality and operations* are described as a
13 “Group of activities that leaders and employees should do to manage quality aspects that
14 directly or indirectly related to LSS activities and operations efficiency such as solving
15 problems.” *Employees’ engagement and involvement* was described as “making the employees
16 loyal to the organisation by making them feel they are part of the organisation and project.”
17 Finally, participants described *Supporting culture* as “organisational beliefs and attitudes that
18 should support and encourage learning and seeking improvements.” These descriptions present
19 the participants’ perspective about the evolved themes. Figure XI shows the themes that have
20 emerged and evolved from participants’ discussions through the focus group.
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36 **Insert figure XII here**
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39 Eight themes were evolved from aggregating the aspects of leadership by the focus group
40 workshop. **These themes considered higher-level concepts (categories).** These themes are
41 the pillar to use Lean Six Sigma successfully. Participants provided descriptions for each theme
42 from their perspective. After developing themes, it is worth to know how these themes
43 influence Lean Six Sigma effectively.
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49 **Discussion**

50 The field study conducted through interviews showed that the top four aspects **of leadership**
51 **behaviours that got high number of occurrences. The aspects refer to the lower-level**
52 **concepts (sub-categories). These aspects** that facilitate the effective use of Lean Six Sigma
53 are:
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56

- 57 • Obtaining ideas from employees
- 58 • Giving training on Lean Six Sigma
- 59
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- Management support and commitment
- Sharing information with employees

These aspects play a crucial role in facilitating the use of Lean Six Sigma in the manufacturing sector in Jordan. The findings that are revealed indicate that leadership behaviours influence Lean Six Sigma operations. All of these factors play a key role with essential support from leaders to leverage the Lean Six Sigma operations. These findings give new insights into the power of some factors in influencing the successful use of Lean Six Sigma in the manufacturing sector in Jordan. **The factors that got a high number of occurrence in data analysis provide new insights into Lean Six Sigma implementation by highlighting the importance of leadership behaviours in driving change, the power of employee engagement in obtaining ideas and driving improvement, the significance of proper training in equipping employees with the necessary skills, the role of effective communication in ensuring understanding and alignment, and the value of a continuous improvement culture in sustaining Lean Six Sigma practices. These insights help organizations understand the key factors that contribute to a successful implementation. When organizations combine Lean and Six Sigma principles with proper training, a culture of continuous improvement, effective communication, empowered employees, engaged employees, supportive culture, and motivated employees they can achieve optimal results for Lean Six Sigma. The findings suggest that these themes work together synergistically, creating a powerful foundation for successful Lean Six Sigma implementation. By focusing on these interconnected elements, organizations can drive process efficiency, improve quality, and enhance overall performance.** Some aspects of leadership behaviours are less frequent than others; thereby, there are less important aspects that leaders might not give high attention to them. This may help organisations face challenges in using Lean Six Sigma; practitioners can be aware of these significant factors and pay great attention to them. These four aspects are also mentioned in previous studies, so they are consistent with those studies. First of all, “Obtaining ideas” appeared dominant among the aspects that most influenced the use of Lean Six Sigma. This result indicates the importance of “Obtaining ideas” for the effective use of Lean Six Sigma. Kaizen approach (continuous improvement) relies on ideas that convey improvements. Employees are more familiar with processes than managers because employees work every day on the same process. So it is the leaders’ responsibility to ask and seek to get ideas from workers at the operational level. Obtaining feedback and ideas as well is mentioned and described in the literature. Obtaining feedback and ideas, from

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2
3 employees to managers, plays an important role in facilitating Lean Six Sigma implementation.
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5 Receiving and giving information that conveys ideas help leaders to know what is happening
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7 in processes, the issues that occur, and obtain suggestions for improvements (Bijl *et al.*, 2019;
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9 Hwang *et al.*, 2014; Laureani and Antony, 2017; Loh *et al.*, 2019; Nogueira *et al.*, 2018; Toledo
10
11 *et al.*, 2019).

12 During the interviews, participants also intensively highlighted *giving training*. This indicates
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14 the vital role for training in realising the benefits of Lean Six Sigma. Giving training was also
15
16 highlighted highly in the literature. Training employees is essential to increase their awareness
17
18 about Lean Six Sigma philosophy and tools (Assarlind *et al.*, 2013; Henderson and Evans,
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20 2000). In addition, widespread training in organisations has been observed as an instrument for
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22 involving the employees in improvement initiatives (Laureani and Antony, 2017). Likewise,
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24 *management support and commitment* were emphasised as an aspect that influences Lean Six
25
26 Sigma. This indicates that management should be committed to providing support such as time,
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28 money, effort, and equipment. Management embraces the project and, in turn, they welcome
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30 any new ideas and insist on overcoming obstacles. A significant number of studies outline the
31
32 importance of top management support and commitment, whereas leaders demonstrate
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34 commitment and support for Lean implementation, and they feel they are accountable to do
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36 their best (Aij *et al.*, 2013; Goodridge *et al.*, 2015; Laureani and Antony, 2017; Maijala *et al.*,
37
38 2018; Poksinska *et al.*, 2013).

39 Finally, in this study of the manufacturing sector in Jordan, data-gathering indicated that
40
41 *sharing information* plays a vital role in the successful use of Lean Six Sigma. Leaders give
42
43 employees the necessary information about processes' performance and update employees with
44
45 any information related to operations. Leaders circulate to find information among
46
47 departments. Aij and Teunissen (2017) point out that effective leaders both communicate
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49 information and listen carefully to subordinates, which help in building trust and gaining more
50
51 information. Sharing information can take several forms, such as visual tools through use of
52
53 whiteboards and dashboards to display information using simple charts (Hung *et al.*, 2015;
54
55 Poksinska *et al.*, 2013). Sharing information makes the information available for the shop floor
56
57 employees and provides on-time feedback on process performance (Poksinska *et al.*, 2013).

58 Overall, as can be seen, the top four aspects share two main elements: developing employees
59
60 and communication. The results indicate the importance of these two themes that practitioners
should focus on. However, leaders' attitudes play a vital role. Leaders should maintain a good
relationship with employees by being humble with employees, socialising, and being interested
in their needs. Showing concern for employees' social side, providing support for them, and

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3 putting great concern for employees' needs to make them feel they are part of the organisation
4 are essential for Lean Six Sigma. The importance of leaders' attitudes is deduced from this
5 aspect "having a good relationship with employees". Taking the field study and the literature
6 together shows that there is a similarity between the study findings and the literature that studies
7 Lean Six Sigma implementation. Moreover, the findings of this research project corroborate
8 the results of several other studies. These findings can help organisations in the manufacturing
9 sector in developing countries pay attention to these aspects in the future to ensure the effective
10 use of Lean Six Sigma.
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12
13 However, this inductive process explored eight themes that were socially constructed based on
14 participants' perspectives, which facilitate effective use of Lean Six Sigma in the
15 manufacturing sector in Jordan. These themes do not stand alone; there are interdependent and
16 interconnection between them. The themes descriptions showed that there is clear
17 interconnection among these themes. The themes that were associated with high number of
18 aspects are *Training and development*, *Continuous improvement and development*, and
19 *Managing qualities and operations*. These themes were the most targeted themes from
20 leadership behaviours aspects; seven of the leadership behaviours aspects were associated with
21 these themes. This would indicate the importance of these themes in supporting Lean Six Sigma
22 and signify that most of the leaders' behaviours focus on these three themes.
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35 **Conclusion**

36 Leadership has been highlighted as a key success factor for Lean Six Sigma implementation
37 (Laureani and Antony, 2018), and this study investigated the leadership behaviours that
38 facilitate Lean Six Sigma implementation. Since leadership has been identified as a key success
39 factor for Lean Six Sigma operations, our study investigates leadership from the behavioural
40 perspective. The researchers adopted grounded theory methodology. Twenty-seven interviews
41 were conducted; thirty-seven aspects emerged from the analysis. These aspects facilitate the
42 successful use of Lean Six Sigma. Then, a focus group was conducted to grouping aspects into
43 themes. As a result of that, eight main themes have emerged namely: Training and
44 development; Continuous improvement and development; Communication; Empowering
45 employees; Motivating employees; Managing qualities and operations; Employees
46 engagement and involvement; Supporting culture. These themes influence Lean Six Sigma
47 operations that emerged from participants' perspectives.
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57 *Practical Implications*

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3 This study provides managerial implications for companies interested in implementing Lean
4 Six Sigma into their operations. Such organisations are encouraged take into account these
5 behaviours as to ensure effective use of Lean Six Sigma. This study encourages businesses to
6 follow and adopt these behaviours in organisations which can help in developing desirable
7 behaviours among leaders to reaching advanced levels in using Lean Six Sigma. Moreover,
8 practitioners can develop training programs for developing leaders. Thus, the Lean Six Sigma
9 journey can become smoother by addressing the issues that face practitioners during the
10 different phases of implementing Lean Six Sigma.
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18 In that respect, the practical implication of this research is to describe the practices that the
19 leadership of organisations must develop to maintain high levels of Lean Six Sigma
20 deployment. Leaders can adjust their behaviours and know the behaviours that need to be
21 developed among leaders that would facilitate Lean Six Sigma. **However, to promote**
22 ***obtaining ideas from employees*, managers can create an open and inclusive environment**
23 **where employees feel comfortable sharing their ideas. They can actively listen, provide**
24 **feedback, recognize and reward contributions, and implement ideas whenever feasible.**
25 **Obtaining ideas from employees on a practical level means actively seeking input,**
26 **suggestions, and innovative solutions from them. Leaders can achieve this by encouraging**
27 **open communication, conducting regular brainstorming sessions, implementing**
28 **suggestion boxes or digital platforms for idea submission, and recognizing and valuing**
29 **employee contributions. Moreover, to support and encourage *giving training on Lean Six***
30 ***Sigma*, managers can provide resources and funding for training programs, communicate**
31 **the importance of Lean Six Sigma to employees, and lead by example by participating in**
32 **training themselves. They can also create opportunities for employees to apply their**
33 **training knowledge and provide ongoing support and feedback throughout the learning**
34 **process. On a practical level, managers can achieve this by partnering with training**
35 **providers, organizing workshops or seminars, and incorporating Lean Six Sigma training**
36 **into employee development plans. They can also establish a system for tracking training**
37 **progress, provide time and resources for employees to attend training sessions, and create**
38 **a supportive environment that encourages the application of Lean Six Sigma principles**
39 **in daily work.**
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56 **Moreover, managers in Jordanian firms can promote and reinforce management support**
57 **and commitment by openly communicating their dedication to Lean Six Sigma, setting**
58 **clear expectations, and actively participating in Lean Six Sigma initiatives. They can**
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3 provide resources, remove obstacles, recognize and reward employees' efforts, and
4 consistently demonstrate their commitment to continuous improvement. This helps
5 create a culture of support and encourages employees to embrace Lean Six Sigma
6 principles in the manufacturing sector in Jordan. On a practical level, managers can
7 achieve this by regularly communicating the importance of management support and
8 commitment to Lean Six Sigma. They can actively participate in improvement projects,
9 provide resources and training, and establish clear expectations for employees.
10 Recognizing and rewarding employees' efforts and consistently demonstrating their own
11 commitment will help reinforce the importance of Lean Six Sigma in the organization.
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19 Furthermore, managers play a crucial role in promoting and reinforcing information
20 sharing with employees. They can ensure that relevant data, metrics, and performance
21 indicators are communicated effectively to employees. This can be done through visual
22 management tools, such as dashboards or scorecards, that provide real-time updates on
23 key process measures. Managers should also encourage regular team huddles or stand-
24 up meetings to discuss progress, challenges, and improvement opportunities. By sharing
25 information transparently, managers enable employees to make data-driven decisions
26 and actively participate in the improvement process. To achieve effective information
27 sharing in practice, managers can implement various strategies. They can use visual
28 communication tools like charts, graphs, and dashboards to present data in a clear and
29 accessible manner. Regular team meetings or huddles can be scheduled to discuss
30 updates, challenges, and improvement ideas. Additionally, managers can encourage open
31 dialogue, create a safe space for sharing ideas, and provide training on effective
32 communication techniques. By incorporating these practical approaches, managers in the
33 Jordanian manufacturing sector can promote a culture of information sharing and
34 collaboration within the organization.
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47 *Limitations and Future Research*

48 There are some research limitations to this study which opens avenues for future research. First,
49 data was collected through qualitative methods which limits the generalizability of the results.
50 **The transferability of research findings should consider both geographical and industry**
51 **sector factors.** Future studies are needed in order to generalize the results to the wider business
52 community. Second, data was collected only from the manufacturing organizations and did not
53 consider other sectors. Future researchers are urged to replicate the study in other sectors.
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3 Third, our study considered only Jordanian firms; therefore, we call upon further research to
4 investigate other national settings which may have different business cultures.
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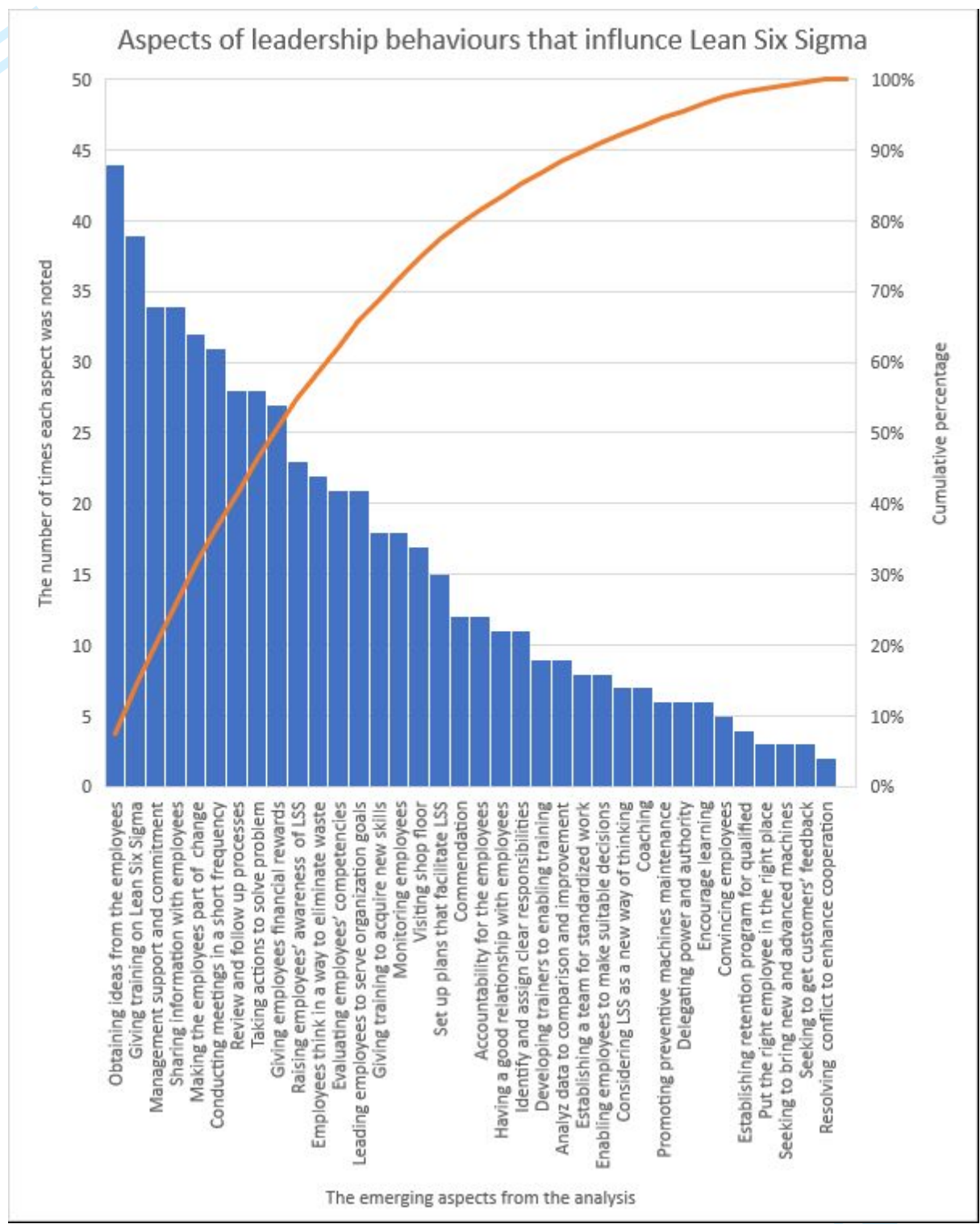
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Figure I Aspects of leadership behaviours that influence Lean Six Sigma



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Figure II The developed themes of leadership behaviours



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Table I Administrative level of the participants

Participants' Position	Number of participants
Senior level	6
Supervisory (manager) level	12
Employees on shop floor level	9

Table II Manufacturing sectors that participate in the study

Number of companies from each industry	Industry
1	Pharmaceutical industry
3	Textile industry
3	Food industry
2	Electrical industry

Table IIIIVV Participants' characteristics in the focus group

Participant number	Industry	Years of experience	Job title
1	Textile industry	8	Lean Manufacturing Coordinator
2	Textile industry	12	Operations Manager
3	Textile industry	5	Team leader
4	Textile industry	7	Shop floor supervisor
5	Textile industry	10	Shop floor employee