A South African Ubuntu analogy of Lean philosophy

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“The noblest pleasure is the joy of understanding”

-Leonardo Da Vinci

ABSTRACT

Lean philosophy has become a global phenomenon in recent years due to its organisational benefits. However, as organisations in many countries attempt to implement Lean, it has been noted that there are several implementation problems and failures. Conversely, literature states that the reason for Lean success in Japan lies in the fact that Lean is deeply rooted in Japanese culture. Similarly, Ubuntu is a philosophy that is deeply rooted in the South African culture.

This study addresses the lack of understanding of the Lean management principles in the South African context, which attributes to poor buy-in during Lean implementation. In order to accomplish this, the aim is to utilise the Ubuntu management philosophy to develop a South African analogy of the Japanese Lean principles.

The research followed the elaborated action design research (eADR) methodology, utilising the problem diagnosing and concept design stages prescribed by this. A case study that followed following the Design, Measure, Analyse, Design, Verify (DMADV) method was employed to investigate the lack of understanding of the Lean management principles in South Africa. During the problem diagnosing stage, a gap analysis (case study) revealed multiple misunderstood Lean principles within a Lean organisation, resulting in a lack of understanding.

The concept design stage made use of a systematic literature review (SLR) to establish the correlations and variations between Lean management principles and Ubuntu management principles. Lean and Ubuntu share a considerable number of similarities and it was noted that Lean has several principles that did not, however, have a corresponding Ubuntu principle.

The results obtained from the SLR were utilized to develop an analogy (Literature-based framework), which was verified and validated via surveys with South African Lean experts. The similarities in the analogy could assist in “translating” Lean concepts to a South African context, thereby improving understanding of the Lean principles and possibly contributing to more successful Lean implementations.

Key words

Lean management philosophy, Ubuntu management philosophy, GAP Analysis, DMADV, Systematic Literature Review, elaborated Action Design Research, Lean Analogy

PREFACE

This dissertation was compiled and presented in article format in accordance with the academic rules of the North-West University (Approved on 21 September 2017 with revisions in 20 June 2019).

Rule A.4.10.5 states:

> *"Where a candidate is allowed to submit the research product in the form of a research article or articles, such research product must be presented for examination purposes as an integrated unit, supplemented with a problem statement, an introduction and a synoptic conclusion as prescribed by faculty rules and the manuscript submission guidelines, or the url link to the manuscript guidelines, of the journal or journals concerned. "*

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> *"Where any research article or internationally examined patent to which the candidate for a master's degree and other authors or inventors have contributed is submitted as the research product of a master's degree programme, the candidate must obtain a written statement from each co-author and co-inventor in which it is stated that such co-author or co-inventor grants permission for the research product to be used for the stated purpose, and in which it is further indicated what each co-author's or co-inventor's academic contribution to the research product concerned was."*

Rule A.4.10.9 states:

> *"Where co-authors or co-inventors as contemplated in rule 4.10.8 were involved in the development of the research product, the candidate must mention this fact in the preface, and must include the statement of each co-author or co-inventor immediately following the preface to the research product."*

The following research paper has been published during the course of this research study:

- M. Mangaroo-Pillay, R.Coetzee and E.Davies, "Investigating the root causes of long lead times in the automotive aftersales industry by mean of the Lean philosophy: A South African case study." *SAIIE neXXXt conference proceedings* Pp 131-146

The following research paper has been submitted to the *International Journal of Lean Six Sigma* during the course of this research study:

- M. Mangaroo-Pillay and R.Coetzee, "A Systematic Literature Review (SLR) comparing Japanese Lean Philosophy and the South African Ubuntu."

LAY-OUT, NUMBERING AND REFERENCING

The two research papers that form part of this dissertation are composed according to the prescribed journal's author guidelines. Therefore, the appearance, page numbers and format of chapters 4 and 5 differ from the rest of the dissertation. Furthermore, the reference lists for these research paper chapters are displayed at the end of the chapters themselves (as opposed to the end of the dissertation).

STATEMENT OF CO-AUTHORS

To whom it may concern,

The listed co-authors hereby give consent that **Mia Mangaroo-Pillay** may submit the manuscript(s) as part of her thesis titled, **"A South African Ubuntu analogy of Lean philosophy"** for the degree Master of Engineering in Industrial Engineering, at the North-West University (NWU):

(This letter of consent complies with rules **A.4.10.8** and **A.4.10.9** of the academic rules, as stipulated by the North-West University)

Dr Rojanette Coetzee	24/10/2019	Potchefstroom
	Date	Signed at
Dr Edward Davies	24/10/2019	Hatfield, Pretoria
	Date	Signed at

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CHAPTER 1

Introduction to the research

This chapter discusses the research problem and goal of the study.

1.1. Background / Rationale

Lean is a management philosophy that is used to eradicate waste, which was developed in Japan in the 1930s (Holweg, 2007). Since then, the Lean philosophy has become a global phenomenon, due to its organisational benefits, such as continuous improvement. Lean provides organisations with multiple tools and quality improvement methods that were popularised in the manufacturing world (Coetzee, 2018), but have since transitioned into other industries due to its versatility.

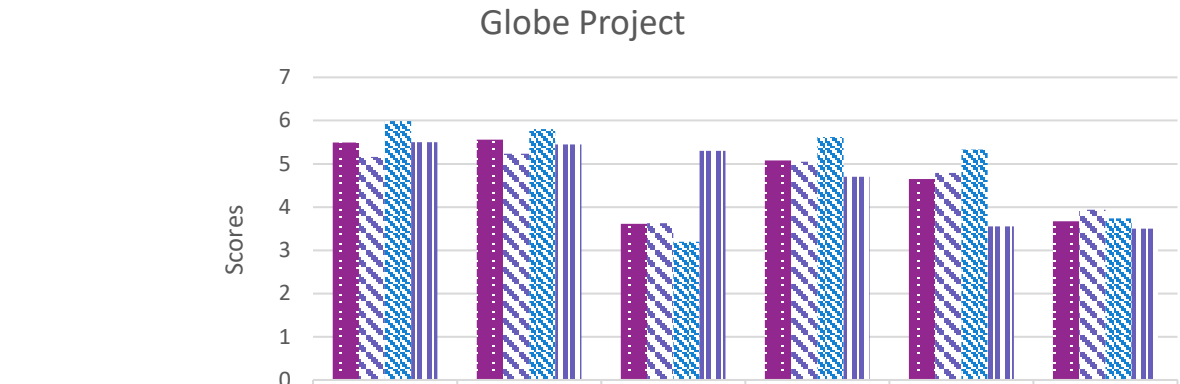
However, given that various industries and countries are implementing Lean, it has been noted that there are several implementation problems and failures (Amer & Shaw, 2014). As a consequence, Lean implementation success factors have been investigated by various researchers (Achanga *et al.*, 2006; Amer & Shaw, 2014; Fadly Habidin & Mohd Yusof, 2013; Hilton *et al.*, 2012; Laureani & Antony, 2012; Martínez-Jurado & Moyano-Fuentes, 2014). In addition, barriers to Lean implementation have been explored : Amer and Shaw (2014) reported that low involvement from leaders, poor employee attitudes, insufficient resources and inappropriate organisational culture contribute to less successful to Lean implementations (Amer & Shaw, 2014).

Organisational culture has been described as an “integrated pattern of human behaviour”, which is unique to an organisation (Coetzee & Martins, 2007). It encompasses the norms, values and beliefs of an organisation. Coetzee and Martins (2007) expressed that in the growing competitive business environment, the appropriate organisational culture is imperative for the success and survival of an organisation.

Due the significance of organisational culture and leadership, the Global Leadership and Organizational Behaviour Effectiveness (GLOBE) project was developed in 1991. The GLOBE project originated to explore the essential question: “How is culture related to societal, organizational, and leader effectiveness?”. It involved 951 organisations over 58 countries. The study provided a fundamental comparison between different cultural styles around the world (Hoppe & Eckert, 2015) by evaluating the countries’ cultures and leadership on the following criteria:

- Charismatic
- Team-Oriented
- Self-Protective
- Participative
- Humane-Oriented
- Autonomous

Figure 1 illustrates the scores for Japan, South Africa and the global average across the various criteria. The South African score is broken down into Caucasian (White) and African (Black) demographics, this is attributed to the diversity of the population of the country, ergo emphasising cultural differences even within a country itself.



	Charismatic	Team-oriented	Self-protection	Participative	Humane-oriented	Autonomous
Japan	5,49	5,56	3,61	5,08	4,65	3,67
South Africa (Black sample)	5,16	5,23	3,63	5,05	4,79	3,94
South Africa (White sample)	5,99	5,8	3,2	5,62	5,33	3,74
Global average	5,5	5,45	5,3	4,7	3,55	3,5

Figure 1 : Bar Graph of the scores of SA, Japan and Global average for the GLOBE Project

Figure 1 shows that there are cultural differences between South Africa and Japan, which could present problems when implementing a Japanese developed philosophy (such as Lean) in the South African context.

From literature Lean implementation difficulties can be observed, such as a resistance due to misunderstanding of Lean principles can be observed, internationally. Fillingham (2007) explained that Lean is widely misunderstood, as “asking staff to work harder and doing more with less” (Fillingham, 2007). Furthermore, he explains that a common response from workers to the idea of Lean implementation is “We’re not Japanese and we don’t make cars” (Fillingham, 2007). This highlights the misunderstanding in cross-organisational culture principles and the misunderstanding of Lean concepts. Another study found that Lean was incorrectly viewed as “all about job-cuts and cutting costs” (Radnor, 2011). This too, contributes to the misunderstanding of Lean concepts.

In 2012, a study explained that the transition from traditional management philosophies to Lean is primarily an organisational culture change matter, as opposed to a technical or manufacturing

matter (Nordin *et al.*, 2012a). This study further stated that multiple authors (Bamber & Dale, 2000; Bhasin, 2011; Bonavia & Marin, 2006; Crute *et al.*, 2003; Lee-Mortimer, 2008; Nordin *et al.*, 2012a; Wong *et al.*, 2009) have indicated that misunderstanding the concept and purpose of Lean is a barrier to Lean implementation (Nordin *et al.*, 2012a). Additionally, some authors (Melton, 2005; Worley & Doolen, 2006) identified cultural differences as another barrier to Lean implementation (Nordin *et al.*, 2012a).

In a recent article, Danese *et al.* (2018) published a review on Lean research. They found multiple gaps in literature, such as a "Lack of cross-country and of cross-national cultural comparisons", which led to their recommendations for future research (Danese *et al.*, 2018): That research be conducted to "provide robust and generalised frameworks and guidelines useful for managers to support the Lean transformation" , filling the gaps between academics and practice by developing country specific models for Lean implementations, and to build models for Lean knowledge transfer, as to help companies adopt Lean in foreign plants (Danese *et al.*, 2018).

Ahmad (2013) proposed a framework that may be utilised to structure future research regarding the cultural role in Lean manufacturing (as depicted in figure 2) (Ahmad, 2013). Figure 2 aims to explain how to successfully transcend from a non-Lean organisation to a Lean organisation. It explains that one needs to first understand the current culture of the non-Lean organisation, then understand the Toyota culture. Subsequently, one should consider the adaptivity and fit of the people and continuous improvement aspects of Lean philosophy. Finally, one needs to consider adaptivity and fit of the different cultural dimensions within a Lean organisation. This being the organisational culture of the company or industry, the national culture of the country the company is within, and the work culture of the people currently working at the organisation. Figure 2 illustrates the balance amongst organisational, national and work cultures that is required for adaption to Lean culture. This underscores the need for further research into adaptation of national cultures into Lean culture.

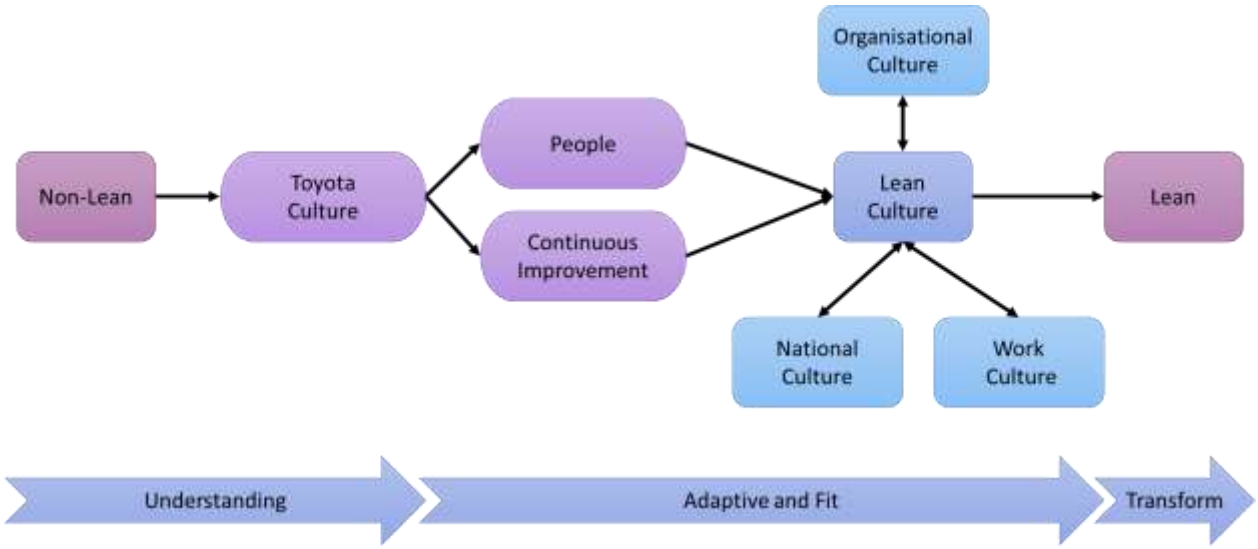


Figure 2: Lean Culture framework for future research (Adapted from Ahmad (2013:4))

1.2. Problem statement

Against this background, it is evident that there is a misunderstanding of the Japanese Lean management principles in other cultural contexts, attributing to poor buy-in during Lean implementation.

1.3. Research opportunity

Ubuntu is the African concept of “humanness” or what it means to be human (Bolden, 2014; Broodryk, 2005; Karsten & Illa, 2005; Kelly, 2018; Matolino & Kwindingwi, 2013; Mbigi, 1997; Van Heerden, 1998). This ancient concept (Ubuntu) originated in central Africa within the earliest societies, and as certain groups of people migrated to other parts of the African continent, they took the Ubuntu philosophy with them (Mangena, 2016; Muxe Nkondo, 2007). As the new groups formed their new societies, the Ubuntu philosophy began to differ slightly among them, while staying true to the core principles (Mangena, 2016).

Nowadays, the Ubuntu philosophy can be found in various African countries such as Zimbabwe, South Africa, Mozambique, Zambia, Malawi, Botswana, Ghana, Angola and the DRC (Mangena, 2016). In South Africa, the Ubuntu philosophy often governs the way a great deal of the population live their lives (Broodryk, 2005:1). Moreover, some South African cultures may unconsciously exercise Ubuntu principles without necessarily referring to it by the name Ubuntu.

The fundamentals of Ubuntu lie in the aphorism “umuntu ngumuntu ngabantu”, which means “I am a person through other people” (Broodryk, 2005). The Ubuntu philosophy has been passed

down from generation to generation, as the leadership and hope foundation. The eight basic Ubuntu core principles are (Broodryk, 2007:59-84):

1. Compassion: Humanness, human rights, humanity, spontaneity, friendliness and helpfulness
2. Forgiveness: Understanding and consideration
3. Responsibility: Respect, obedience, giving unconditionally and sharing
4. Honesty: Good vs bad, norms and openhanded-ness
5. Self-control: Order, dignity, informality, redistribution and spirituality
6. Caring: Sympathy, appreciation and empathy
7. Love: Kindness, charity, tolerance and peace
8. Perseverance: Strength, commitment and cohesion

Since the 1990s the Ubuntu management concept has been presented to the world (Karsten, 2005). In the early 2000s, Johann Broodryk, the first person to receive a PhD in Ubuntu) published a book titled *Ubuntu management philosophy* (Broodryk, 2005). His book captured the essence of the Ubuntu philosophy and explained how to utilise it as a management philosophy in modern businesses (Broodryk, 2005). Later, the principles were also summarised by Msila (2015), who stated that Ubuntu is grounded in 5Ps, applicable to management:

- People-centredness
- Permeable walls
- Partisanship
- Progeny
- Production

Since Ubuntu is inherently African, many South Africans were raised with or can relate to its teachings and principles, it could be utilised as an effective analogy for explaining the Japanese Lean principles (Van den Heuvel *et al.*, 2007). Furthermore, Ubuntu management principles provide a set of values, that when implemented can increase the way in which an organisation functions. Ubuntu management principles have been utilised by Sir Richard Branson, the leader and founder of the Virgin Group (Broodryk, 2005:v-xii; Kelly, 2018). Broodryk (2005:3-4) explains that the challenge of today's world is to manage people in more human ways, by doing so an organisation can build a strong culture. This is where the value of Ubuntu management principles becomes apparent (Broodryk, 2005:1-6).

1.4. Research aim

The aim of this research is therefore to utilise the Ubuntu management philosophy to develop a South African analogy of the Japanese Lean principles.

1.5. Research objectives

The following objectives are set:

i. **Gap analysis** – Investigate a Lean organisation to see if Lean principles are correctly understood.
ii. **Empirical investigation** – Conduct a systematic literature review on the correlations and the variations between Japanese lean management principles and South African Ubuntu management principles
iii. **Verification** – Ensure that the analogy satisfies the required design requirements.
iv. **Validation –** Confirm the validity of the analogy to prove that it addresses the research problem.

1.6. Chapter summary

This chapter established the background of this study, along with the problem and aim.

CHAPTER 2

Literature study

This chapter examines the relevant literature on Lean, Ubuntu and the applicable research methods

The goal of this chapter is to discuss the literature which is of relevance to this research study. The breakdown of this literature study is depicted in figure 3. The first section (§2.1) explores Lean's origin and definition along with management concepts and barriers to implementation, whereas the next section (§2.2) explains Ubuntu's origin and management concepts. This will allow for a basic understand of the complexities of these two philosophies. The last section (§2.3) discusses the different research methods employed throughout this research.

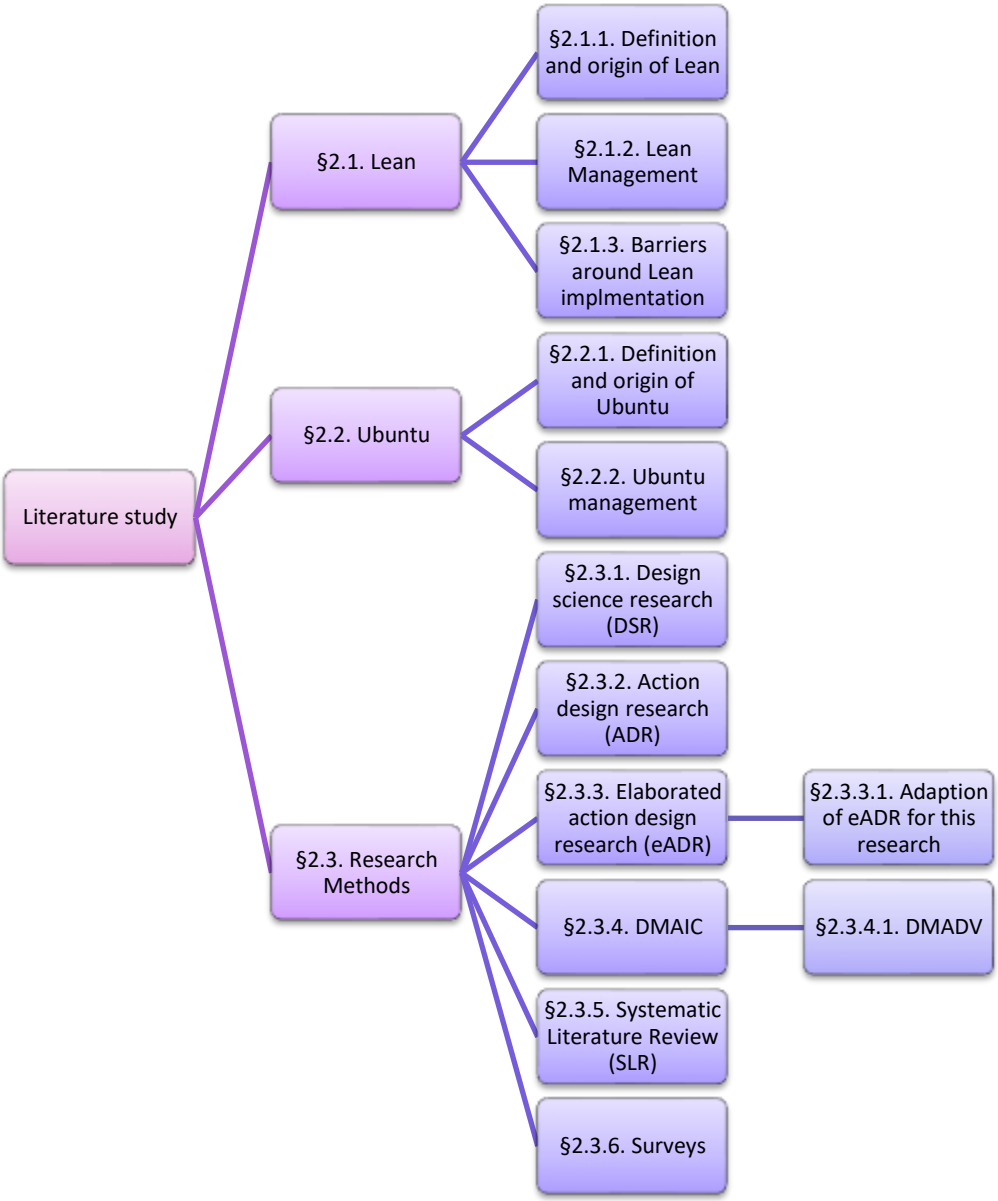


Figure 3: Breakdown of Literature study

2.1. Lean

2.1.1. Definition and Origin of Lean

As mentioned, Lean is a management philosophy, used to eradicate waste, that was developed in Japan's manufacturing industry (Holweg, 2007:15). Lean is polyonymous, being referred to by multiple names such as "Lean manufacturing", "Lean production", "Lean thinking" and "Lean" (Emiliani, 2006). However, a considerable number of academics and practitioners view Lean as a philosophy and have aptly dubbed it "Lean Philosophy" (Sezen & Erdogan, 2009).

Its roots can be traced back to humble beginnings in the early 1890s when Sakichi Toyoda designed and patented a manually operated loom (Emiliani, 2006). The loom drastically improved worker productivity and product quality, elements that have become synonymous with current day Lean philosophy (Emiliani, 2006). Sakichi Toyoda's descendants went on to develop Toyota and the Toyota Production System (TPS) duly (Emiliani, 2006).

Sezen and Erdogan (2009) explains that although Lean originates with Toyota, it was initially examined by the Massachusetts Institute of Technology (MIT) and introduced to the world as the "Lean production system" in the book titled *The machine that changed the world* by Womack *et al.* (1990). Holweg (2007) clarifies the reason for the use of the word "Lean" as Womack *et al.* (1990) highlighting the juxtaposition between the "Mass production" system of the Western world and the production system of Toyota (Holweg, 2007). However, a lesser known fact is that the term "Lean" was actually first developed by John Krafcik in 1988, as used it to describe the system of Japanese production, who could "do more with less", hence Lean (Sezen & Erdogan, 2009).

The Lean philosophy was further explained as having five principles (Womack & Jones, 2003):

1. **Value** – Value is defined from the customer perspective
2. **The value stream** – Map the set of actions required to create products/services
3. **Flow** – Work towards continuous flow throughout the process
4. **Pull** – Utilise a pull system (manufacture what the customer, when they want it)
5. **Perfection** – continuously strive for the paragon of product/service

2.1.2. Lean management

As previously eluded to, Lean originates from the Toyota Production System (TPS). In the 1980s, it became evident that there was something distinct and valuable about Japanese quality and efficiency at Toyota (Liker, 2003). Toyota was designing faster vehicles, with more reliability than their American counterparts and at a competitive cost, whilst maintaining their relatively high employee salaries (Liker, 2003).

It became known that the secret to Toyota's success was their ability to turn operational excellence into a strategic weapon, this led to the development of Lean tool and quality improvement methods (Liker, 2003), such as:

- Just-in-time (JIT)
- Kaizen
- One-piece flow
- Jidoka
- Heijunka

However, it is imperative to note that these tools alone cannot accomplish the impact of the true Lean philosophy, as Lean has a deeper business philosophy based on its understanding of people and human motivation (Liker, 2003). This business philosophy is captured in the 14 Lean management principles, which form the "4P" model of the Toyota way (figure 4) and are discussed in table 2.

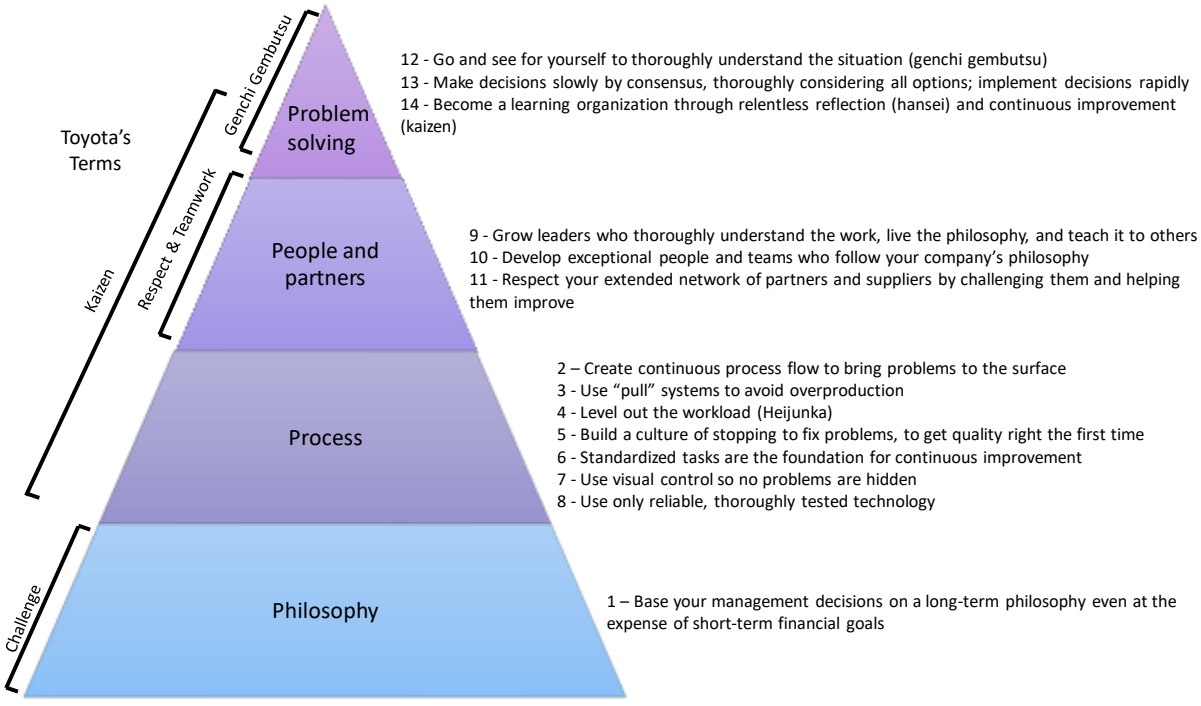


Figure 4 : The "4P" model of the Toyota way (replicated from Liker (2003))

The elements illustrated in figure 4 are discussed and summarised in table 1, where each level of the pyramid is represented by sections.

Table 1: Explanation of the 14 Lean management principles (Liker, 2003)

Section	Principle	Summary
I – Long term philosophy	1 – Base your management decisions on a long-term	Align the entire organisation and grow towards a bigger goal than just making a profit. Be

	philosophy even at the expense of short-term financial goals	responsible as the organisation generates value for society, customers and the economy.
II – The right process will produce the right results	2 – Create continuous process flow to bring problems to the surface	Processes should be re-designed to accomplish value-added, continuous flow, while reducing idle time to zero.
	3 - Use “pull” systems to avoid overproduction	Only produce what the customer wants, how much they want, when they want it. (Function on a just-in-time basis, which will minimize your work-in-process and inventory)
	4 - Level out the workload (Heijunka)	Eliminate wastes, overburden to resources and unevenness in production scheduling.
	5 - Build a culture of stopping to fix problems, to get quality right the first time	Equipment should have built in features that allow it to stop itself when an issue has been detected. Thereafter, visual management should be utilised to indicate the support type need
	6 - Standardized tasks are the foundation for continuous improvement and employee empowerment	Make use of constant, replicable methods throughout the organisation to maintain predictability, timing and outputs. Therefore, creating the foundations of pull and flow within the system.
	7 - Use visual control so no problems are hidden	Design simplistic visual indicators to aid employees in determining whether they are deviating from standard conditions or not. This will support pull and flow.
	8 - Use only reliable, thoroughly tested technology that serves your people and processes	Utilise technology that supports your employees and does not replaces them. It is best to manually work out a process before adding the supporting technology. Additionally, conduct annual test on the technology, whilst not being afraid to reject or modify it.
III – Add value to the organisation by developing your people and partners	9 - Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others	Leaders should be role models from within the organisation, that understand the daily work in great detail, such that they can best teach the company’s philosophy to others.
	10 - Develop exceptional people and teams who follow your company’s philosophy	Develop a robust, firm culture, through which company values and beliefs are widely shared and transcends over the various years. Cross-functional teams will improve quality and productivity, whilst enhancing flow by technical problem solving.
	11 - Respect your extended network of partners and suppliers by challenging them and helping them improve	Treat your partners and suppliers with veneration, like there are an extension of your organisation. Moreover, challenge them to develop by setting targets and helping them achieve it.
IV – Continuously solving root problems drives organisational Learning	12 - Go and see for yourself to thoroughly understand the situation (genchi gembutsu)	Personally, observe and verify data, by going to the source of the problem and seeing it for oneself. This will allow managers to have more than a superficial understanding of the issue.
	13 - Make decisions slowly by consensus, thoroughly	Do not select a single direction until you have meticulously considered the alternatives. Utilise the Japanese principle of Nemawashi, which is

	considering all options; implement decisions rapidly	collective decision making amongst all those affected by an issue.
	14 - Become a learning organization through relentless reflection (hansei) and continuous improvement (kaizen)	After establishing all the process, utilise continuous improvement tools to address inadequacies. This will allow for the exposure and elimination of wastes. Moreover, reflect on crucial milestones and develop best practices going forward.

2.1.3. Barriers to Lean Implementation

With the popularisation of the Lean philosophy, multiple researchers have begun to research Lean implementation success factors, and barriers to Lean implementation (Achanga *et al.*, 2006; Amer & Shaw, 2014; Fadly Habidin & Mohd Yusof, 2013; Hilton *et al.*, 2012; Laureani & Antony, 2012; Martínez-Jurado & Moyano-Fuentes, 2014).

Research explains that Lean originated in Japan, and is largely based on Japanese culture, norms and folklore, thus Lean is inherently Japanese (Wittrock, 2015). Nordin *et al.* (2012a) conducted a study, in which they found that transition from traditional management philosophies to Lean is primarily an organisational cultural change matter, as opposed to only a technical or manufacturing matter. They explained that multiple authors (Bamber & Dale, 2000; Bhasin, 2011; Bonavia & Marin, 2006; Crute *et al.*, 2003; Lee-Mortimer, 2008; Nordin *et al.*, 2012a; Wong *et al.*, 2009) have indicated that misunderstanding the concept and purpose of Lean is a barrier to Lean implementation (Nordin *et al.*, 2012a). Additionally, authors (Melton, 2005; Worley & Doolen, 2006) identified cultural differences as another barrier to Lean implementation (Nordin *et al.*, 2012a).

From the aforementioned, it can be determined that multiple authors agree that the misunderstanding of the concept and purpose of Lean, along with cultural difference attribute to barriers when it comes to Lean implementation. Thus, in this study it is worth investigating these barriers, in order to find ways to address them.

2.2. Ubuntu

2.2.1. Definition and Origin of Ubuntu

Ubuntu is the ancient African philosophy of the concept of “Humanness” or what it means to be human (Bolden, 2014; Broodryk, 2002; Broodryk, 2005; Inyang, 2008; Mbigi, 1997; Van den Heuvel *et al.*, 2007). Although Ubuntu has existed for centuries, it has only recently (as of the 1990s) been captured in written literature (Broodryk, 2007). Prior to this, the Ubuntu philosophy was verbally passed down from generation to generation, as the foundation for leadership and hope (Broodryk, 2007)

It is well known that South Africa is a melting pot of rich diversity and cultural wealth, as it is composed of multiple cultures and sub-cultures, hence it has been dubbed the “Rainbow Nation”. However, it could be said that the one phenomenon or value that unites all South Africans is Ubuntu (Broodryk, 2005). In fact, Broodryk (2005) explains that it is recognised in the following languages within South Africa:

1. Afrikaans – Mensheid
2. English - Humanness
3. isiNdebele - Ubuntu
4. isiXhosa – Ubuntu or Umuntu
5. isiZulu – Ubuntu or Umtu
6. Sesotho and Sepedi – Botho or Motho
7. Setswana - Motho
8. siSwati - Ubuntu
9. Tshivenda – Vhuthu or Muthu
10. Xitsonga – Bunhu

Authors concur that the fundamentals of the Ubuntu philosophy lie in the aphorism “umutu ngumuntu ngabantu”, which translates as “I am a person through other people” (Bolden, 2014; Broodryk, 2002; Broodryk, 2005; Inyang, 2008; Mbigi, 1997; Van den Heuvel *et al.*, 2007). The eight basic Ubuntu philosophy principles are (Broodryk, 2005):

1. **Compassion** – Humanness, human rights, humanity, spontaneity, friendliness and helpfulness
2. **Forgiveness** – Understanding and consideration
3. **Responsibility** – Respect, obedience, giving unconditionally and sharing
4. **Honesty** – Good vs bad, norms and openhanded-ness
5. **Self-control** – Order, dignity, informality, redistribution and spirituality
6. **Caring** – Sympathy, appreciation and empathy
7. **Love** – Kindness, charity, tolerance and peace
8. **Perseverance** – Strength, commitment and cohesion

Ubuntu has had many famous ambassadors over the years such as Nelson Mandela, Richard Branson, Bill Clinton and Desmond Tutu (Broodryk, 2005; Hailey, 2008).

2.2.2. Ubuntu Management

Upon the formal documentation of the Ubuntu philosophy in the 1990s, it became apparent that South Africa had something valuable to offer the world of management (Karsten & Illa, 2005; Micklethwait & Wooldridge, 1996):

"Even South Africa has made contribution with the rise of something called 'Ubuntu management' which tries to blend ideas with African traditions as tribal loyalty."

In the early 2000s, Johann Broodryk who, as mentioned, was the first person to receive a PhD in Ubuntu, published a book titled *Ubuntu management philosophy* (Broodryk, 2005). His book captured the essence of the Ubuntu philosophy, while explaining how to utilise it as a management philosophy in modern business (Broodryk, 2005). Prior to this, Lovemore Mbigi published his book *UBUNTU: The African dream in management in 1997,* which discussed how organisations could embrace the Ubuntu philosophy (Mbigi, 1997). However, when considering these two founding authors, it is imperative to note that Broodryk discusses Ubuntu from a South African perspective, whereas Mbigi brings a Zimbabwean perspective to Ubuntu. Therefore, for the purpose of this study Broodryk's book will be utilised as a base of understanding of Ubuntu management.

Due to Ubuntu management philosophy finds itself within its infancy, multiple authors list the principles as different terms. However, careful reading soon shows that the core concepts and/ or teaching of the principles remain the same. All authors on the subject, agree that Ubuntu is primarily people focused, with strong values in teamwork, collective decision making, shared visions, honesty, loyalty, support and respect within an organisation (Broodryk, 2005; Karsten & Illa, 2005; Kelly, 2018; Malunga, 2006; Matolino & Kwindingwi, 2013; Msila, 2015; Van den Heuvel *et al.*, 2007; Van Heerden, 1998).

For the purpose of explaining the Ubuntu management principles, Vuyisile Msila's breakdown of the principles will be utilised, as he segments them with more detail as compared to other authors. The Ubuntu management principles are discussed in table 2 (Msila, 2015).

Table 2: Ubuntu Management principles (as adapted from Msila (2015))

Section	Principles	Discussion
I - People centredness	1- People centred work culture - Community, solidarity, commitment	By placing focus on all employees, it fosters a feeling of responsibility to elevate the organisational culture. When employees are happy, it boosts team commitment to achieve organisational goals.
	2 - Empowering people - Team leadership and shared responsibility	Once all employees share leadership traits, it is easier to achieve the organisation's goals. Employees utilise their skills to continually develop the organisation, as responsibility is shared by all.
	3 - Transformational leadership - Inspire, motivate, influence, support	It reinforces trust and respect in an organisation, as leaders are treated with honour by fellow employees. This allows the leaders to bring about valuable change in the organisation.

	4 - Mentoring - supportive environment	To strengthen people-centredness within an organisation, Ubuntu recommends mentoring. As it aids in developing employees, such that they can grow the organisation.
	5 - Shared vision - goal directed	People-centred companies are efficacious, due to employees trying to achieve one vision. This is based on common ground with the interest of the company at heart.
II - Permeable walls	6 - Openness and honesty - supporting relationships and communication	To achieve coordination within an organisation, clear communication is key, which is supported by openness and honesty. This requires the full participation of everyone in the organisation.
III - Partisanship	7 - Loyalty to the organisation	Loyalty must be built through strong organisational values. This is achieved by cultivating and promoting collegiality, whilst reinforcing commitment within an organisation. Organisations should perform the African tradition of “sharing a calabash”, by providing employees with the platform to share their ideas to build the organisation.
IV - Progeny	8 - Collective decision making	Ubuntu utilises consensus amongst employees in arriving at decisions within an organisation, as it based on the need for a “village to survive”. Thus, all employees need to participate in decision making.
	9 - Sharing power and Teamwork	Power sharing within an organisation creates a sense of equality amongst employees. It fosters the importance of solidarity, responsibility and effective teamwork.
V - Productivity	10 - Continuous employee support and development	Continuously develop employees and provide them with constant support, whilst magnifying the brand and goals.
	11 - An effective team is a team with the right tools	To magnify production, effectiveness and efficiency within an organisation, employees should have access to the correct tools and equipment needed.
	12 - Strong organisational value	Effectively organisations will shape and intensification the positive values, which lead to strong employee commitment.
	13 - Rewarding employees for application of the "right culture"	Encourage employees by introducing a rewards system, thereby illustrating the benefits the organisational culture to employees.

2.3. Methodology

2.3.1. Design Science Research (DSR)

Design Science research (DSR) is a paradigm that is rooted in the fields of engineering and science (Hevner *et al.*, 2004). It is primarily a paradigm for problem solving, which pursues the innovative creation of artefacts that enhance human knowledge (Hevner *et al.*, 2004). There are four distinguishable types of artefacts within DSR (Mwilu *et al.*, 2016:4), namely:

- **Constructs** – Language for defining and communicating problems and solutions (Hevner *et al.*, 2004; Mwilu *et al.*, 2016)
- **Models** – Representation for real world situations for better understanding (Hevner *et al.*, 2004; Mwilu *et al.*, 2016)
- **Methods** – Provide guidance on solving problems by defining processes (Hevner *et al.*, 2004; Mwilu *et al.*, 2016)
- **Instantiations** – Demonstrate the implementation of constructs, models and methods, as a functioning system (Hevner *et al.*, 2004; Mwilu *et al.*, 2016)

The paradigm of DSR illustrates the understanding, executing and evaluating of systems research, that incorporates both behavioural-science and design-science paradigms (Hevner *et al.*, 2004). The practical representation of the aforementioned is depicted in figure 5.

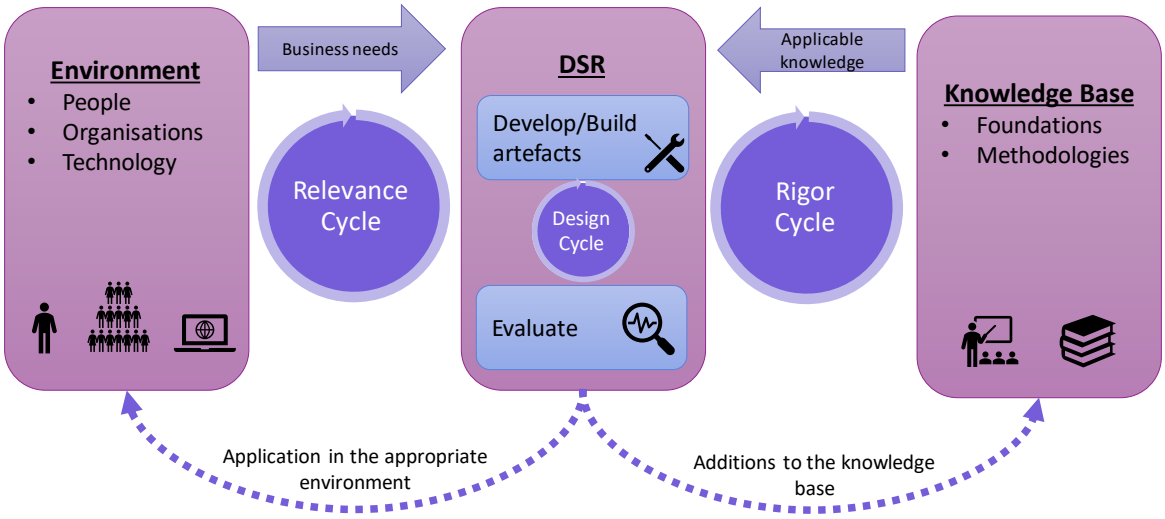


Figure 5: Framework for DSR (Adapted from Hevner et al. (2004))

The three cycles of the DSR method can be explained as follows (Coetzee, 2018; Hevner *et al.*, 2004):

- **Relevance cycle** – Allows one to connect the research (within the design science activities) to the application domain environment.
- **Design cycle** – Allows one to continuously and iteratively evaluate the artefact whilst developing and building it.
- **Rigor cycle** – Allows one to base the research (within the design science activities) on existing knowledge and literature.

2.3.2. Action Design Research (ADR)

Sein *et al.* (2011) explained that Action Design Research (ADR) is a research method (that exist within the DSR paradigm) for producing design knowledge through building and evaluation of artefacts in an organisational context (Sein *et al.*, 2011). The value lies in its ability to deal with

two ostensibly different challenges: (1) addressing the problem circumstances encountered in the organisational context; and (2) the construction and evaluation of the artefact that addresses the problem (Sein *et al.*, 2011). Hence, it allows for the building, intervention and evaluation of the artefact, which reflects theoretical pioneers, researchers intentions and users' contextual influence (Coetzee, 2018; Sein *et al.*, 2011).

Furthermore, ADR allows one to address a problematic situation by building an innovate artefact based on an organisational setting, whilst learning from interventions (Coetzee, 2018; Sein *et al.*, 2011). It is imperative to realise that ADR utilises DSR, by emphasising the influence of the relevance cycle (from DSR) as a guideline for building, intervention and evaluation during research (Sein *et al.*, 2011).

The ADR method is comprised of four stages and seven principles, as depicted in figure 6 and discussed in the section that follows.

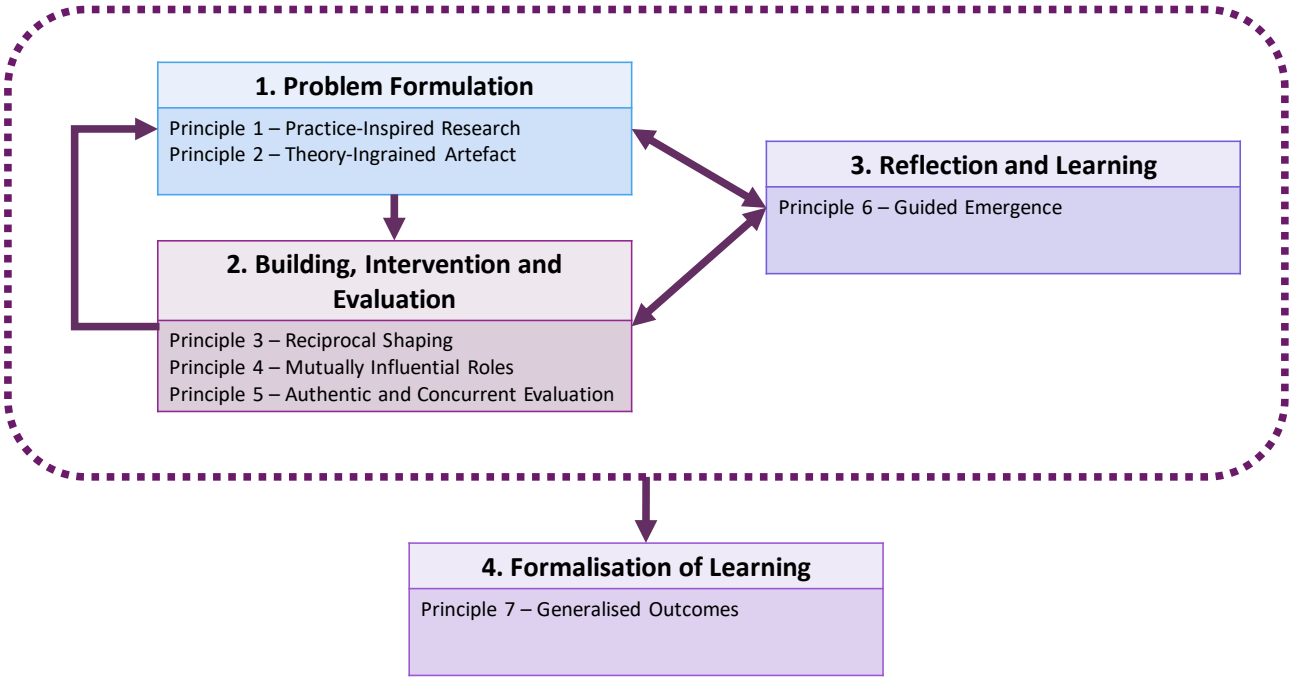


Figure 6: ADR stages and principles (Sein et al., 2011)

Stage 1 – Problem formulation

Stage 1 is triggered once a problem is perceived in industry or predicted by academics (Coetzee, 2018; Sein *et al.*, 2011) and consists of the following two principles:

- **Principle 1 – Practice-Inspired Research -** Emphasis is placed on looking at industry or field problems as opportunities for knowledge-creation

- **Principle 2 – Theory-Ingrained Artefact -** ADR artefacts are developed and evaluated based on theory

Stage 2 – Building, Intervention and Evaluation

This stage utilised stage 1 and theoretical premises as a springboard for the development of the initial artefact design (Coetzee, 2018; Sein *et al.*, 2011). Furthermore, this stage integrates building the artefact, intervention of the organisation and evaluation of the interlinks (Coetzee, 2018; Sein *et al.*, 2011). This stage consists of the following three principles:

- **Principle 3 – Reciprocal Shaping -** The two domains (artefact and organisation setting) should be virtually inseparable
- **Principle 4 – Mutually Influential Roles -** It is imperative that symbiotic learning occurs amongst the various project participants, by sharing knowledge with each other
- **Principle 5 – Authentic and Concurrent Evaluation -** Evaluation should be inherent to the building stage as opposed to being conducted separately

Stage 3 – Reflection and Learning

The Reflection and Learning stage moves conceptually from developing a solution for a specific time to applying its teachings to a wider category of problems (Coetzee, 2018; Sein *et al.*, 2011). Furthermore, it is imperative to note that this stage occurs in parallel to stages 1 and 2. This stage embodies the following principle:

- **Principle 6 – Guided Emergence -** The collective artefact should reflect the initial design by the researchers and its continuous sculpting from organisational use, perspectives and participants

Stage 4 – Formulisation of Learning

This last stage requires the outlining of accomplishments, along with the descriptions of organisational outcomes in order to formulise the learning (Coetzee, 2018; Sein *et al.*, 2011). This stage consists of the following principle:

- **Principle 7 – Generalised outcomes -** By including the organisational changes that occurred during implementation, one is able to generalise outcomes. Thus, as explained by Coetzee (2018) one should “move from the specific-and-unique to the generic-and-abstract.”

2.3.3. Elaborated Action Design Research (eADR)

Given that the aforementioned ADR method suggests only a single DSR entry point (for research) may be used, which is focused on an existing artefact, there is potential in the elaborated Action Design Research method, which allows entry on multiple points (Mullarkey & Hevner, 2015).

The eADR method incorporates the first three stages of ADR ("Problem Formulation", "Building, Intervention and Evaluation" and "Reflection and Learning") into an iterative cycle (Mullarkey & Hevner, 2015). The eADR method (figure 7) depicts that the method is composed of four stages. Similarly to ADR, eADR starts of by focusing on the "Problem Diagnosing" stage. However, thereafter eADR splits the second stage of ADR over three stages in eADR. This allows for individual attention to be placed on the designing, building and implementing an artefact (Mullarkey & Hevner, 2015).

Moreover, eADR emphasises that "Reflection and Learning" occurs at every stage, as opposed to just at one stage in ADR (Coetzee, 2018). Mullarkey and Hevner (2015) explain that learning from iterative evaluation and reflection via intervention may enlighten both academics and industry, by providing a contribution in the form of an artefact that was developed via a rigorous method (Mullarkey & Hevner, 2015). The aforementioned breakdown of eADR is captured in figure 7.

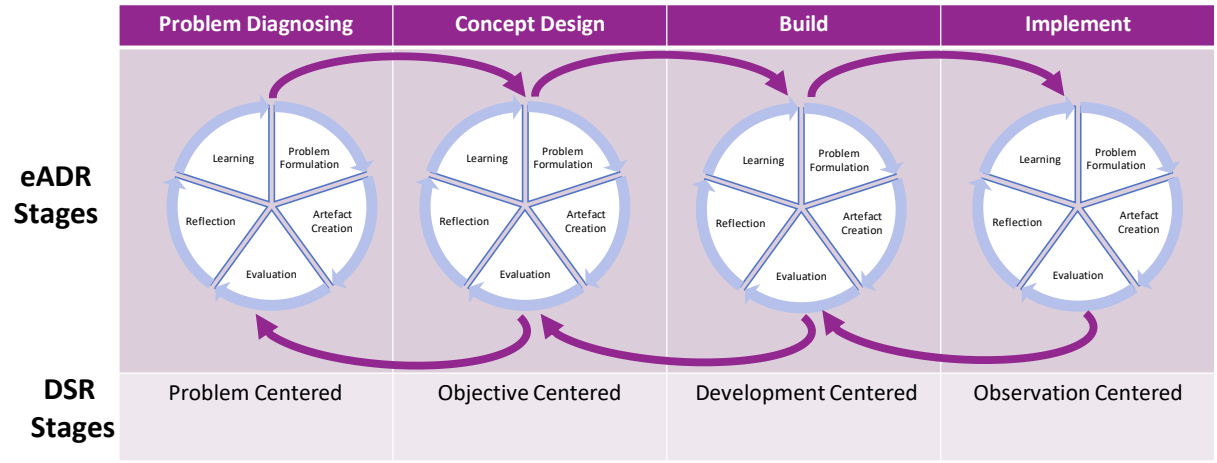


Figure 7: eADR process model with DSR entry points (Adapted from Coetzee (2018) and Mullarkey and Hevner (2015))

From figure 7, the different stages of eADR can be seen, along with the various DSR entry stages of the eADR method. Mullarkey and Hevner (2015) believe that eADR will be effective if the DSR paradigm is entered at its earliest point (Mullarkey & Hevner, 2015).

2.3.4. DMAIC

DMAIC is a well-thought-out problem-solving procedure. It is utilised for quality and process improvement of existing processes, that forms part of the Six Sigma methodology (Montgomery, 2009) .DMAIC is an acronym for a five-step process:

- Define – Identifying and defining the scope of the problem and aim of the project
- Measure – Measuring the current state of the problem situation
- Analyse – Analysing and investigating the possible root causes of the problem situation
- Improve – Generating possible solutions to address the root causes
- Control – Developing an ongoing process management plan

Snee (2005) explains that DMAIC may limit projects or research as it is a framework for improving existing processes or products. Therefore, Patil *et al.* (2013) suggest utilising an alternate Design for Six Sigma (DFSS) methodology, such as DMADV.

From the success of the DMAIC method, emerged the Design for Six Sigma (DFSS) methodology. Patil *et al.* (2013) explained that DFSS is a systematic methodology which utilises tools, training and measurements to design products/processes that abide to Six Sigma quality levels, whilst meeting customer expectations (Patil *et al.*, 2013). Within the DFSS methodology exist various cycles(methods) that one may use (Patil *et al.*, 2013), this is captured in table 3.

Table 3: Various cycles(methods) of DFSS (Adapted from Patil et al. (2013))

DFSS cycle (method)	Phases					
DMADV	Define	Measure	Analyse	Design	-	Verify
IDOV	-	Identify	-	Design	Optimise	Verify
DMADOV	Define	Measure	Analyse	Design	Optimise	Verify
DMEDI	Define	Measure	Explore	Develop	Implement	-
CDOV	-	-	Concept	Design	Optimise	Verify
DCCDI	Define	Customer	Concept	Design	Implement	-
DCOV	Define	-	Characterize	-	Optimise	Verify
DIDOV	Define	Identify	-	Design	Optimise	Verify
DMADIC	Define	Measure	Analyse	Design	Implement	Control
DMCDOV	Define	Measure	Characterise	Design	Optimise	Verify

In table 3, the first mentioned cycle is the DMADV method, which is detailed as:

- Define – Identifying and defining the scope of the problem and aim of the project
- Measure – Measuring the current state of the problem situation
- Analyse – Analysing and investigating the possible root causes of the problem situation

- Design – Designing possible solutions to address the root causes
- Verify – Verifying that the designed solution will address the root causes

While DMAIC is a framework for improving existing processes, DMADV is a framework for designing and creating new processes (Snee, 2005). Therefore, it can be concluded that when designing solutions to new problems one should make use of the DMADV, as opposed to the DMAIC method.

2.3.5. Systematic Literature Review (SLR)

A systematic Literature Review (SLR) is a type of literature review that allows for the location, appraisal and synthesis of the best available evidence , in literature, based on a specific research question or aim (Boland *et al.*, 2017). Moreover, the purpose of an SLR is to provide informative and evidence-based answers to the posed research question (Boland *et al.*, 2017). Booth *et al.* (2012) emphasises that an SLR is a systematic, explicit and reproducible method for the identification, evaluation and synthesis of existing literature and work of academics and practitioners (Booth *et al.*, 2012).

The results of an SLR may be a stepping stone to advancements within a field or allow for the combination of information with professional judgement to allow for just decision making (Boland *et al.*, 2017). Xiao and Watson (2019) explain that there are different types of SLRs, each with a different purpose (figure 8).

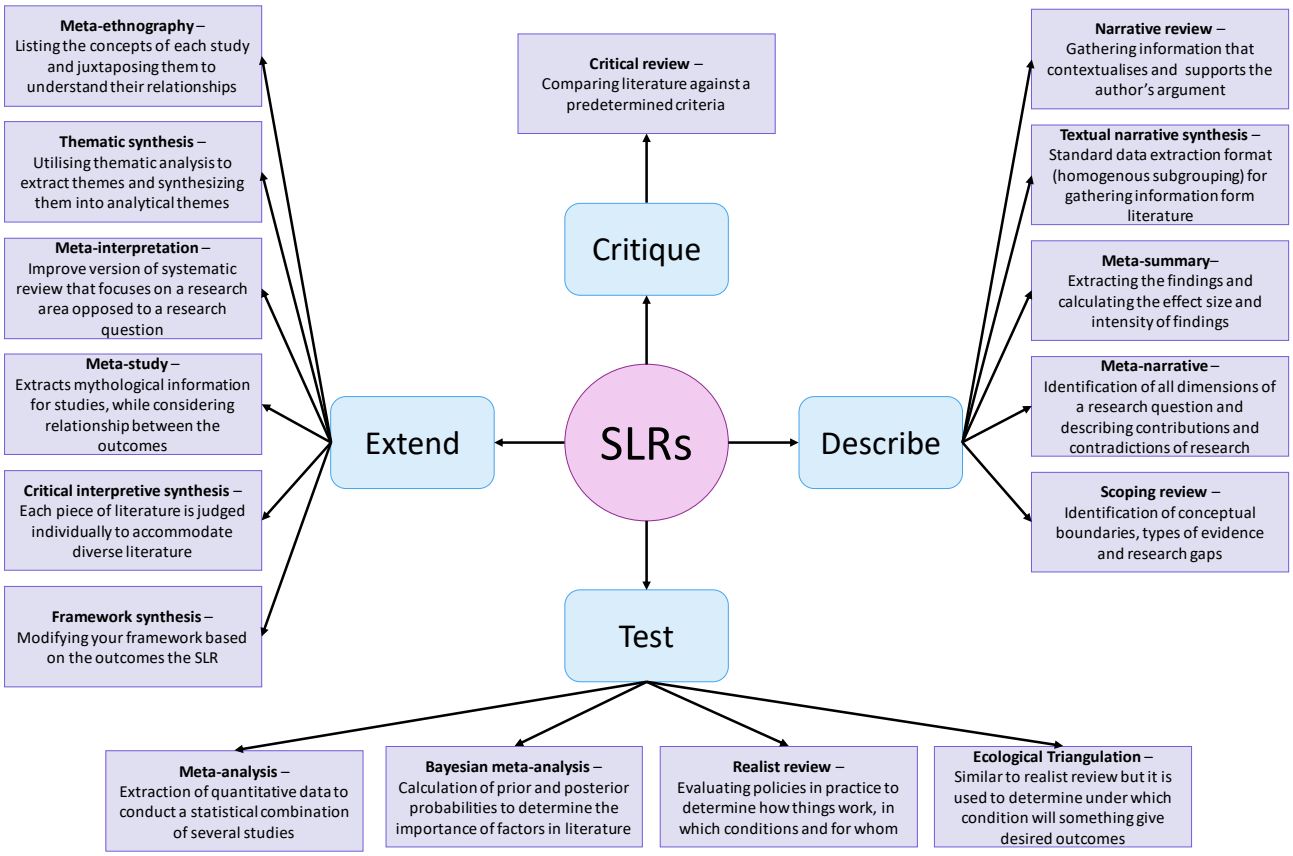


Figure 8: Types of SLRs

Boland *et al.* (2017) places emphasis on the need for research to understand what they want to achieve before selecting the type of SLR they will peruse. One of the objectives of this study, explained in chapter 1, was to conduct an SLR in order to find the correlations and variations between Lean and Ubuntu. Ergo from figure 8, it can be deduced that a descriptive scoping SLR was the best option for identifying conceptual boundaries of a specific field by considering all the evidence and research gaps (Xiao & Watson, 2019).

2.3.6. Surveys

Surveys facilitate a quantitative or numeric description of trends, attitudes and opinions of a population via studying a sample of thereof (Creswell, 2014). Sinkowitz-Cochran (2013) agrees that surveys offer a convenient and efficient way to obtain answers to various questions, stating that they are one of the most regular forms of measurement (Sinkowitz-Cochran, 2013). Furthermore, surveys allow for data collection in a standardised form (Kelley *et al.*, 2003). Kelley *et al.* (2003) goes on to discuss the advantages and disadvantages of surveys, as illustrated in table 4.

Table 4: Advantages and disadvantages of surveys (Adapted from Kelley et al. (2003))

Advantages of surveys	Disadvantages of surveys
• Empirical data is collected, as data is from real-world observations • It allows for the generalization of opinions of a specific population, due to the breadth of coverage of people in a study • Surveys are a cost effective method of collecting large amounts of data in a short period of time	• Researchers may neglect the significance of the data if the place to much focus on the range of coverage • Conclusions made, based on the data, may lack details or depth, if the researcher is not careful • It may be difficult to secure a high response rate to the survey

OECD (2012) differentiates between two distinct branches of surveys:

- **Interviewer-administered** - the researcher or independent person asks participants the questions posed within a survey
- **Self-administered** – The researcher gives the participant the survey to complete by themselves

However, self-administered surveys are further broken down into four types: (1) Group administration, (2) Mail procedures, (3) Dropping off at participant, and (4) Internet surveys (OECD, 2012). While the other types are promising, internet surveys provide the highest potential for returns at a low cost, as participants may complete it at their convenience (OECD, 2012).

It is imperative to note that multiple authors (Bryman & Bell, 2014; Creswell, 2014; De Vos *et al.*, 2011; Fanning, 2005; Kelley *et al.*, 2003; OECD, 2012; Sinkowitz-Cochran, 2013) warn that there is a great need to minimize measurement errors, whilst emphasising the ethical considerations of surveying. In order to achieve this, they suggest the following:

- Format of the survey should be uncluttered and well spread
- Instructions should be included
- A thank you message should be included at the end of the survey
- One should make use of a pre-existing scale for responses
- Statements should not be vague or ambiguous
- Statements should not be leading or persuasive
- Statements should not contain unexplained jargon or acronyms
- Statements should be as few as possible
- Statements should as short as possible
- Statements should not double-barrelled
- Grouping should be utilised for compartmentalising statements
- Surveys should maintain anonymity and confidentiality of the participants
- Statements should be composed in simple and basic English, and pitched at the right level
- Each statement should be relevant to the validation and verification process

2.4. Chapter summary

This chapter explored the origin and definition of Lean and Ubuntu while investigating the management principles associated with each. Moreover, this chapter established the various methods utilised throughout this research, by examining their process and advantages.

CHAPTER 3

Research Design

This chapter discusses the research design followed throughout this study.

3.1. Introduction

The research conducted throughout this dissertation places emphasis on addressing the need to enhance the understanding of the Japanese Lean management principles in the South African context, in order to improve buy-in during Lean implementation. Therefore, the aim of this research is to utilise Ubuntu management principles to develop a South African analogy of the Japanese Lean management principles.

The Design Science Research (DSR) paradigm was selected , due to it being developed for problem-solving research with the intention of developing innovative artefacts (Coetzee, 2018; Hevner *et al.*, 2004). Additionally, the Action Design research (ADR) methodology within the DSR paradigm was utilised, allowing the researcher to address two challenges (Sein *et al.*, 2011):

1. Addressing the problem circumstances encountered in the organisational context
2. Constructing and evaluating the artefact that addresses the problem

Taking into account that this study aimed to develop an analogy (a new and innovative artefact), the elaborated Action Design Research (eADR) methodology was employed (Mullarkey & Hevner, 2015). Since ADR focusses on works with already existing artefacts, whereas eADR is utilised when no artefact exists (Coetzee, 2018). The contextualising of the relationship between the DSR research paradigm and eADR methodology is depicted in figure 9.

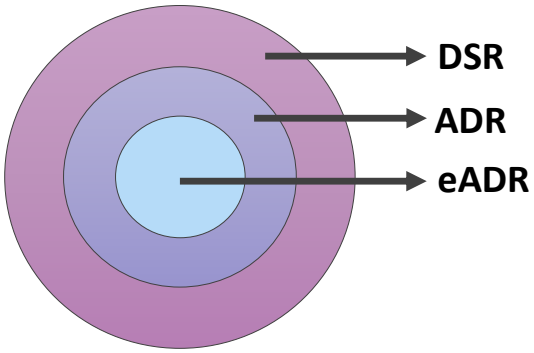


Figure 9: Relationship between eADR, ADR and DSR

Due to the sophisticated design of the eADR methodology, the researcher may enter and exit at any stage on the research gamut. This study's goal suggests that it focus on the research and development of the Lean-Ubuntu analogy. Thus, this study entered at the Problem-diagnosing stage, thereafter, conducting four iteration of the Concept design stage before existing (figure 10).

From figure 10, the overarching methodology of this study can be seen, comprising of five cycles. The stages of eADR are colour co-ordinated and indicated with acronyms, namely: (1) PD – Problem-diagnosing in purple and (2) CD – Concept design in blue. Furthermore, the concept design cycles (in blue) are labelled CD 1 to CD 4, demonstrating the order in which they are to

follow. Each cycle also illustrates the chapter(s) numbers and titles in which it is discussed, alongside the cycle. Moreover, CD 4 (the biggest cycle) is considered the primary or main research cycle, as each of the smaller cycles form part of its various steps. The order in which the cycles occurred are indicated by the letters at the top centre, A to E. It is imperative to note that CD 3 (cycle D) occurred after the artefact creation of CD 2 (cycle C), so that the survey could be utilised for evaluation during CD 2. The details of each cycle are explained in section 3.1.1 to 3.1.5, that follow.

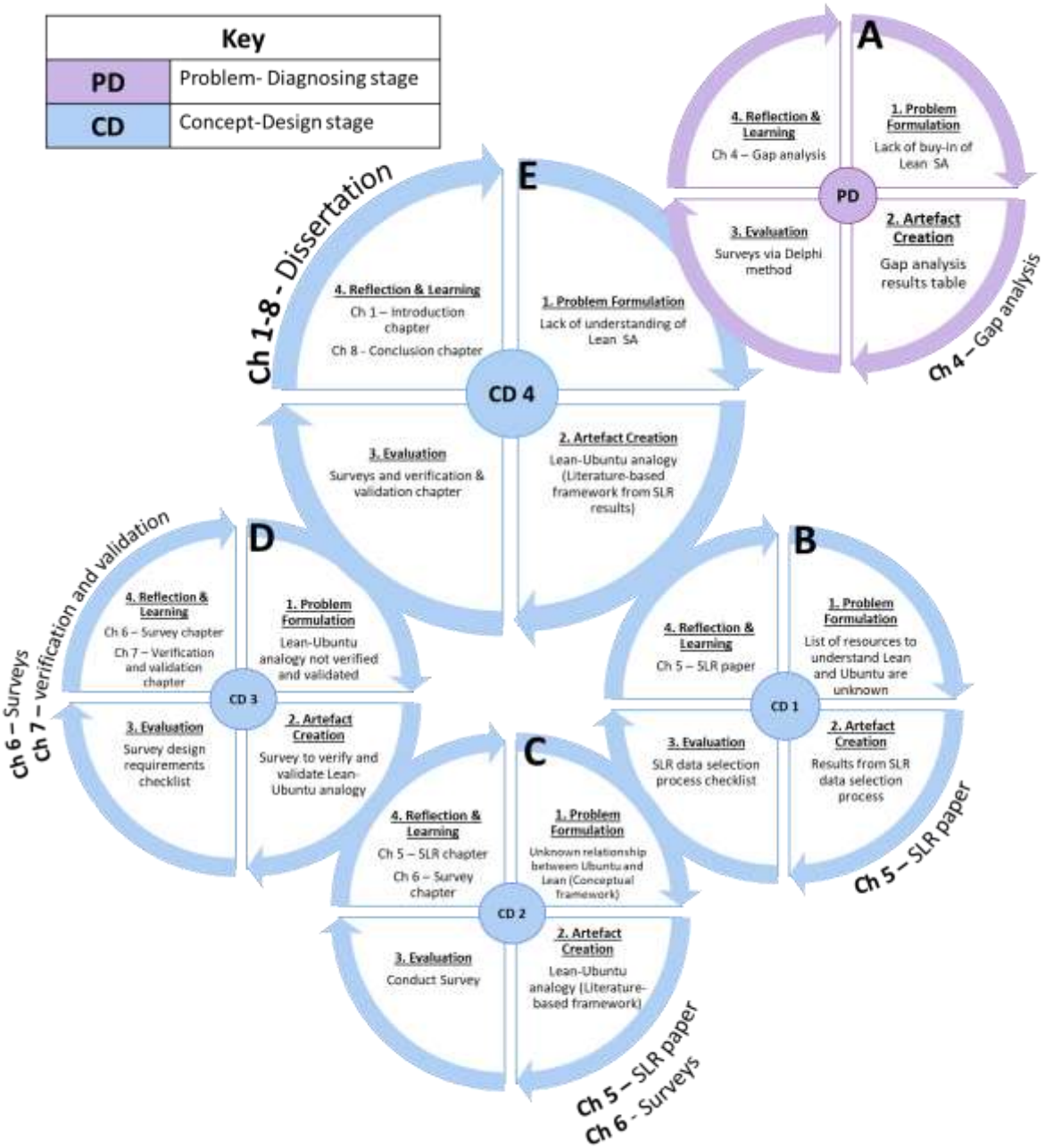


Figure 10: eADR Research design

3.1.1. PD - Problem Diagnosing - Gap Analysis

The intention of this stage was to affirm the nature of the research problem. The following points discusses the cycle steps of the problem diagnosing (PD) phase:

1. **Problem Formulation** – The research problem from **Chapter 1** was further explored in the lack of buy-in of Lean in SA by means of a case study, which followed the DMADV methodology.
2. **Artefact Creation** – In order to investigate the problem, a root-cause analysis was conducted. The results from the root cause analysis of **Chapter 4 (Gap analysis paper)**, were tabulated to illustrate how a Lean organisation violated several Lean management principles due to misunderstanding (**Chapter 4**). Furthermore, the table contained proposed solutions to address each of the violated Lean management principles.
3. **Evaluation** – Surveys were conducted with employees of the organisation to evaluate the proposed solutions to address the mismatched (violated) Lean principles.
4. **Reflection & Learning** – The reflection and learning of the problem diagnosing phase was documented in the conclusions of the research paper (**Chapter 4**).

3.1.2. CD1 - Concept Design 1 – Systematic Literature Review (selection process)

With the goal of developing a South African analogy of the Japanese Lean management principles, the intent of this stage was to investigate and report on the available literature on Lean management principles and Ubuntu management principles. The following points discuss the cycle steps of the concept design 1 (CD 1) phase:

- **Problem Formulation** – The lists of resources to understand Lean and Ubuntu principles were unknown in this stage.
- **Artefact Creation** – A systematic literature review (SLR) was conducted, as an empirical investigation to discover the available literature on Lean management principles and Ubuntu management principles (**Chapter 5**). An artefact was created in the form of the search results obtained from the selection process of literature.
- **Evaluation** – The SLR selection process' search results were verified by a fellow independent researcher using a checklist (Refer to **Chapter 5** for more details).
- **Reflection & Learning** – The reflection and learning of the Concept Design 1 (CD 1) phase was documented in the SLR research paper (available in **Chapter 5**)

3.1.3. CD 2 - Concept Design 2 – Lean-Ubuntu analogy and surveys

The intent of this stage was to investigate and report on the correlations and variations between Lean management principles and Ubuntu management principles, thereby establishing the relationship between them. The verified search results from the SLR were used to develop the Lean-Ubuntu artefact. The following points discuss the cycle steps of the concept design 2 (CD 2) phase:

- **Problem Formulation** – The relationship between Lean management principles and Ubuntu management principles was unknown.
- **Artefact Creation** –The SLR selection process' search results were utilised to develop the Lean-Ubuntu analogy, a literature-based framework (refer to **Chapter 5**)

- **Evaluation** – The Lean-Ubuntu analogy was verified by South African Lean experts, via surveys (**Chapter 6**).
- **Reflection & Learning** – The reflection and learning of the Concept Design 2 (CD2) phase was documented in the SLR research paper for the analogy (available in **Chapter 5**), and the survey results in **Chapter 6 and 7**

3.1.4. CD 3 - Concept Design 3 –Survey design

The intent of this stage was to validate if the Lean-Ubuntu analogy addresses the research problem. The following points discusses the cycle steps of the concept design 3 (CD 3) phase:

- **Problem Formulation** – It is unknown if the Lean-Ubuntu analogy address the research problem and conforms to design requirements.
- **Artefact Creation** – A survey was developed to validate if the analogy addresses the research problem and verify if it conforms to design requirements (**Chapter 6**).
- **Evaluation** – The survey was evaluated using a checklist (**Chapter 6**)
- **Reflection & Learning** – The reflection and learning of the CD 3 phase was documented in **Chapter 6.** Furthermore, the various verification and validation processes are captured in **Chapter 7**

3.1.5. CD 4 - Concept Design 4 – Dissertation

The intent of this stage was to develop a South African analogy of the Lean management principles, that utilises the Ubuntu management principles. The following points discusses the cycle steps of the concept design 4 (CD 4) phase:

- **Problem Formulation** – There is a lack of understanding of the Lean management principles in the South African context (The research problem from **Chapter 1** and confirmed in **Chapter 4**)
- **Artefact Creation** – A literature-based framework (the Lean-Ubuntu analogy) was developed (based on SLR search results), that illustrates the correlations and variations between Lean management principles and Ubuntu management principles (**Chapter 5**).
- **Evaluation** – The Lean-Ubuntu analogy was evaluated using the surveys and checklists throughout the study. The various verification and validation processes are captured in **Chapter 7**.
- **Reflection & Learning** – The reflection and learning of the Concept Design 4 (CD 4) phase was documented in the conclusions of this dissertation (**Chapter 8**)

3.2. Knowledge contribution

In a recent paper, Gregor and Hevner (2013) explained the relationship between research project contexts and potential DSR contribution, which was depicted using a matrix (figure 11). The problem's maturity is ranked on the X-axis, whereas the artefact's maturity is ranked on the Y-axis. The matrix allows one to rank research goals and an envisaged contribution of a specific study or project (Coetzee, 2018).

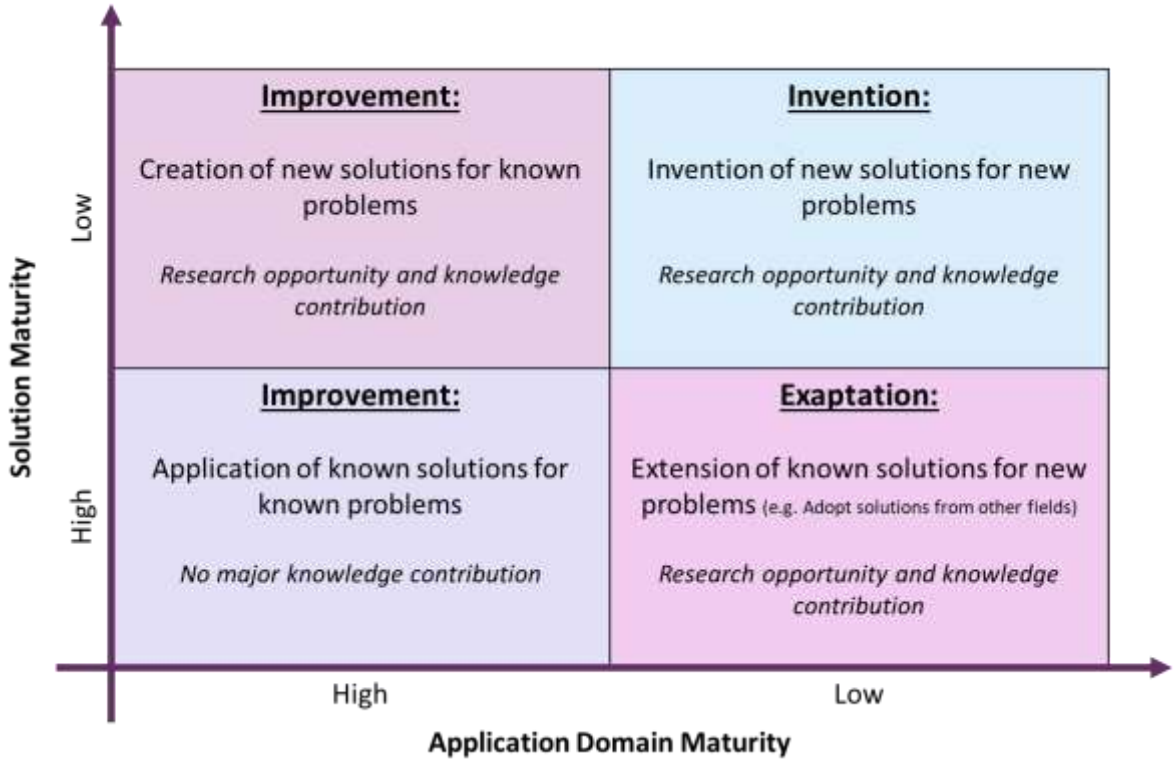


Figure 11: DSR Knowledge contribution framework (Gregor & Hevner, 2013)

By utilising the matrix as a guideline, this study's knowledge contribution is classified and discussed in **Chapter 8**.

3.3. Chapter summary

This chapter served as a breakdown and explanation of the research design employed in this study as well as the contribution made. The chapters that follow discuss the detailed method and findings for the various stages of the research design.

CHAPTER 4

Gap Analysis

This chapter contains a research paper that explores the misunderstanding of Lean management principles in a South African case study.

This paper formed part of the conference proceedings of the *SAIIE NeXXXt* conference and can be found at:

https://conferences.sun.ac.za/index.php/SAIIENeXXXt/SAIIENeXXXt/schedConf/presentations

INVESTIGATING THE ROOT CAUSES OF LONG LEAD TIMES IN THE AUTOMOTIVE AFTERSALES INDUSTRY BY MEANS OF THE LEAN PHILOSOPHY: A SOUTH AFRICAN CASE STUDY

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ABSTRACT

The aftersales service industry has the potential to produce 80% of an organisation's profit, although most only generate 20%. Similarly, the organization, used as a case study, struggles to achieve their operational performance indicators (OPIs) and the consequent profit margins. The aim of the study was therefore to investigate the root causes and develop corresponding preventative actions.

The research followed a DMADV (Define-measure-analyse-design-verify) approach, uniquely designed by integrating specific methods: Gemba walks defined the scope of the problem and aim; The root causes determined by a 20-Key audit and five-why analyses were reported in a thematic map; Potential solutions were developed utilising Kernel theories, and verified via the Delphi technique.

This study points out the many challenges, such as low employee moral and high staff turnover rates, when implementing a German adaptation of a Japanese philosophy (Lean) in the South African service industry, emphasizing the misunderstanding of lean principles. Furthermore, it highlighted the implications of a cross-cultural adaptations of lean, within organizational cultures.

* Corresponding Author

1 INTRODUCTION

The aftersales service department of a company has the potential to produce 80 percent of a company's profit and improve Operational Performance Indicators (OPIs), although most only generate 20 percent [1]. In 2018, the South African automotive industry was under strains due to fiscal uncertainties. Ergo, automotive dealerships around the country have begun to attentively focus on the improvement and optimisation of their after sales service departments [2].

Conversely, it has been discovered that the after sales department of an automotive dealership, used as case study, is currently experiencing a decline of the department's OPIs (productivity, efficiency and effectiveness). This poses a potential loss of income for the organisation.

The organisation, used as a case study, is part of an international German automotive company. This German company adapted the lean approach (with its Japanese foundation) and are implementing it in their different organisations, worldwide. However, this could lead to complications within the organisational cultures of these different companies.

The lean methodology often provides organisations with a continuous improvement approach needed to combat organisational inefficiancies (amongst other things) [3]. However, although there are many Lean Production System (LPS) techniques that may be utilised in the after sales services, there is no all-inclusive route available for every and any company [1]. This lends to the idea that companies will require tailored lean procedures, ergo building a lean culture specific to the organisations' systems and goals.

2 RESEARCH AIM

The aim of this research was to investigate the root causes of the organisation's poor OPIs: productivity, efficiency and effectiveness, by means of the lean continuous improvement approach.

The next section explains the research design that was followed, while section 4 provides the findings of each phase of the research. The study is concluded in section 5, with further research recommendations stated in section 6.

3 RESEARCH DESIGN

The research spanned across multiple departments of the after-sales service centre, with a complex problem and unknown root causes Therefore, the research design incorporated many problem-solving methods, in order to narrow down the problem and its causes that needed to be addressed. These methods were integrated using a DMADV (Define, Measure, Analyse, Design, Verify) approach [4], which is an adaption of the DMAIC (Define, Measure, Analyse, Improve, Control) approach. The DMADV method is ideally used for improvements, adjustments or the creation of new concepts, which made it well suited for this improvement focused study [4].

The research design (Figure 1) illustrates the different methods and finding during the various phases of the research. The detail of each segments in the diagram is discussed in the corresponding section (illustrated with section "§" numbers)

Referring to Figure 1, the research initiated by scoping the study and measuring the current state. The problem diverged into multiple issues during the five-why analysis, but converged again into common root causes, during the thematic analysis. Subsequently, diverging once again into multiple solutions, which later converged to the best suited solutions for verification. The resulting research design is explained in the sections to follow. The results of each phase of the research is presented in Section 4.

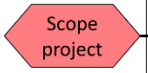
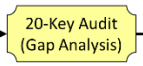
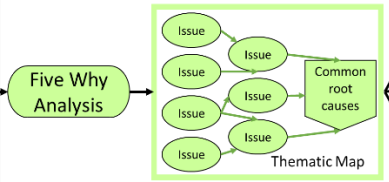
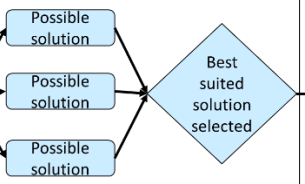
	Define	Measure	Analyse	Design	Verify
Diagram					
Method	§3.1- Conduct **Gemba walks** and **literature studies**.	§3.2- Conduct a **20-Key audit**.	§3.3- Conduct a **five-why analysis** on each of the 20 keys, thereafter conducting a **thematic analysis** on the outcomes of the five-why analysis.	§3.4- Utilising **Kernel theories** to design multiple possible solutions to address the root causes.	§3.5- Conducting surveys (via the **Delphi method**) to verify employee agreement with the solutions.
Findings	§4.1- Overall scope of the **problem and aim** are define.	§4.2- A **radar diagram** that indicates the audit's outcomes.	§4.3 – A **five-why summary** of the results, followed by a **thematic map** illustrating the convergence to common root causes. A table comparing the root causes to their corresponding **violated lean principles**.	§4.4- The **proposed solutions** to address the root causes.	§4.5- **Verified solutions**.

Figure 1:Research design

3.1 Define Phase - Gemba walks and literature study

For the define phase, the overall scope of the problem and aim were defined. This was achieved through Gemba walks, where walking the shopfloor allowed for the observations of process executions and activities [5].

Literature studies on lean were also conducted in order to compare the current state of the organisation to literature [6] [7] [8] [3]. It was found that lean is the philosophy of focusing on eliminating waste, ergo only including the value adding activities to a process [2] [8] [6]. These wastes are identified as transportation, inventory, motion, waiting, over-production, over processing, defects and underutilised intellect [7] [6]. The lean philosophy was selected for this research, as the organisation (used as a case study) utilised lean approaches and concepts in daily operations. This South African dealership is part of an international German automotive company, who has also adapted the lean philosophy from Japan. The results of this phase are captured in section 4.1.

3.2 Measure Phase - 20 key audit

This phase of the study composed of collecting (measuring) information on the current state of the organisation. The 20 Keys strategy was engineered by Iwao Kobayashi, as a system to improve an organisation in 20 different operational zones [9]. In his book 20 Keys to Workplace Improvement, Kobayashi [10] defined his approach as a Practical Program of Revolutions in Factories (PRORF), a five-point (five level) evaluation system [10]. Furthermore, the 20 Keys approach allows one to conduct a gap analysis in an organisation, in order to discover which areas (of each of the 20 keys) needs the most attention. For this study, Kobayashi's book was utilised in developing a 20-key audit sheet, allowing for the placing of the organisation on one of the five levels for each of the 20 keys. Information for the 20-keys audit was gathered by interviewing several employees and via observations during further Gemba walks. The results from the audit, a radar diagram is presented in Section 4.2. This proved to be useful in narrowing the scope of the problem's causes.

3.3 Analyse Phase - 5-Why analysis

The analyse phase investigated (and converged) the root causes of the issues highlighted during the 20-key audit in the measure phase. A five-why analysis was conducted on each one

of the 20 keys. Whilst conducting the analysis, trends in the root causes started to emerge. When working with data that converges (or diverges), it is recommended that a thematic map be utilised for analysis [11] [12] [13] [14]. and visual representation of patterns in data, [15] [13], while not overlooking the smaller data points in the grand scheme of things [14].

The data obtained during the five-why analysis converged to six root causes as indicate by the thematic map, explained in Section 4.3. The thematic map also illustrates the links between the data gathered from the five-why analysis.

3.4 Design Phase – Kernel theories

The design phase proposed different solutions to the root causes outlined in the thematic map. All proposed solutions were based on various Kernel theories, which are described as nuggets (kernels) of knowledge and theories from nature or science, that allows for the justification of a process design [16] [17]. By utilising Kernel theories, the design of a solution is based on previous evidence discovered within academia.

The alternative solutions that were proposed in this stage, were evaluated based on the following criteria (using a 5-point Likert scale for each criterion) (table 1):

- Cost to the company,
- Implementation time,
- Complexity of solution,
- Resistance expected from management, and
- Resistance expected from workshop employees.

Table 1: Likert scale used to score alternative solutions

Extremely High	High	Average	Low	Extremely Low
(1)	(2)	(3)	(4)	(5)

This allowed for the selection of the possible best-suited solution to address each root cause. These solutions are discussed, in terms of implementation details, in section 4.4.

3.5 Verify Phase – Delphi method

The verify phase made use of surveys via the Delphi method. The Delphi method is defined as gathering input from relevant people on a specific topic [18]. Due to the structure of the Delphi method, it allows for multiple rounds of surveys, each based on the outcome of its predecessor [19]. The rounds of surveys may only stop once consensus is reached on each research question. This may be declared if the average rate on a question is greater than 75% (e.g. 3.75 on a 5-point Likert scale) [18]. On average, consensus is reached after three rounds [18] [20] [21]. The surveys allowed for the testing of the suggested solutions, as well as testing the suggested implementation time frames, detailed in section 4.5.

4 FINDINGS

4.1 Define phase – Problem and aim

From the Gemba walks and literature studies, it was revealed that the problem causing the decline of organisational OPI's was long lead times. Thus, the aim of the study was to investigate the root causes of the organisation's poor OPIs, by means of the lean continuous improvement approach, as provided in section 2.

4.2 Measure Phase - Radar Diagram

The results from the 20-key audit are illustrated as a radar diagram (figure 2). The findings indicate that the organisation did not score more than three (out of five) for any of the 20 operational zones. This is indicative of the fact that there is room for much improvement within the organisation. Upon conducting the 20 key audit, it was also apparent that the

service centre lacked synergy. The lack of synergy was observed during the interviews (on the Gemba walk), when employees were confused on the roles and responsibilities for different operational zones and/or were unaware of their existence.

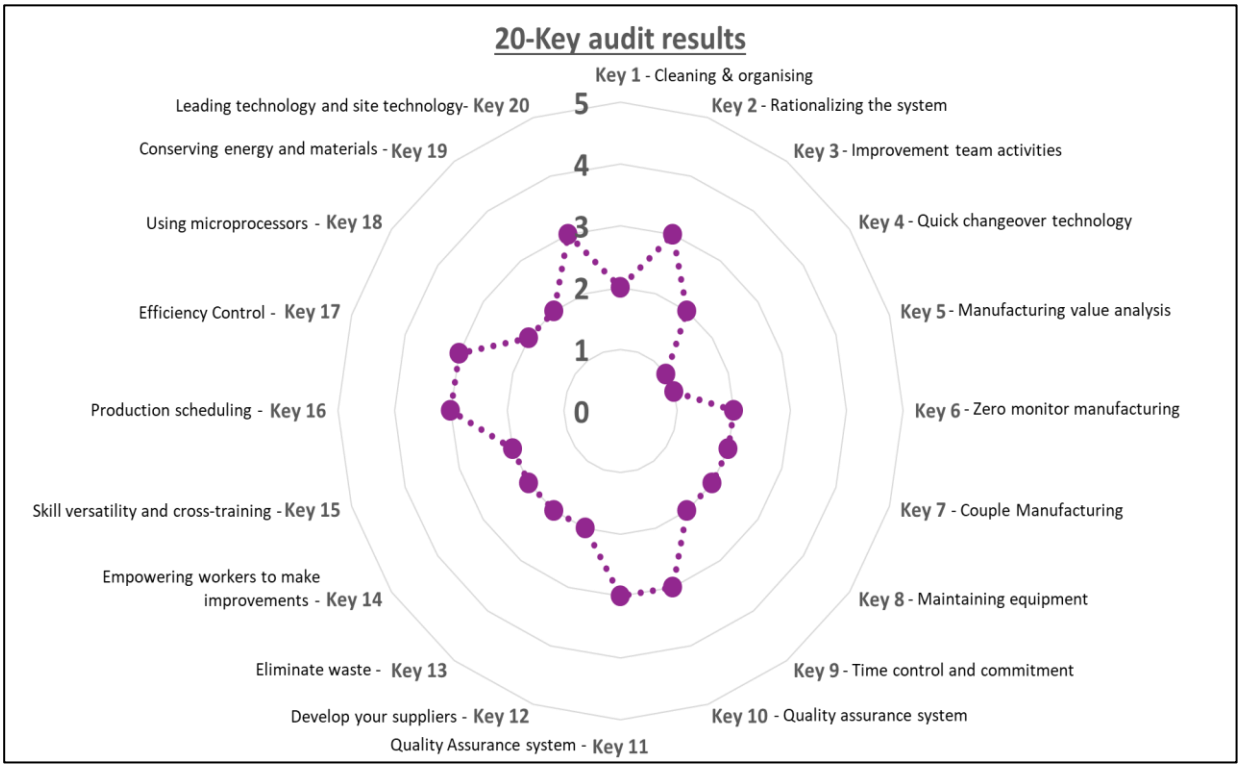


Figure 2: Radar diagram of the results from the 20 key audit

4.3 Analyse Phase – Thematic Map

A five-why analysis was done to find the causes for the low score of each of the 20 keys. The five-why summary is shown in Fig 3. This matrix grid was created by allocating the 20 key numbers to the rows and allocating A to E levels for each of the five whys across the columns. During analysis of the data suspected trends emerged, which were colour-coded.

The outcome of the five-why analysis was further investigated by means of a thematic analysis in order to discover the root causes of each of the 20 keys. The thematic map is illustrated in Fig 4.

The matric grid created by the 1-20 numbers and A-E levels, were used to illustrate the correlation between the five-why summary and the thematic map. Ergo, section A1 in the five-why summary (Figure 3) is labelled block A1 in the thematic map (Figure 4). Each of the suspected trends were confirmed as a root cause theme and therefore allocated the same colour as in the five-why summary.

The thematic map illustrates the convergence to the six common root causes of the low score of each of the 20 keys: (1) late job distribution to employees, (2) low employee morale and norms, (3) high staff turnover rate, (4) low employee skill level, (5) insufficient/absent tools and equipment, and (6) lack of demarcated areas; of which "high staff turnover rate" and "low employee morals and norms" were found to be the root causes for most of the issues (evident by the number of arrows ending at it).

The organisational culture could have had an influence on the employee moral and norms (root cause nr 2), as well as creating the work atmosphere, which could in turn influence staff turnover rates (root cause nr 3) [22]:

"Organisational culture is manifested in the typical characteristics of the organisation. It therefore refers to a set of basic assumptions that worked so well in the past that they are accepted as valid assumptions within the organisation... (which manifests itself in attitudes and behaviour)".

Hence, an ineffective organisational culture may have contributed to the situation in the case study organisation, as it dictates how things are done within an organisation (regardless if it is wrong or right) [22].

Suspected Trends	
Staff turnover	
Not enough equipment	
Job distribution in mornings	
Employee skill level	
Lack of demarcated areas	
Employee Moral and norms	

Level	A	B	C	D	E

Key	Problem Statement	Why 1	Why 2	Why 3	Why 4	Why 5
1	Work surfaces are disorganised	Technicians are comforable with work surfaces	They have to wait for some tools and equipment	There is not enough tools and equipment	Technicians must have their own tool boxes and share some equipment	
2	Specific objectives are not displayed with graphs	It was not seen as a need. They have data boards declaring hours.	Its is believed to be a waste of time	Workers may not look at it	There is new staff and it may take time to view visuals with understanding	There are different levels of knowledge and skills in workers.
3	There are no improvement teams	Technicians are already very busy and won't have time for it	It is seen as extra work	They feel that they won't be paid for it, thus they are resistant		
4	There is WIP piled up on work surfaces	Workers leave WIP closest to the car it belongs to	They are unsure where to leave it	There are no demarcated areas to place WIP		
5	It take more than 10 min to changeover jobs	Each job is different	There are different things wrong with each vehicle, and it needs time to get the parts for the job	The part store is situated away from the bays	It is the design of the building.	
6	Waste removal (for all types of waste) has not begun	It is difficult	Staff find it hard to grasp the current waste removals	There is new staff often (high staff turnover rate)		
7	The organisation still sees a need for monitoring	Workers some times need supervision	There is a lack of certain skills, so it is taught through supervision	Some workers were previously disadvantaged and there are new workers often		
8	There are only some forms of Kanbans	Workers are unsure of what they need for the next job	Workers only receive job cards in the morning	This is how the current system functions		
9	Maintenance and inspection of equipment has not formed part of their daily routines	Workers will not have enough time to do so	There is a delay in starting up in the mornings	Due to Job allocations being done in the mornings and low employee moral		
10	There is a delay to start up in the morning on jobs	There is time needed to prepare for the day	The moral of workers is low and there is a leadership issue	Jobs are distributed in the mornings	It is the current system of doing things	
11	There are no measures in place to conduct self quality checks	It is seen as a waste of time	People are not going to be honest, this it is a risk to check ones own work			
12	There are no value adding study groups across the departments with the suppliers	All suggestions and observations are done via managers	There is a lack of time for workers to be apart of study groups			
13	There are no waste improvement sessions	The service centre is still trying to master the current wastes	Workers feel like it is extra work	They are struggling to cope with the current work load	There is new staff often	People leave for better opportunities
14	There are no employee improvement teams	There is no time for extra activities	Workers are struggling to cope with the current work load	Employee moral is low	The staff turnover is high, thus there is new staff often. There are also some issues with leadership	They leave for better opportunities else where
15	Employees are not able to execute everyone's tasks on a basic level	Some workers are better trained for specific jobs	Their past experiences and abilities are different	Some employees come from previously disadvantaged backgrounds		
16	Service and efficiency goals are not met	There is overbooking and a lack of employee motivation	There is a lack of planning and high staff turnover rate	They are booking cars and not hours, ergo there is a lack of work scope. Also, staff find better opportunities else where		
17	Daily efficiency is not displayed in control charts	It takes too much time to develop these charts	There is a lack of skill to draw and interpret these charts	Workers still need to go for training to develop excel and analytical skills		
18	The service centre is not as automated as it could be	The service centre is not allowed to bring in new technology	They are apart of an international company, which requires standardisation throughout the world			
19	There is a struggle to actively reduce costs via conservation	Most of the equipment stays on throughout the day	It has become operator and workshop floor norms	It has not been formally addressed		
20	The company struggles to successfully incorporate new technologies	Workers take time to adjust	Due to the different levels of experience	Workers come from different backgrounds, as well as a high staff turnover		

Figure 3: Five-why summary

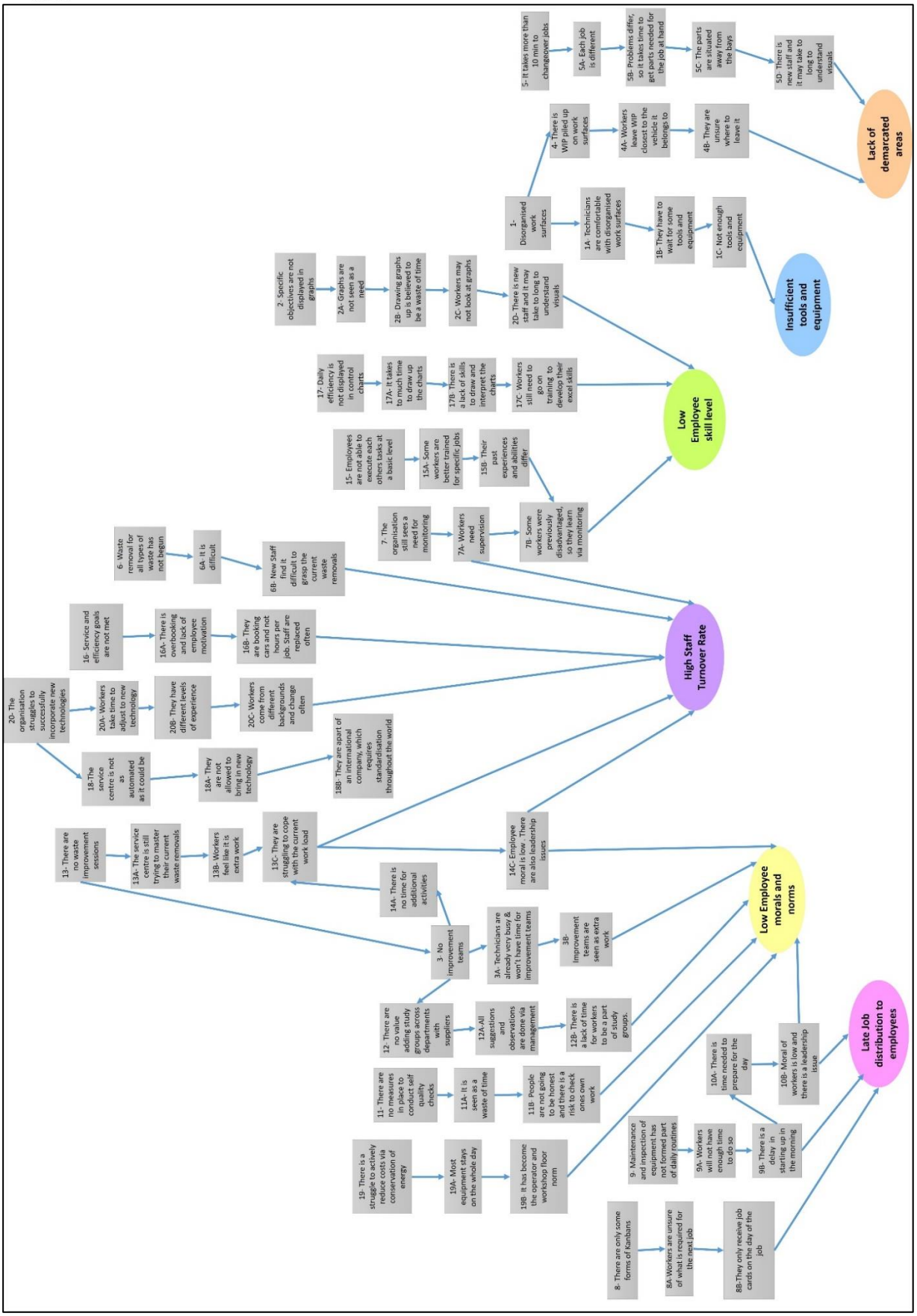


Figure 3: Thematic Map of root causes

The thematic analysis contradicted the case study organisation's opinion that they have implemented or adopted lean principles, while the results indicated that there was a mismatch of multiple principles [7]. The root causes and the violated lean management principles [7] are provided in table 2: The left column states the root cause and the he right column , states which of the 14 management principles of the Toyota way [7] was violated, indicated with a "P" and the principle number.

Table 2: Identified root causes and contrasting lean aspects

#	Identified Root Cause	Violated Lean Principle
1	Late job distribution to employees -The organisation takes extra time to start up operations in the morning, because jobs are only distributed to the employees in the morning. As a result, there is a delay in acquiring the parts and tools required to complete the job for that day.	1.1. **P4** - *Level out the workload (heijunka)*- Planning 1.2. **P6** – *Standardised tasks are the foundation for continuous improvement and employee empowerment* - Standardised tasks
2	Low employee morale and norms - Worker morale is low; this was recognised by management. Management has identified leadership issues. Many shop floor employees expressed their feeling of not being heard within the organisation, as there are not enough opportunities to express their suggestions. This lends to the waste in the form of unused employee creativity.	2.1. **P10** – *Develop exceptional people & teams who follow your company's philosophy* - Respect for people 2.2. **P2** – *Create continuous process flow to bring problems to the surface* - Eliminate waste (Unutilised employee creativity)
3	High staff turnover rate - The high staff turnover rate refers to the fact that workers are often resigning. Like with many organisations, some workers leave to pursue better opportunities at other companies.	3.1. **P1** – *Base your management decisions on a long-term philosophy* - Long life employment 3.2. **P10** – *Develop exceptional people & teams who follow your company's philosophy* - Employee development
4	Low employee skill level - Some employees come from disadvantaged backgrounds. In addition to this, not all employees are at the same skill level. These factors culminate to impacts the work experiences and skill levels of the various employees.	4.1. **P10** – *Develop exceptional people & teams who follow your company's philosophy* - Employee development 4.2. **P9** – *Grow leaders who thoroughly understand the work, live the philosophy, and teach others* - Grow leaders
5	Insufficient/absent tools and equipment - Technicians and shopfloor employees are required to bring their own toolboxes. Specialised equipment and tools are supplied at the specialised tools room. Due to this, employees frequently must share tools, which causes delays in jobs.	5.1. **P6** – *Standardised tasks are the foundation for continuous improvement and employee empowerment* - Standardised tasks
6	Lack of demarcated areas - Employees leave parts and tools used on vehicles next to the vehicles, as there are no demarcated areas for work-in-progress and tools. This causes multiple wastes in terms of motion, as workers walk around the parts and tools on the floor, as well as having too move them often	6.1. **P6** – *Standardised tasks are the foundation for continuous improvement and employee empowerment* - Standardised tasks 6.2. **P7** – *Use visual control so no problems are hidden* - Visual management

4.4 Design Phase - Improvement

During the improvement phase of the study, Kernel theories were used to develop suitable solutions, to address the root causes. These Kernel theories were aligned with the violated lean principle in table 2, striving towards achieving a true lean transformation. The root causes, applicable Kernel theories, solutions and implementation details are depicted in Table 3.

Table 3: Table of explanations of solutions

Root Cause	Kernel Theory	Solution	Implementation details
1 - Late Job distribution to employees	Optimisation tool for planning	Weekly job schedule	Employees skill levels must be evaluated to ensure that they are able to complete jobs allocated to them. In order to allocate jobs fairly, a justified method of allocating jobs must be identified. Weekly meetings must be set up to allocate jobs to employees for the up and coming week.
2 - Low employee moral	Improvement via team activities (Key 3 of 20 Keys)	More team building activities.	Group activities must be identified and scheduled. Thereafter, all employees must be invited to the events
3 - High staff turnover rate	Toyota's approach to Maslow's need hierarchy	Small improvement teams	Small improvement teams will aid in utilising employee creativity and involvement within the organisation. As it will require developing teams of 5 people from different departments, determining the roles within the teams and identifying improvement projects.
4 - Low employee skill level	Growing leaders who thoroughly understand the work, live the philosophy and teach it to others	Mentorship program	Employee skill levels must be reviewed to determine where they need to improve. This will allow for allocation of mentors based on the skill level of employees. A list of tasks to train on must be drafted and employees must be tested on their ability to complete the tasks.
5 - Insufficient (absent) tools and equipment	Standardise work (Using standard times)	Schedule for tools and equipment	A schedule will aid in providing structure to the method of sharing tools and equipment. A tool schedule must be created. Time studies must be conducted to determine the standard times for using tools. Lastly employees must be trained on how to use the tool schedule and it should be displayed on the workshop floor.
6 - Lack of demarcated areas	Use visual control so no problems are hidden	Standardised workstation layouts	A Kaizen event must be hosted to implement 5S in work cells. Hereafter, employees must be trained on how to set up their work cells based on the outcome of the 5s kaizen event. Lastly, all work cells must be inspected on a monthly basis.

4.5 Verify Phase – Testing Solutions

The Delphi method was used to verify the proposed solutions that were designed in the previous phase, by developing a survey to investigate employee's agreement with the proposed solutions.

Since each solution was developed from a Kernel theory, these Kernel theories were utilised to develop a hypothesis-based outcome for each solution which was in turn utilised to design a corresponding survey statement. Hypothesis-based outcomes allowed the researcher to assume what the outcome of the solution would be (based on literature) in order to test the participants agreement. The statements were compiled in a survey with a 5-point Likert Scale (Table 4) to evaluate their agreement with each of the statement. All statements were written in basic English (ensuring all jargon was explained).

Table 4: Likert scale used in the survey

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
(1)	(2)	(3)	(4)	(5)

Table 5 provides a summary of the root causes, proposed solutions, Kernel theories, hypothesis-based outcomes and survey statements).

Table 5: Table of summary for developing the survey

No.	Problem (Root causes)	Solution to address the problem	Kernel theory	Hypothesis-based outcome	Survey Statements
1	Late job distribution to employees	Develop a weekly job schedule	Optimisation tool for planning	A weekly job schedule will enable workers to coordinate jobs and prepare for jobs before the time.	1. A weekly jobs schedule will help workers to prepare for their up and coming jobs.
					2. A list of skills needed to complete each job can be compiled in 2 months.
2	Low employee morale and norms	Implement more team building activities	20 keys to workplace improvement - key 3 (Improvement via team activities)	Team building activities will improve employee relationships. This will lead to employees feeling valued by the organisation, which will improve the morale of employees.	3. Team activities will help workers build better relationships with each other.
					4. Team activities will show employees that the company values them.
					5. A suggestion box can be installed in 2 weeks, so employees can suggest team activities they would like to do.
3	High staff turnover rate	Create small improvement teams	Lean's approach to Maslow's Need Hierarchy	Small improvement teams will allow employees to feel valued and a part of the organisation, because it gives them a platform to provide their input. This will lead to employees wanting to stay at the organisation.	6. Small improvement teams (group projects to improve the work environment) will lead to employees feeling valued by the company.
					7. Small improvement teams will lead to employees feeling part of the company.
					8. A small improvement team can focus on one project in a month.

4	Low employee skill levels	Develop a mentorship Program	Principle 9 of the Toyota Way (Growing leaders who thoroughly understand the work, live the philosophy and teach it to others)	A mentorship program will allow more experienced workers to train other workers, via a practical transfer of knowledge. Lower skilled employees will be able to enhance their skill set, while developing leadership in higher skilled employees	9. A mentorship program will allow employees to gain new skills from other experienced employees. 10. It will take one month to evaluate the skills that employees have and need.
5	Insufficient (absent) tools and equipment	Create a schedule for tools and equipment	The lean tool of standard work (using standard times)	A tool and equipment schedule will allow increase access to tools and equipment. This schedule will further reduce waste in the form of waiting	11. A schedule for tools and equipment will allow workers to use and share tools with each other, so that workers do not wait a long time for tools. 12. It will take 2 months to measure the time employees spend using a tool/equipment for a job task. (Time measurements will be done for all tools and equipment).
6	Lack of demarcated areas	Create standardised workstation layouts	Principle 7 of the Toyota Way (Use visual control so no problems are hidden)	Standardised workstations will be more organised. This will reduce waste in terms of motion, waiting and defects, as employees will not have to look for parts/tools.	13. Having the same layouts in all the workstations will organise them and reduce waste (motion, waiting and defects). 14. It will take 2 weeks to hold a 5S kaizen event (A team-based activity to organise the workstations, which allows employees to have a say).

After the employees participated in the survey, their responses were tabulated and analysed using control charts. Consensus was defined as the average for each statement being above 3.75, which is a 75% agreement (on a 5-point Likert scale) [18]. The results are shown in table 6, including their position in the company, years at the organisation and age.

Responses to statements 1-3 and 6-14 of the survey, all displayed an average greater than 3.75 after the first round, declaring consensus and responses within the control limits (Table 6). However, responses to statements 4 and 5 provided challenges, as the response of participant 7 was out of the lower control limit (indicated in red in table 6). Upon investigation, it was revealed that the participant was a 52-year-old individual, placing him in the "aging and high seniority workforce" category [23]. It was also found that he had only been working at the organisation for 3 months. It can be deduced that the combination of being new to the organisation and older than most employees, caused him to view the organisation differently, since his view on feeling valued by the organisation was not yet established. This renders the data point removable with a valid cause, and the average re-calculated for statement 4 and 5. The last row of table 6 portrays that consensus on all statements were reached, as all averages are greater than 3.75.

Table 6 : Data from survey responses

#	Position	Position details	Years of service	Age	Response to statements													
					1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Management	Service Manager	0.33	28	4	3	4	4	3	4	4	3	4	2	4	3	4	4
2	Management	Workshop manager	0.25	34	1	2	5	5	5	5	5	5	5	4	1	2	4	1
3	Management	Dealership principle	2.00	38	3	4	5	4	5	4	5	4	3	5	5	5	5	2
4	Technician	N/A	3.00	28	5	3	5	5	5	5	5	5	5	5	5	4	5	5
5	Technician	N/A	0.58	31	4	3	5	5	4	4	4	3	5	5	5	4	4	4
6	Technician	N/A	1.00	33	4	4	4	4	4	4	4	4	4	3	4	4	4	4
7	Technician	N/A	0.25	52	5	2	5	2	2	4	5	5	5	5	2	5	4	5
8	Technician	N/A	0.08	32	4	5	4	4	4	4	4	4	5	5	3	3	4	4
9	Technician	N/A	0.50	31	2	3	5	5	5	4	4	4	3	3	4	5	4	4
10	Apprentice	N/A	1.00	26	5	2	5	5	5	5	4	4	5	5	5	4	5	5
11	Apprentice	N/A	0.25	21	4	4	5	5	5	4	4	4	5	4	4	2	5	3
12	Apprentice	N/A	0.17	24	5	5	5	5	5	5	5	5	5	2	5	5	5	5
13	Apprentice	N/A	1.00	36	3	4	5	5	5	5	5	5	5	5	3	4	3	4
14	Apprentice	N/A	0.17	26	5	5	4	4	5	5	5	5	5	5	5	4	5	5
15	Apprentice	N/A	0.50	28	5	3	5	5	5	5	5	4	3	4	5	4	5	2
16	Other	Parts Clerk	3.00	33	5	5	5	4	4	5	4	3	5	4	4	5	5	4
17	Other	Parks Clerk	1.00	45	4	5	5	5	5	5	5	4	5	5	5	5	5	5
18	Other	Contractor	2.00	35	4	5	4	5	5	4	5	5	5	2	2	2	4	5
19	Other	Windscreen Contractor	2.00	41	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	Other	Customer Relations	1.50	26	4	4	5	5	5	5	5	5	4	4	3	3	5	5
Initial Averages					4.00	3.75	4.70	4.50	4.50	4.50	4.55	4.25	4.50	4.05	3.90	3.85	4.45	4.00
Final Averages					4.00	3.75	4.70	4.63	4.63	4.50	4.55	4.25	4.50	4.05	3.90	3.85	4.45	4.00

This study reached consensus amongst participants after the first round of questions, ergo there was no need for additional rounds of the Delphi method. Since consensus amongst participants were reached, the solution can be considered verified.

5 CONCLUSIONS

In this study the organisation, used as case study, was experiencing a decline of the department's OPIs, which posed a potential loss of income for the organisation. Therefore, the aim of this research was to investigate the root causes of the organisation's poor OPIs by means of the lean continuous improvement approach.

The study was conducted by means of the DMADV approach, combining different problem-solving techniques in a novel approach. The root causes determined by a 20-Key audit and five-why analyses were reported in a thematic map. Potential solutions were developed utilising Kernel theories, after which they were verified via the Delphi technique.

This study indicated, the mismatch of multiple of the 14 lean management principles which is a common problem during lean implementations world-wide [24] [25] [26]. Hoogvelt and Yuasa [24] express that "The experience with Japanese or 'lean' production systems when transplanted to the West has often been below expectations", this was attributed to the misunderstandings in different social, economic and organisational cultures [24].

Furthermore, this research has also revealed the importance of organisational culture, ergo the people (employees) of an organisation have the power to make the organisation succeed or fail. The case study highlighted the issues with trying to implement the same organisational management strategies world-wide, throughout different organisations of the same "parent-company", causing lean and organisational cultural mismatches. From literature, it was made apparent that lean is rooted deeply in the Japanese culture [24]. Japan's history and folklores

depict a lean culture of doing nothing without meaning, thus ensuring that all members in a party understand the implications of decisions made. This ideology has transcended into the business world of Japan, making it the pioneers in lean. This could explain why there is a mismatch of lean in other countries' organisations.

The study also found that when dealing with organisational culture, there is no universal solution, instead continuous improvement approaches must be adapted to the current culture. When lean techniques are used verbatim, it may cause misunderstandings between the organisational culture and lean principles. The aforementioned cross-cultural adaptations of lean, highlights the importance of an effective organisational culture for successful lean implementation. Management should therefore be aware of the difference in cultures when adapting lean cross-culturally.

In summary, this study has developed a novel approach to discovering, analysing and addressing the mismatch of lean principles within an organisation and thereby emphasises the influence that organisational culture has on lean implementation.

6 FUTURE RESEARCH

The focused of this study was on identifying the root causes and solutions for improving the organisations OPI's. However, an implementation plan was not developed for the proposed solutions. It is therefore recommended that future research focus on such an implementation plan.

This research focused on a single organisation of an international automotive company. This international body's parent-company is a German based automotive company, which has taken lean tools from Japan and adapted it to the German culture. This set of adapted tools is utilised in strategies of the international organisation across the world. It is suggested that further research be conducted on the adaption and integration lean tool strategies to the South Africa culture.

During this study, it was proven that there is a misunderstanding of lean principles and it is recommended that future research be done on addressing this problem.

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CHAPTER 5

Systematic Literature review

This chapter contains a research paper that investigates the correlations and variations between Japanese Lean management principles and South African Ubuntu management principles, by mean of an SLR.

A Systematic Literature Review (SLR) comparing Japanese Lean Philosophy and the South African Ubuntu Philosophy

Mia Mangaroo-Pillay and Rojanette Coetzee

Abstract

- **Purpose –** To enhance the understanding of the Japanese Lean management principles in South African contexts using Ubuntu, in order to improve buy-in during lean implementation.
- **Design/methodology/approach** – A scoping systematic literature review (SLR) was used to investigate the correlations and variations between Lean management principles and Ubuntu management principles
- **Findings** – Both similarities and differences were discovered between Ubuntu and Lean. It was noted that Lean adopts principles that do not have corresponding Ubuntu principles, such as levelling out workload, continuous process flow, stopping to fix the problem and visual management.
- **Research limitations/implications** – While this research only utilised a South African concept (Ubuntu) to develop a novel Lean analogy, future research could be pursued in similar vein for other countries outside of Japan.
- **Practical implications** – The similarities could assist in "translating" Lean concepts to a South African context, ergo improving the understanding of the Lean principles and possibly contributing to more successful lean implementations.
- **Originality/value** – To the researcher's knowledge at time of publication, it is believed that this study is the first comparison of these two management philosophies. Ergo, the Lean-Ubuntu analogy is a novel comparison of Lean.

- **Keywords** – Lean management principles, Ubuntu management principles, South Africa, Systematic literature review, literature-based framework, Lean analogy
- **Paper type** – Literature review

1. Introduction

The Lean philosophy (from Japan) has become a global phenomenon, due to its organizational benefits for continuous improvement (Stone, 2012). However, it has been noted that there are several implementation problems and failures, such as poor employee buy-in (Amer & Shaw, 2014). Therefore, *Lean implementation success factors* and *barriers to lean implementation* have been widely investigated by numerous researchers (Achanga et al., 2006; Amer & Shaw, 2014; Fadly Habidin & Mohd Yusof, 2013; Hilton et al., 2012; Laureani & Antony, 2012; Martínez-Jurado & Moyano-Fuentes, 2014).

A 2012 study explained that the transition from traditional management philosophies to the Lean philosophy is primarily an organisational culture change matter, as opposed to solely a technical or manufacturing concern (Nordin *et al.*, 2012). This study further stated that various authors (Bamber & Dale, 2000; Bhasin, 2011; Bonavia & Marin, 2006; Crute *et al.*, 2003; Lee-Mortimer, 2008; Nordin *et al.*, 2012; Wong *et al.*, 2009) have indicated that *misunderstanding the concept and purpose of Lean* is a barrier to Lean implementation (Nordin *et al.*, 2012). Additionally, some authors (Melton, 2005; Worley & Doolen, 2006) identified *cultural differences* as a barrier to Lean implementation (Nordin *et al.*, 2012).

Danese et al. (2018) found multiple gaps in the literature concerning cultural differences and the misunderstanding of Lean , such as a "Lack of cross-country and cross-national cultural comparisons", which led to their recommendations for cultural comparisons (Danese et al., 2018:13). Ahmad (2013) proposed a framework that may be utilised to structure research regarding the cultural role in Lean manufacturing (Ahmad, 2013). His work illustrates the need for balance amongst organisational, national and work culture that is required for adaption to Lean culture. This highlights the need for research in adaptation of national cultures into the Lean culture.

Therefore, against this background, there is a need to enhance the understanding of the Japanese Lean management principles in other cultural contexts, in order to improve buy-in during lean implementation in these different cultural settings.

It is suggested that the key to Lean's success in Japan, is due to it being deeply rooted in the Japanese culture (Hoogvelt & Yuasa, 1994). But there are other management philosophies, of which Ubuntu, which is deeply rooted in the South African culture (Broodryk, 2007), is one. The purpose of this research is to investigate the correlations and variations between the Lean management principles and Ubuntu management principles (from the South African culture), via a scoping systematic literature review (SLR), for the first time in print.

2. Background

2.1. Ubuntu Philosophy

Ubuntu is the African concept of "humanness" or what it means to be human, which is claimed to have predated the majority of indigenous African knowledge (Bolden, 2014; Broodryk, 2005; Karsten & Illa, 2005; Kelly, 2018; Matolino & Kwindingwi, 2013; Mbigi, 1997; Van Heerden, 1998). The philosophy has only recently, as of the 1990s, entered the literature (been documented in written format). Before that the Ubuntu philosophy was passed down from generation to generation, as the foundation for leadership and hope (Broodryk, 2007).

The ancient concept of Ubuntu is reported to have originated in central Africa within the earliest societies, and as certain groups of people migrated to other parts of the continent, they took the Ubuntu philosophy with them (Mangena, 2016; Muxe Nkondo, 2007). As the new groups formed their new societies, the Ubuntu philosophy began to differ slightly among them, whilst seemingly staying true to the core principles (Mangena, 2016). Nowadays, the Ubuntu philosophy can be found in various African countries, such as Zimbabwe, South Africa, Mozambique, Zambia, Malawi, Botswana, Ghana, Angola and the DRC (Mangena, 2016).

With South Africa being a melting pot of rich diversity and cultural wealth, it is composed of several cultures and sub-cultures. In South Africa, the Ubuntu philosophy often governs the way a great deal of the population live their lives (Broodryk, 2005). Moreover, some South African cultures may unconsciously exercise Ubuntu principles, even without referring to it by name.

The fundamentals of Ubuntu lie in the aphorism "*umuntu ngumuntu ngabantu*", which means "I am a person through other people" (Broodryk, 2005). The eight basic Ubuntu core values are (Broodryk, 2007):

1. *Compassion* **–** Humanness, human rights, humanity, spontaneity, friendliness and helpfulness
2. *Forgiveness* **–** Understanding and consideration
3. *Responsibility* – Respect, obedience, giving unconditionally and sharing
4. *Honesty* – Good vs bad, norms and openhanded-ness
5. *Self-control* – Order, dignity, informality, redistribution and spirituality
6. *Caring* – Sympathy, appreciation and empathy
7. *Love* – Kindness, charity, tolerance and peace
8. *Perseverance* – Strength, commitment and cohesion.

Since the formal documentation of the Ubuntu philosophy in the 1990s (Karsten & Illa, 2005), it has transcended into the management sphere with the development of the Ubuntu management philosophy (Broodryk, 2005). In the early 2000s, Johann Broodryk (the first person to receive a PhD in Ubuntu) published his book *Ubuntu Management Philosophy* (Broodryk, 2005), which captured the essence of the Ubuntu philosophy and explained how to utilise it as a management philosophy in modern business (Broodryk, 2005). Later, the principles were also expanded upon by Msila (2015), who stated that Ubuntu is grounded in five levels for management applications – The 5Ps of Ubuntu (People centredness, permeable walls, partisanship, progeny and productivity).

2.2. Lean Philosophy

Lean is a business philosophy, used to eradicate waste, that was developed in Japan in the 1930s as part of the Toyota Production System (Holweg, 2007). Its gained world attention in the 1980s, due to its quality and efficiency (Liker, 2003). The Lean philosophy is described as being based on five key principles (Womack & Jones, 2003), namely:

1. *Value* – Defined from the customer perspective
2. *The value stream* – Map the set of actions required to create products or services
3. *Flow* – Work towards continuous flow throughout the process
4. *Pull* – Use a pull system
5. *Perfection* – Continuously strive for the paragon of the product/service.

These five principles subsequently, gave rise to the Lean management philosophy (Satolo *et al.*, 2017). With its origins in the manufacturing industry, this philosophy provides organisations with multifarious tools and quality improvement methods, via the 14 management principles, as described by Liker in *The Toyota Way (2003)*.

3. Research Method

A systematic literature review (SLR) was conducted to establish the possible correlations and variations between the Lean and Ubuntu management principles. In order to achieve this, many articles, journals and books were utilised from selected data bases.

The investigation entailed conducting a scoping SLR, which falls under the category of descriptive SLRs. This allowed for the extraction of as much information about Ubuntu and Lean, while giving an overview of the conceptual boundaries of the subjects (Booth *et al.*, 2016; Xiao & Watson, 2019).

The scoping SLR followed the method described by Xiao and Watson (2019) and is illustrated in figure 1.

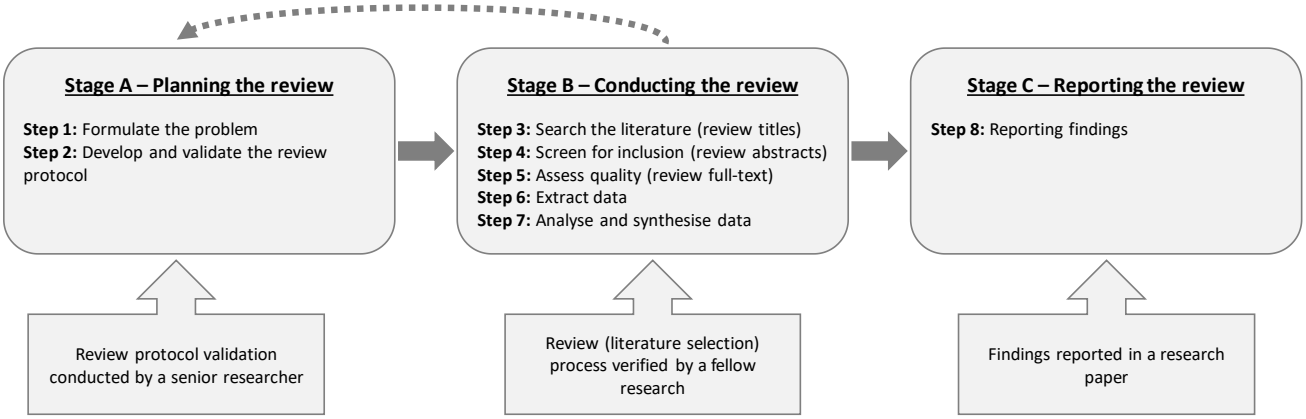

Figure 1 : Method of Systematic Literature Review (Adapted from Xiao & Watson, 2019)

The research method for conducting the SLR (illustrated in figure 1), has validity and verification ingrained within the steps of the process to maintain rigour throughout the process (Xiao & Watson, 2019).

3.1. Step 1 – Formulate the problem

The development of narrow research questions was utilised to steer the entire process going forward (Xiao & Watson, 2019).

3.2. Step 2 – Develop and validate the review protocol

The review protocol was developed by identifying the purpose of the study, creating the inclusion criteria, search strategies, quality assessment criteria and screening procedures (Xiao & Watson, 2019). Furthermore, this protocol must be validated by another researcher.

3.3. Step 3 – Search the literature

The literature searches were conducted via electronic databases, as it "constitutes the predominant sources of published literature collections" (Xiao & Watson, 2019). The six databases were searched using the advanced search features, as to abide by the inclusion criteria.

3.4. Step 4 – Screen for inclusion

For the purpose of screening the literature, the abstracts were reviewed If the resource meet the inclusion criteria the full-text was read (Xiao & Watson, 2019). The process followed was verified by a fellow researcher (via checklists) to ensure rigor.

3.5. Step 5 – Assess quality

A predetermined quality check was conducted to evaluate the resources that meet the inclusion criteria and full-text read (Xiao & Watson, 2019). This entailed checking the resources against the exclusion criteria and for validity of the source

3.6. Step 6 – Extract data

The information found in resources, that meet the quality assessment, were read and manually coded (Xiao & Watson, 2019). This will allow for the emergence of themes and patterns.

3.7. Step 7 – Analyse and synthesize data

The codes were utilised to organise the data and highlight correlations and variations between Lean and Ubuntu(Xiao & Watson, 2019).

3.8. Step 8 – Report findings

The findings are document in section 4, which encompasses the methodology followed, particularly the inclusion criteria, and the conclusions of the study (Xiao & Watson, 2019).

4. Findings

4.1. Step 1

The developed narrow research questions (RQ) were stated as follows:

- *RQ1* - What are the correlations or compatibilities between Lean management principles and Ubuntu management principles?
- *RQ2* - What are the variations or gaps between Lean management principles and ubuntu management principles?

4.2. Step 2

The developed review protocol is detailed in table 1. After the establishment of the protocol, it was validated by a senior researcher during iterative discussions and deliberations.

Table 1: Review protocol

Purpose of the study	To establish the correlations and variations between the Japanese Lean philosophy and the South African Ubuntu philosophy.
Inclusion criteria	• Literature including "Lean" or "Ubuntu" in their title, abstract or keywords. • Literature on Ubuntu management philosophy • Literature on lean management philosophy
Exclusion	• Theology/religious based Ubuntu literature (as opposed to the management philosophy of Ubuntu • Ubuntu in terms of legislative principles • Ubuntu literature referring to Software/programming • Lean literature related to obesity/weight-loss • Lean literature that only discusses the 5 principles of Lean philosophy (as opposed to management principles) • Non-English literature
Search databases	Searches were conducted on 6 databases, namely: • ScienceDirect, • Scopus, • IEEE Xplore, • Web of Science, • EBSCOhost (*Academic Search Premier, Africa-wide information, Applied Science & Technology Source, Business Source Premier, eBook Collection, E-journal, MasterFILE premier, Philosophers Index with full-text*) • Emerald Insight Journals
Keywords	All the selected databases were searched using the following key words: • "Lean Philosophy" and "Management Principles" • "Ubuntu Philosophy" and "Management Principles"
Quality assessment criteria	• All duplicate literature was excluded • Recovered literature will be checked for relevance (besides inclusion and exclusion criteria)

4.3. Step 3 to 5

This section illustrated the detailed selection process of resources for Lean management principles and Ubuntu management principles, as described in steps 3 to 5 of the method.

4.3.1. Lean management principles – Resources found

The process of identifying literature was conducted over a period of two week on six databases. The initial search of the databases proved to be challenging, as searching "Lean philosophy" and "Management principles" yield several results that illustrated misinterpretation and confusion of principles. Multiple sources listed lean tools and techniques as management principles, instead of listing the actual 14 management principle of Lean (Liker, 2003). Additionally, several results found confused the 5 principles of Lean philosophy (Womack & Jones, 2003) with the 14 management principles of Lean(Liker, 2003).

In order to filter through the resources found, a second search was conducted. Where an additional search term was added: "Toyota", because the 14 management principles of Lean was originally developed by Toyota (Liker, 2003). After the second search, 185 results screened, thereafter 6 articles were filtered through the screening and quality check steps.

Finally, the 6 articles were deemed eligible for use after a full-text assessment. The aforementioned selection process is depicted in figure 2.

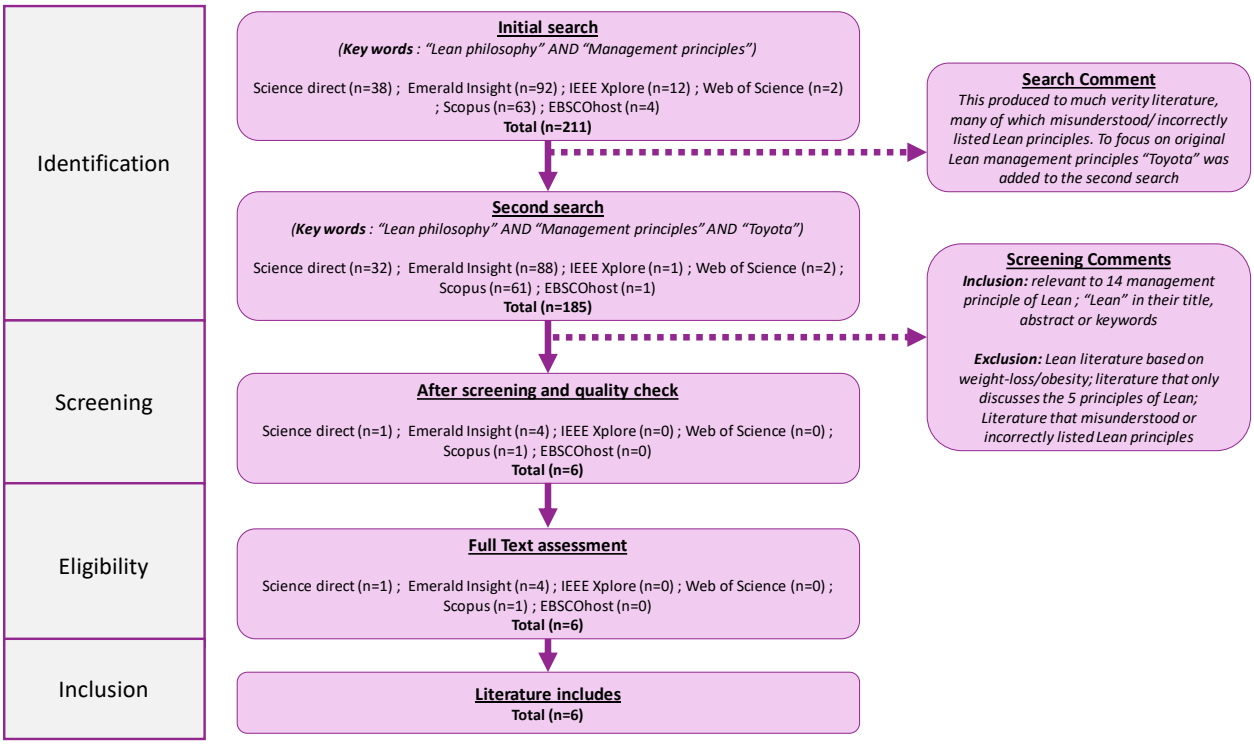

Figure 2: Selection process chart for literature on Lean management principles

The process followed was verified by a fellow researcher, via a checklist to ensure rigor. In order to achieve this, this independent researcher followed the process depicted in figure 2 over a period of 3 months and got to similar results. The only discrepancy picked up was that an additional article was added to the Emerald Insight database, between the time of conducting the search and conducting the validation search. Upon picking up the discrepancy, the researcher reviewed the additional article and found that it did not meet the inclusion criteria for this study, thus it was excluded.

4.3.2. Ubuntu management principles – Resources found

In a similar vein to the Lean search process, this process of identifying literature was conducted over a period of two week on the same six databases. The initial search of the databases proved to be challenging, as searching "Ubuntu philosophy" and "Management principles" yield only 4 results (i.e. too few results due to specific key words searched). In order to expand the search, a second search was conducted on the same databases, but "philosophy" was removed from the keywords. This allowed for 45 results to be found, as it was not restricted by the concept of Ubuntu being a philosophy. However, it was determined that 45 results were too minimal, so a third search was to be done. This was conducted on an eBook database, to expand the search once more to textbooks in the field. In sum of the second and third searches resulted in 70 resources.

After screening and quality checking the 70 resources, it was determined that 4 results met the criteria set. Finally, the 4 resources were deemed eligible for use after a full-text assessment. The aforementioned selection process is depicted in figure 3.

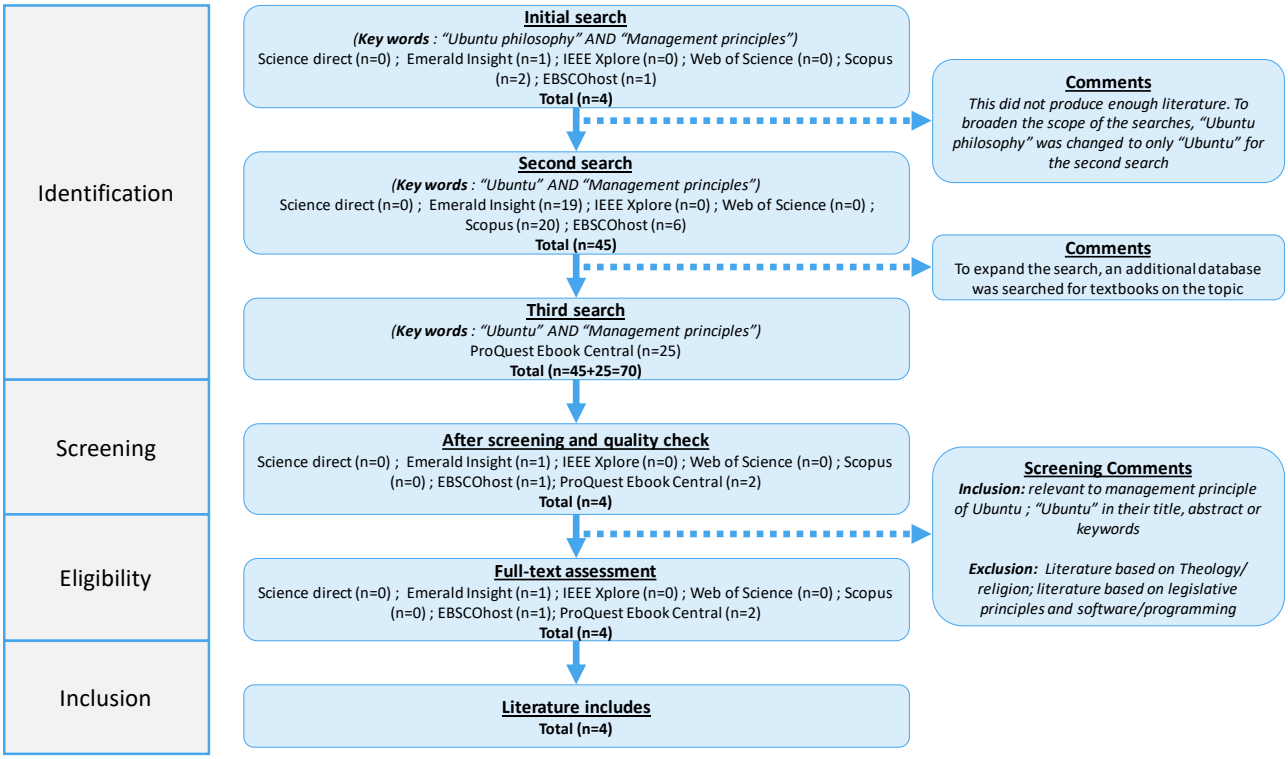

Figure 3: Selection process chart for literature Ubuntu management principles

In accordance to the Lean search verification, this process was also verified by the same fellow researcher, via a checklist to ensure rigor. With the intention of achieving verification, this independent researcher followed the process depicted in figure 3 and reached the same results, thus no discrepancies were found.

4.4. Step 6

After conducting the unbiased searches, as discussed in section 4.3, ten literature sources met the criteria to be included in this study. The literature sources on Lean management principles and Ubuntu management principles that was included in this study is listed in table 2.

Table 2 : Literature used in this study

	#	Author(s) and Year	Title	Type of source
Lean	L1	Ljungblom (2014)	Ethics and Lean Management – a paradox?	Journal article
	L2	Gelei *et al.* (2015)	Lean production and leadership attributes – the case of Hungarian production managers	Journal article
	L3	Satolo *et al.* (2017)	Lean production in agribusiness organizations: multiple case studies in a developing country	Journal article
	L4	Meiling *et al.* (2012)	Managing for continuous improvement in off-site construction: Evaluation of lean management principles	Journal article
	L5	Moeuf *et al.* (2016)	Strengths and weaknesses of small and medium sized enterprises regarding the implementation of lean manufacturing	Journal article
	L6	Saurin *et al.* (2013)	A complex systems theory perspective of lean production	Journal article
Ubuntu	U1	Broodryk (2005)	UBUNTU: Management Philosophy	eBook
	U2	Msila (2015)	Ubuntu: Shaping the current workplace with (African) wisdom	eBook
	U3	McFarlin *et al.* (1999)	South African management development in the twenty-first century	Journal article
	U4	Van Heerden (1998)	The application of post-war Japanese management principles to post-apartheid South African information services: a viable option?	Research Article

4.5. Step 7 to 8

All the resources listed in table 2 were analysed for common trends and patterns in their principles, this is discussed in depth in section 4.5.1 and 4.5.2.

4.5.1. Lean management principles

Upon analysing the literature source found, table 3 was developed based on the Lean management principles (Liker, 2003),summarising the meaning of each of the principle, whilst categorising the principles into the 4P sections.

Table 3: Summary of the meaning of the 14 Lean management principles

Section	Principle	Summary
I – Long term philosophy	1 – Base your management decisions on a long-term philosophy even at the expense of short-term financial goals	Align the entire organisation and grow towards a bigger goal than just making a profit. Be responsible as the organisation generates value for society, customers and the economy.
II – The right process will produce the right results	2 – Create continuous process flow to bring problems to the surface	Processes should be re-designed to accomplish value-added, continuous flow, while reducing idle time to zero.
	3 - Use "pull" systems to avoid overproduction	Only produce what the customer wants, how much they want, when they want it. (Function on a just-in-time basis, which will minimize your work-in-process and inventory)
	4 - Level out the workload (Heijunka)	Eliminate wastes, overburden to resources and unevenness in production scheduling.
	5 - Build a culture of stopping to fix problems, to get quality right the first time	Equipment should have built in features that allow it to stop itself when an issue has been detected. Thereafter, visual management should be utilised to indicate the support type need
	6 - Standardized tasks are the foundation for continuous improvement and employee empowerment	Make use of constant, replicable methods throughout the organisation to maintain predictability, timing and outputs. Ergo, creating the foundations of pull and flow within the system.
	7 - Use visual control so no problems are hidden	Design simplistic visual indicators to aid employees in determining whether they are deviating from standard conditions or not. This will support pull and flow.
	8 - Use only reliable, thoroughly tested technology that serves your people and processes	Utilise technology that supports your employees and does not replaces them. It is best to manually work out a process before adding the supporting technology. Additionally, conduct annual test on the technology, whilst not being afraid to reject or modify it.
III – Add value to the organisation by developing your people and partners	9 - Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others	Leaders should be role models from within the organisation, that understand the daily work in great detail, such that they can best teach the company's philosophy to others.
	10 - Develop exceptional people and teams who follow your company's philosophy	Develop a robust, firm culture, through which company values and beliefs are widely shared and transcends over the various years. Cross-functional teams will improve quality and productivity, whilst enhancing flow by technical problem solving.
	11 - Respect your extended network of partners and suppliers by challenging them and helping them improve	Treat your partners and suppliers with veneration, like there are an extension of your organisation. Moreover, challenge them to develop by setting targets and helping them achieve it.
IV – Continuously solving root problems drives	12 - Go and see for yourself to thoroughly understand the situation (genchi gembutsu)	Personally, observe and verify data, by going to the source of the problem and seeing it for oneself. This will allow managers to have more than a superficial understanding of the issue.
	13 - Make decisions slowly by consensus, thoroughly	Do not select a single direction until you have meticulously considered the alternatives. Utilise the

organisational Learning	considering all options; implement decisions rapidly	Japanese principle of Nemawashi, which is collective decision making amongst all those affected by an issue.
	14 - Become a learning organization through relentless reflection (hansei) and continuous improvement (kaizen)	After establishing all the process, utilise continuous improvement tools to address inadequacies. This will allow for the exposure and elimination of wastes. Moreover, reflect on crucial milestones and develop best practices going forward.

4.5.2. Ubuntu management principles

Upon analysing the literature source found relevant to Ubuntu, table 4 was developed based on the Ubuntu management principles. From the literature it was observed that although authors may differ in the naming of the principles, the core value and meaning behind the principles remained the same. Therefore, for the purpose of this study, the naming structure described by Msila (2015) was utilised to summaries the findings, as it was the most descriptive yet concise. Table 4 summarises the meaning of each of the principle, whilst categorising the principles into the 5P sections.

Table 4: Summary of the meaning of the Ubuntu management principles

Section	Principles	Summary
I - People centredness	1- People centred work culture - Community, solidarity, commitment	By placing focus on all employees, it fosters a feeling of responsibility to elevate the organisational culture. When employees are happy, it boosts team commitment to achieve organisational goals.
	2 - Empowering people - Team leadership and shared responsibility	Once all employees share leadership traits, it is easier to achieve the organisation's goals. Employees utilise their skills to continually develop the organisation, as responsibility is shared by all.
	3 - Transformational leadership - Inspire, motivate, influence, support	It reinforces trust and respect in an organisation, as leaders are treated with honour by fellow employees. This allows the leaders to bring about valuable change in the organisation.
	4 - Mentoring - supportive environment	To strengthen people-centredness within an organisation, Ubuntu recommends mentoring. As it aids in developing employees, such that they can grow the organisation.
	5 - Shared vision - goal directed	People-centred companies are efficacious, due to employees trying to achieve one vision. This is based on common ground with the interest of the company at heart.
II - Permeable walls	6 - Openness and honesty - supporting relationships and communication	To achieve coordination within an organisation, clear communication is key, which is supported by openness and honesty. This requires the full participation of everyone in the organisation.
III - Partisanship	7 - Loyalty to the organisation	Loyalty must be built through strong organisational values. This is achieved by cultivating and promoting collegiality, whilst reinforcing commitment within an organisation. Organisations should perform the African tradition of "sharing a calabash", by providing employees with the platform to share their ideas to build the organisation.
IV - Progeny	8 - Collective decision making	Ubuntu utilises consensus amongst employees in arriving at decisions within an organisation, as it based on the need for a

		"village to survive". Ergo, all employees need to participate in decision making.
	9 - Sharing power and Teamwork	Power sharing within an organisation creates a sense of equality amongst employees. It fosters the importance of solidarity, responsibility and effective teamwork.
V - Productivity	10 - Continuous employee support and development	Continuously develop employees and provide them with constant support, whilst magnifying the brand and goals.
	11 - An effective team is a team with the right tools	To magnify production, effectiveness and efficiency within an organisation, employees should have access to the correct tools and equipment needed.
	12 - Strong organisational value	Effectively organisations will shape and intensification the positive values, which lead to strong employee commitment.
	13 - Rewarding employees for application of the "right culture"	Encourage employees by introducing a rewards system, ergo illustrating the benefits the organisational culture to employees.

5. Discussion

It was found that Ubuntu and Lean share many similarities, such as being people focused with foundations in respect, teamwork, leadership, collective decision making and continuous improvement. However, Ubuntu management principles do not account for several Lean principles, such as continuous process flow, pull systems, levelling out the workload, building a culture of stopping to fix problems and visual control. The correlations and variations between Lean management principles and Ubuntu management principles are captured in a comparison table (Table 5).

An additional difference is that Lean philosophy is based on the 4Ps of Lean (Philosophy, Process, People & partners and Problem solving), whereas Ubuntu management philosophy is based on the 5Ps of Ubuntu (People-centeredness, Permeable walls, Partisanship, Progeny and Productivity).

Table 5: Comparison table of Lean and Ubuntu management principles

Lean Management Principles	Ubuntu Management Principles	Discussion
1 – Base your management decisions on a long-term philosophy even at the expense of short-term financial goals	7 - Loyalty to the organisation 12 – Strong values	Lean requires one to align the entire organisation, with growing towards a bigger goal than simply turning a profit. Thereby, building a long term philosophy of being responsible as the organisation generates value for society and customers. Correspondingly, Ubuntu states that one must build loyalty through organisational values, by cultivating and promoting collegiality and reinforcing commitment.
2 – Create continuous process flow to bring problems to the surface	None	No corresponding Ubuntu principle
3 - Use "pull" systems to avoid overproduction	None	No corresponding Ubuntu principle
4 - Level out the workload (Heijunka)	None	No corresponding Ubuntu principle

5 - Build a culture of stopping to fix problems, to get quality right the first time	None	No corresponding Ubuntu principle
6 - Standardized tasks are the foundation for continuous improvement and employee empowerment	2 - Empowering people - Team leadership and shared responsibility	Lean explains that by making use of constant, replicable methods throughout the organisation to maintain predictability, timing and outputs, it will empower employees. Similarly, Ubuntu declares that due to responsibility being shared by all, employees will use their obtained skills to continually develop the organisation.
7 - Use visual control so no problems are hidden	None	No corresponding Ubuntu principle
8 - Use only reliable, thoroughly tested technology that serves your people and processes	11 - An effective team is a team with the right tools	Lean expresses that an organisation should only make use of technology that supports their employees and does not replace them. Thereby, giving employees the best tools for them. Equally, Ubuntu explains that employees should have access to the correct tools and equipment, in order to magnify production.
9 - Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others	3 - Transformational leadership - Inspire, motivate, influence, support 4 - Mentoring	Lean desires to have leaders be role models from within the organisation, such that they can teach the company's philosophy to other. In the same way, Ubuntu requires leaders to bring about valuable change within the organisation, because they are from the organisation.
10 - Develop exceptional people and teams who follow your company's philosophy	10 - Continuous employee support and development 9 - Sharing power and Teamwork 1 - People centred work culture - Community, solidarity, commitment 13 - Rewarding employees for application of the "right culture"	Lean explains that by developing an organisation's employees, it will develop a robust, firm culture, through which company values and beliefs are widely shared and transcends over the various year. Ubuntu develops a similar approach over multiple principles. It requires the continuous support and development of employees. Furthermore, it encourages sharing power and teamwork amongst employees, whilst rewarding the use of the "right culture". Lastly, Ubuntu is based on a people centred work culture, which fosters a feeling of responsibly to elevate the organisational culture.
11 - Respect your extended network of partners and suppliers by challenging them and helping them improve	6 - Openness and honesty - supporting relationships and communication	Lean expects one to treat their organisational partners and suppliers with veneration, as if they were an extension of the company.

		Ubuntu achieves this by supporting openness and honesty within all, as such to forester clear communication.
12 - Go and see for yourself to thoroughly understand the situation (genchi gembutsu)	8 - Collective decision making	Lean encourages all to personally observe and verify data, by going to the source of the problem oneself. Ergo allowing for collective decision making by all involved. Correspondingly, Ubuntu believes that that it takes a "village to survive", thus it is imperative for all to be involving in decision making.
13 - Make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly	8 - Collective decision making	Lean explains that an organisation should not select something until alternatives are meticulously considered, thereby making use of collective decision making (Nemawashi). Likewise, Ubuntu believes that it is imperative for all to be involving in decision making.
14 - Become a learning organization through relentless reflection (hansei) and continuous improvement (kaizen)	5 - Shared vision - goal directed 10 - Continuous employee support and development	Lean requires for organisations to utilised continuous improvement tools to address inadequacies, once all processes are established. Ubuntu believes that people-centred companies are efficacious because employees try to achieve one goal. Furthermore, Ubuntu requires for continuous support and development of employees, such that they can continuously grow and develop the organisation.

6. Literature-based framework – The Lean-Ubuntu analogy

In order to provide a visual representation of the relationship between Lean and Ubuntu management principles, a literature-based framework was designed, termed the Lean-Ubuntu analogy. In order to ensure that the Lean-Ubuntu analogy was aesthetically appealing and able to convey the relationship between Lean and Ubuntu, design requirements were established. Table 6 states the design requirement and discusses how each of these requirements were achieved in the design.

Table 6: Table of design requirements

#	Design Requirements	How it was addressed in the framework
1	The framework must be simple in structure	The framework has minimal complexity or levels to it
2	The framework must be coherence amongst all the elements	The relationship between the principles is depicted using a Venn-diagram
3	The framework must be visually intuitive	The relationship between the elements is obvious at first glance

4	The framework must be legible	The framework makes use of basic colours and fonts, in sufficient font size
5	The framework must incorporate aspects of the original works	The framework incorporates the original P-levels of Lean and Ubuntu (the pyramids)
6	The framework must adopt a stand procedure for explaining relationships	The framework utilises the standard procedure of Venn-diagrams to depict the relationship between the two philosophies.

Figure 4 depicts the aforementioned relationship between Ubuntu and Lean. It illustrates the "pyramids" of each management philosophy, depicting the 4Ps of Lean (left side of figure) and 5Ps of Ubuntu (right side of figure). Additionally, the figure is comprised of a Venn-diagram, which illustrated the principles that overlap (correlations) and the Lean principles that do not have a corresponding Lean principle (variations).

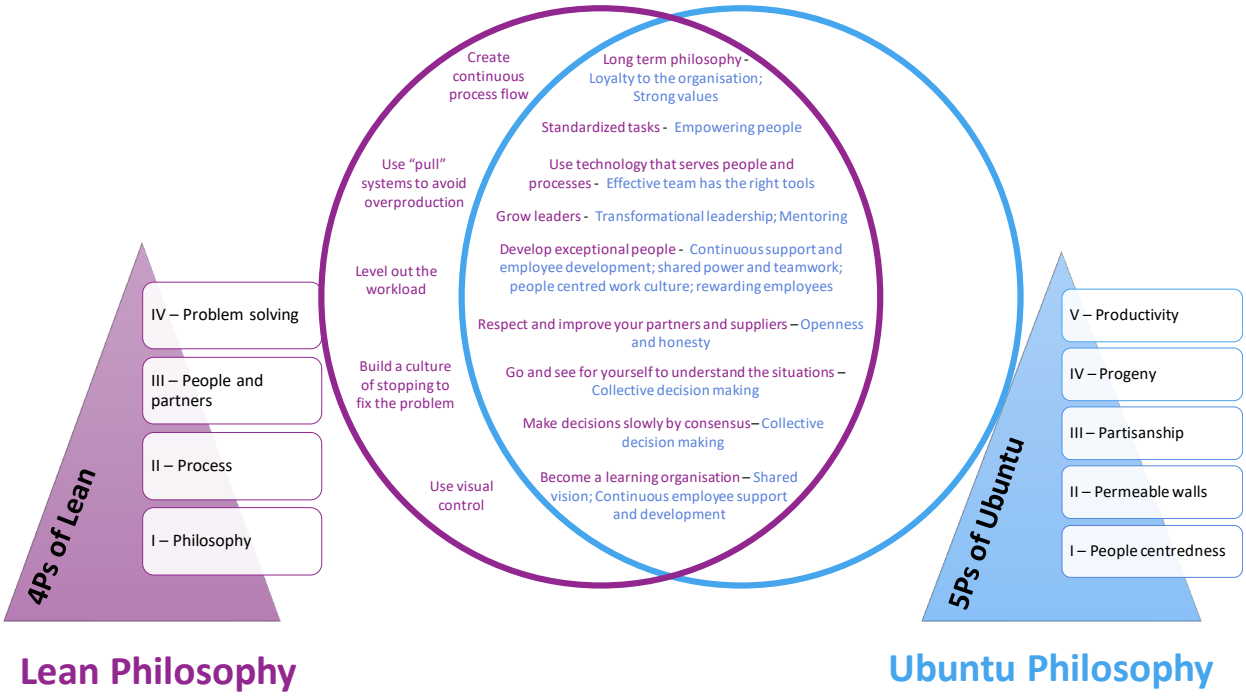

Figure 4 : Diagram of relationship between Lean management principles and Ubuntu management principles

Whilst the similarities between Lean and Ubuntu are captured in the overlap of the Venn diagram, the pyramids illustrate the differences in philosophical foundations. From figure 4, it can be observed that the Lean philosophy has its foundation in building a long term philosophy first, whereas the Ubuntu management philosophy has its roots planted in people-centeredness. It is imperative to note, that Lean too, addresses the people factor in its third tier of the philosophy.

7. Conclusions and Opportunities for further research

During this research, a novel Lean-Ubuntu analogy was developed for the South African context (via a SLR), illustrating the correlations and variations between Ubuntu and Lean. Moreover, the study offered a fulsome understanding, by connecting Japanese Lean management principles to their respective South African Ubuntu versions. This addressed the need to bridge the gap in understanding of the Lean principles. Furthermore, to the researcher's knowledge, it is believed that this study is the first comparison of these two management philosophies.

By utilising the similarities found, South African organisations can use the Ubuntu concepts to explain Lean concepts, in order to improve the understanding of Lean implementation. The Lean-Ubuntu analogy therefore gives South Africans the platform to understand Lean management principles, increasing buy-in and contributing to more effective Lean implementations.

During this study, the importance of conducting parallel selection process verification was highlighted. Whilst the researcher conducted the selection process over a period of two weeks, the independent fellow researcher conducted their selection process over a period of three months. This resulted in more resources being added to the databases in this time, thereby skewing the verification process. Thus, it is imperative to ensure that selection process verification occurs expeditiously.

This study illustrates the comparison between Lean philosophy and a local South African philosophy; therefore, it is further recommended that future research be done on exploring other countries' philosophies to compare with Lean.

While designing the literature-based framework, the challenges of using established design requirements was brought to light. As no established design requirements for creating a Lean framework were found in the literature, thus it is recommended that future research be done on establishing design requirements for Lean framework creation.

While these findings are promising, this research only compared Lean management principles and Ubuntu management principles. Thereby, emphasising that Ubuntu and Lean share many similarities, whilst discovering that Ubuntu principles do not account for several Lean principles. It is therefore recommended that further investigations be conducted on the lack of corresponding Ubuntu principles, in order to find suitable comparisons.

Additionally, while this paper focuses on the creation the Lean-Ubuntu analogy, further explorations should be conducted on validating this literature-based framework. It is also recommended that studies be carried out on the practical implementation of this framework, along with how to teach it to employees within organisations.

8. Resources

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CHAPTER 6

Surveys

This chapter explains how surveys were designed and carried out for the verification and validation of the Lean-Ubuntu analogy.

6.1. Introduction

In chapter 5, the research paper, “A systematic literature review (SLR) comparing Japanese Lean management principles and South African Ubuntu management principles” was presented. The SLR concluded with the development of an analogy between Lean and Ubuntu based on the findings of the SLR, which was depicted as the Lean-Ubuntu analogy. In order to verify and validate the Lean-Ubuntu analogy, a survey was administered to South African Lean experts

6.1.1. Research approach

The research utilised a qualitative design to explore the comparison between Lean and Ubuntu. This allowed for the collection and analysis of data from participants, which was based on their individual experiences of specific phenomenon (Levitt, 2018:2).

6.1.2. Entrée and establishing researcher roles

Permission was obtained from the North-West University Engineering Research Ethics Committee (NWU-ENG-REC) to conduct the research. Prior to the commencement of the surveys, informed consent was obtained from the participants. Prospective participants were also informed that their participation was voluntary, and that they could withdraw, at any time, from the research.

The researcher fulfilled different roles in this research: developing the questions (statements) for the surveys, explaining the purpose of the research to all participants, and analysing and interpreting the data gathered from surveys.

6.1.3. Sampling strategy

The research utilised purposive sampling, as participants were selected for predetermined reasons (De Vos *et al.*, 2011:231). As suggested by Nordin *et al.* (2012b) and Skulmoski *et al.* (2007), participants were carefully chosen for their aptitude to provide an expert response to the survey questions, thus sampling was non-statistical in nature (Nordin *et al.*, 2012b; Skulmoski *et al.*, 2007). The selected panel of participants was a heterogeneous group, composed of Lean academic experts and Lean industry experts. This sampling strategy was further coupled with snowball sampling, as the identified experts were able to lead the researcher to other experts (De Vos *et al.*, 2011:233).

Considering the aforementioned, the inclusion criteria was developed, similar to that of Coetzee (2018):

1. Operative communication skills
2. Inclination and ability to partake

3. Adequate time to partake
4. A 3-year (minimum) expert known and demonstrable experience in Lean management in South Africa

Multiple studies suggest that there is flexibility in qualitative research with regards to sample sizes (Crouch & McKenzie, 2006:14; De Vos *et al.*, 2011:350; Malterud *et al.*, 2016:8; Marshall, 1996:3). However, Marshall *et al.* (2013:11) recommended that qualitative studies make use of 20-30 surveys, whilst researchers should take into consideration the requirements of their journal publication's standards. Considering the aforementioned recommendation, the researcher aimed to identify and conduct 20 surveys with experts (or as much as can be permitted by the limitation of experts).

17 prospective participants were identified using the aforementioned sampling method and inclusion criteria. From the prospective sample, 10 participants partook in the survey, thereby providing an 58.82% response rate. The distribution of the experience levels of the participants is shown in table 5 and figure 12.

Both table 5 and figure 12 express that the sample was well distributed, with the majority of participants having an experience level of 7-15 years. The sample even contains 10% of participants with more than 21 years of experience.

Table 5: Distribution of participants' experience

Experience Level	Proportion of sample	Percentage of sample
3 years	2	20%
4-6 years	1	10%
7-10 years	3	30%
11-15 years	3	30%
16 -20 years	0	0%
>21 years	1	10%
Total	**10**	**100.00%**

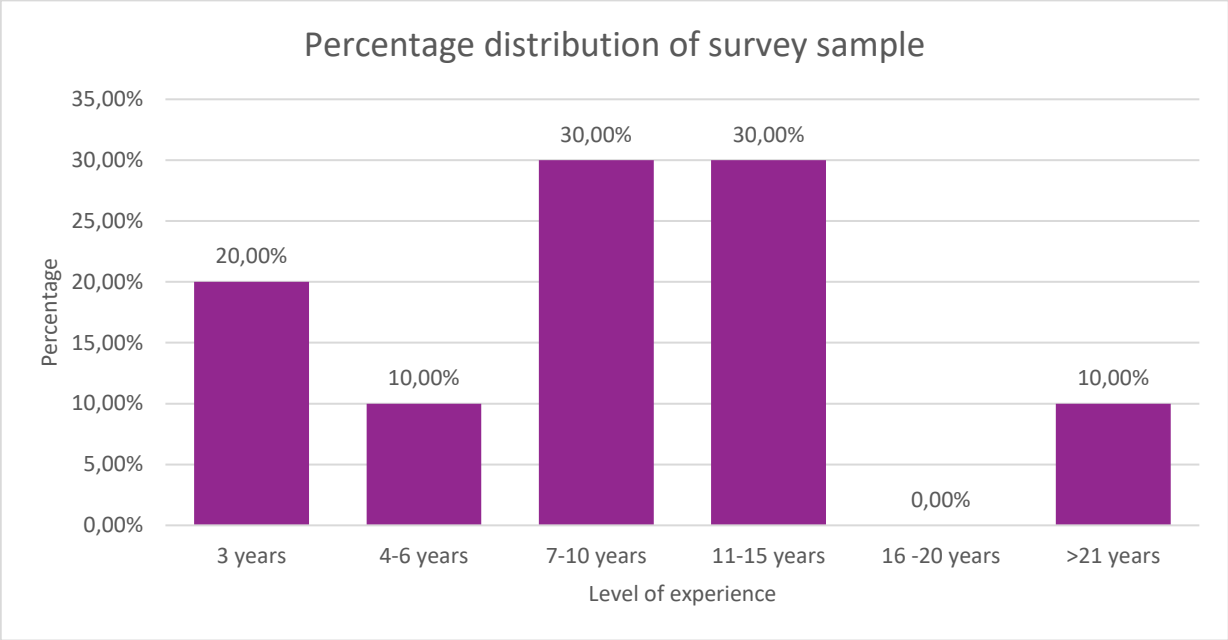

Figure 12: Percentage distribution of survey sample

6.1.4. Administration procedure

An online survey, along with an interactive PowerPoint presentation video, was sent via email to the participants. Furthermore, the online survey contained an informed consent form.

The email explained that participants were required to watch the video, prior to completing the survey, as the video served as an overarching explanation of the research and findings thereof. The video and survey were to take the participants no longer than 30 minutes to complete. After 10 days, a reminder email was sent to individuals who did not respond by the given deadline.

6.1.5. Strategies to ensure data quality and integrity

Different strategies were implemented to ensure data quality and integrity throughout the survey process. The research was guided by the "Eight 'Big-Tent' Criteria for Excellent Qualitative research" (Tracy, 2010:3-11).

Sincerity and credibility of data and results were ensured by being honest and transparent throughout the survey process (Tracy, 2010:5-8). The researcher aimed to achieve resonance by natural generalisation and transferability of findings. In order to achieve significant contribution and meaningful coherence, the researcher adhered to all ethical considerations and utilise approved methods, whilst interconnecting literature and findings (Tracy, 2010:3).

6.2. Survey Construction

As advocated by Sinkowitz-Cochran (2013:2), this survey was a self-administered or individually-administered survey, such that participants may complete it themselves (Sinkowitz-Cochran, 2013:2). This allowed for the researcher to have minimal involvement, thereby placing the emphasis on the participants professional opinions (De Vos *et al.*, 2011:188). Furthermore, the survey was composed of scaled and closed-ended questions (statements), consequently participants will select their response from a list of predetermined options, as it is less time-consuming and demanding on the participant (De Vos *et al.*, 2011:198; Sinkowitz-Cochran, 2013:3).

6.2.1. Survey design requirements

In order to develop an all-encompassing survey, a survey design requirements checklist was set up based on the literature discussed in chapter 2 (Bryman & Bell, 2014; De Vos *et al.*, 2011; Fanning, 2005; Kelley *et al.*, 2003; OECD, 2012; Sinkowitz-Cochran, 2013). All these design requirements were adhered to while designing the survey (as illustrated in table 6).

Table 6 : Survey design requirements

#	***Design requirement***	***Achieved***
1	Format is uncluttered and well spread	√
2	Instructions are included	√
3	A thank you message is included at the end of the survey	√
4	Make use of a pre-existing scale for responses	√
5	Statements are not vague or ambiguous	√
6	Statements are not leading or persuasive	√
7	Statements do not contain unexplained jargon or acronyms	√
8	Statements are as few as possible	√
9	Statements are as short as possible	√
10	Statements are not double-barrelled	√
11	Grouping is utilised for statements	√
12	Surveys maintain anonymity and confidentiality of the participant	√
13	Statements are composed in simple and basic English, and pitched at the right level	√
14	Each statement is relevant to the validation process	√

6.2.2. Scale of choice

Literature (Bryman & Bell, 2014; De Vos *et al.*, 2011; Fanning, 2005; Kelley *et al.*, 2003; OECD, 2012; Sinkowitz-Cochran, 2013) suggests that the Likert scale is the best option for ranking agreement levels of participants. The standard five point Likert scale (table 7) will be utilised for the purpose of this study (Bryman & Bell, 2014:196; Sinkowitz-Cochran, 2013:4).

Table 7 : Likert scale

(1)	(2)	(3)	(4)	(5)
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

6.2.3. Defining consensus

Consensus amongst participants would be reached when the minimum average percentage of agreement per statement was greater than 75%, which measures 3.75 on the 5 point Likert scale. This definition of consensus is adapted from the Delphi method's definition of consensus amongst participants, which is also a 75% agreement level (Nordin *et al.*, 2012b).

6.2.4. Survey statements design

The survey statements were designed with a specific goal in mind: testing the Lean-Ubuntu analogy developed based on the SLR's outcomes. In order to accomplish this, table 8 (De Vos *et al.*, 2011) was developed to verify and validate the following:

- Verify the design requirements (**DR**) of the literature-based framework (As explained in Chapter 5)
- Verify the correlations and variations between Lean principles (**LP**) and Ubuntu principles (**UP**) in the Lean-Ubuntu analogy artefact
- Validate the research problem (**PS**)
- Validate that the artefact addresses the research problem statement (**PS**)

Table 8 discusses each of the aforementioned objectives' elements and which survey statements were developed from them.

Table 8: Development of Survey statements

Objective	Elements	Survey statements
Verify the design requirements (**DR**) of the literature-based framework	**DR 1** – The framework must be simple **DR 2** – The framework must be coherence amongst all the elements	1 - The framework is simple in design
		2 - There is coherence amongst all the elements of the framework
		3 - The framework is visually intuitive at first glance

	DR 3 - The framework must be visually intuitive **DR 4** - The framework must be legible **DR 5** - The framework must incorporate aspects of the original works **DR 6** - The framework must adopt a standard procedure for explaining relationships	4 - The framework is legible
		5 - The framework incorporates aspects of the original works into its design
		6 - The framework utilises a standard procedure for explaining relationships between entities
Verify the content of the artefact (correlations and variations between Lean principles (**LP**) and Ubuntu principles (**UP**))	**LP 1** - Base your management decisions on a long-term philosophy even at the expense of short-term financial goals **UP 7** - Loyalty to the organisation **UP 12** – Strong Values	7 - The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Loyalty to the organisation"
		8 - The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Strong values"
	LP 2 - Create continuous process flow to bring problems to the surface **UP** - None	9 - The Lean principle of "Creating continuous process flow" does not have a correlating Ubuntu principle.
	LP 3 - Use "pull" systems to avoid overproduction **UP** - None	10- The Lean principle of "Use 'pull' systems" does not have a correlating Ubuntu principle.
	LP 4 – Level out the workload (Heijunka) **UP** - None	11 - The Lean principle of "Level out the workload" does not have a correlating Ubuntu principle.
	LP 5 - Build a culture of stopping to fix problems, to get quality right the first time **UP** - None	12 - The Lean principle of "Building a culture of stopping to fix problems" does not have a correlating Ubuntu principle.
	LP 6 - Standardized tasks are the foundation for continuous improvement and employee empowerment **UP 2** - Empowering people - Team leadership and shared responsibility	13 - The Lean principle of "Standardized tasks are the foundation for continuous improvement and employee empowerment" correlates with the Ubuntu principle of "Empowering people"
	LP 7 - Use visual control so no problems are hidden **UP** - None	14 - The Lean principle of "Use visual control" does not have a correlating Ubuntu principle.
	LP 8 - Use only reliable, thoroughly tested technology that serves your people and processes	15 - The Lean principle of "use only reliable thoroughly tested technology" correlates with the Ubuntu principle of "An effective team is a team with the right tools".

	UP 11 - An effective team is a team with the right tools	
	LP 9 - Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others **UP 3** - Transformational leadership - Inspire, motivate, influence, support **UP 4** - Mentoring	16 - The Lean principle of “Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others” correlates with the Ubuntu principle of “Transformational leadership”. 17 - The Lean principle of “Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others” correlates with the Ubuntu principle of “Mentoring”.
	LP 10 - Develop exceptional people and teams who follow your company’s philosophy **UP 1** - People centred work culture - Community, solidarity, commitment **UP 9** - Sharing power and teamwork **UP 10** - Continuous employee support and development **UP 13** - Rewarding employees for application of the "right culture"	18 - The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “People centred work culture”. 19 - The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Sharing power and teamwork”. 20 - The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Continuous employee support and development”. 21 - The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Rewarding employees for application of the ‘right culture’”.
	LP 11 - Respect your extended network of partners and suppliers by challenging them and helping them improve **UP 6** - Openness and honesty - supporting relationships and communication	22 - The Lean principle of “Respect your extended network of partners and suppliers” correlates with the Ubuntu principle of “Openness and honesty”.
	LP 12 - Go and see for yourself to thoroughly understand the situation (genchi gembutsu) **UP 8** - Collective decision making	23 - The Lean principle of “Go and see for yourself to thoroughly understand the situation” correlates with the Ubuntu principle of “Collective decision making”.
	LP 13 - Make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly **UP 8** - Collective decision making	24 - The Lean principle of “Make decisions slowly by consensus, thoroughly considering all options” correlates with the Ubuntu principle of “Collective decision making”.
	LP 14 - Become a learning organization through relentless reflection (hansei) and continuous improvement (kaizen)	25 - The Lean principle of “Become a learning organization through relentless reflection and continuous improvement” correlates with the Ubuntu principle of “Shared vision”.

	UP 5 - Shared vision - goal directed **UP 10** - Continuous employee support and development	26 - The Lean principle of "Become a learning organization through relentless reflection and continuous improvement" correlates with the Ubuntu principle of "Continuous employee support and development".
Validate the research problem(**PS**)	**PS 1 –** There is a lack of understanding of Lean management principles in South Africa, which creates poor employee buy-in during Lean implementation	27 – Lean is sometimes misunderstood during implementation
Validate that the artefact addresses the problem statement (**PS**)	**PS 1 –** There is a lack of understanding of Lean management principles in South Africa, which creates poor employee buy-in during Lean implementation	28 - The analogy could be used to "translate" the Lean management principles into a South African context, by means of Ubuntu. 29 - The analogy could aid in gaining employee buy-in during Lean implementation.

6.2.5. Format (Layout)

The final survey format (Appendix A) , was composed in a similar fashion to that of Coetzee (2018) with the following sections:

- Informed consent information
- Participant information
- Confirmation of design requirements
- Confirmation of Ubuntu-Lean relationships
- Confirmation of research problem and addressing it
- Closure

6.3. Survey results

After conducting the survey, the results were tabulated and analysed (refer to appendix B). As discussed in section 6.2.3 consensus was defined as greater than or equal to 75% (3.75 on a 5 point Likert scale), ergo consensus was achieved for each of the survey statements, as captured in table 9 and figure 13.

Table 9: Survey results

#	Survey statements	Averages	Percentage
1	The framework is simple in design	4.33	86.67%
2	There is coherence amongst all the elements of the framework	3.89	77.78%
3	The framework is visually intuitive at first glance	4.22	84.44%

4	The framework is legible	4.44	88.89%
5	The framework incorporates aspects of the original works into its design	4	80.00%
6	The framework utilises a standard procedure for explaining relationships between entities	4.11	82.22%
7	The Lean principle of “Base your management decisions on a long-term philosophy” correlates with the Ubuntu principle of “Loyalty to the organisation”	3.78	75.56%
8	The Lean principle of “Base your management decisions on a long-term philosophy” correlates with the Ubuntu principle of “Strong values”	4	80.00%
9	The Lean principle of “Creating continuous process flow” does not have a correlating Ubuntu principle.	4.11	82.22%
10	The Lean principle of “Use ‘pull’ systems” does not have a correlating Ubuntu principle.	4.11	82.22%
11	The Lean principle of “Level out the workload” does not have a correlating Ubuntu principle.	3.89	77.78%
12	The Lean principle of “Building a culture of stopping to fix problems” does not have a correlating Ubuntu principle.	3.75	75.00%
13	The Lean principle of “Standardized tasks are the foundation for continuous improvement and employee empowerment” correlates with the Ubuntu principle of “Empowering people”	4	80.00%
14	The Lean principle of “Use visual control” does not have a correlating Ubuntu principle.	3.89	77.78%
15	The Lean principle of “use only reliable thoroughly tested technology” correlates with the Ubuntu principle of “An effective team is a team with the right tools”.	4.44	88.89%
16	The Lean principle of “Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others” correlates with the Ubuntu principle of “Transformational leadership”.	4.22	84.44%
17	The Lean principle of “Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others” correlates with the Ubuntu principle of “Mentoring”.	4.11	82.22%
18	The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “People centred work culture”.	4.33	86.67%
19	The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Sharing power and teamwork”.	4.22	84.44%
20	The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Continuous employee support and development”.	4.67	93.33%

21	The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Rewarding employees for application of the ‘right culture’”.	3.78	75.56%
22	The Lean principle of “Respect your extended network of partners and suppliers” correlates with the Ubuntu principle of “Openness and honesty”.	4	80.00%
23	The Lean principle of “Go and see for yourself to thoroughly understand the situation” correlates with the Ubuntu principle of “Collective decision making”.	4	80.00%
24	The Lean principle of “Make decisions slowly by consensus, thoroughly considering all options” correlates with the Ubuntu principle of “Collective decision making”.	4.33	86.67%
25	The Lean principle of “Become a learning organization through relentless reflection and continuous improvement” correlates with the Ubuntu principle of “Shared vision”.	4	80.00%
26	The Lean principle of “Become a learning organization through relentless reflection and continuous improvement” correlates with the Ubuntu principle of “Continuous employee support and development”.	4	80.00%
27	Lean is sometimes misunderstood during implementation	4.67	93.33%
28	The analogy could be used to “translate” the Lean management principles into a South African context, by means of Ubuntu.	4	80.00%
29	The analogy could aid in gaining employee buy-in during Lean implementation.	4.22	84.44%

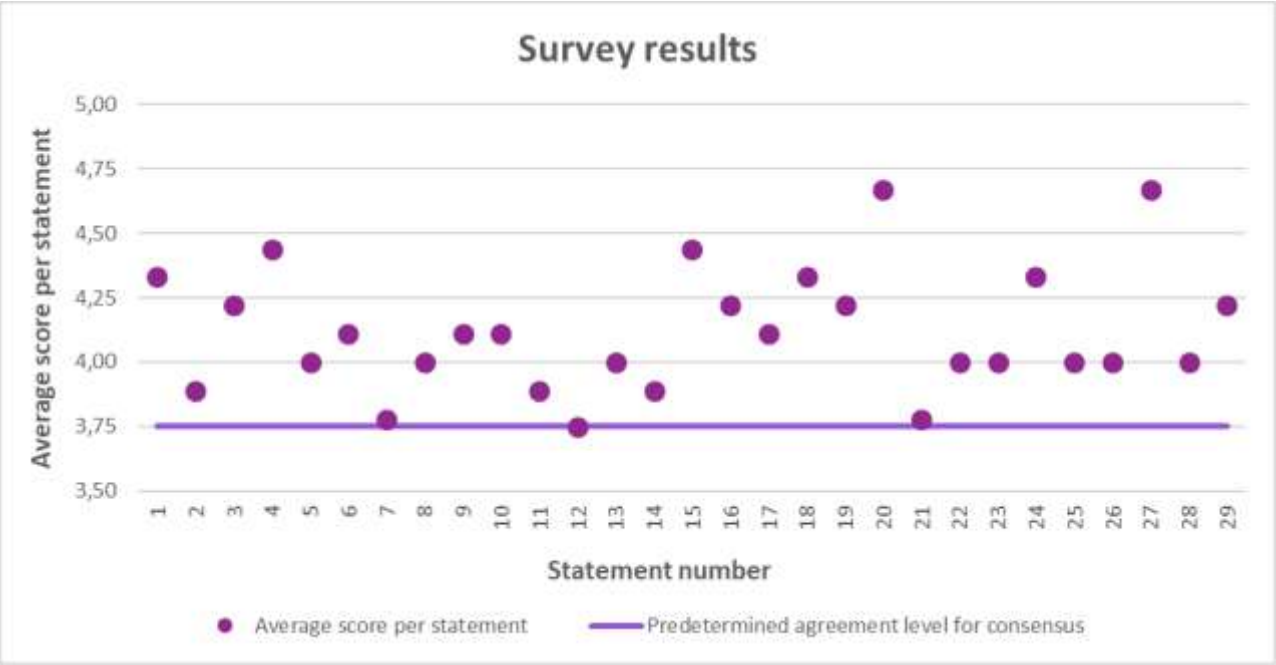

Figure 13: Survey results

The results displayed in table 9 and figure 13 are discussed in the sections that follow, according to the **quantitative** feedback (averages) and **qualitative** feedback (comments and notes), with the raw data available in appendix B.

6.3.1. Verification of artefact design requirements

Survey statements 1-6 were based around the design requirements for a literature-based framework (The Lean-Ubuntu analogy). The **quantitative** results for statements 1-6 proved consensus amongst participants regarding the aesthetics of the Lean-Ubuntu analogy, therefore proving that this framework adheres to all the design requirements. No **qualitative** feedback (comments) were provided by participants on statements 1-6.

6.3.2. Verification of the relationship between Lean principles and Ubuntu principles

The relationship between Lean and Ubuntu was evaluated in survey statements 7-26. The results in table 5 display the results after analysis of the data, however in appendix B the original averages are capture before data analysis. From appendix B, it can be observed that the original averages for statements 12,13 and 25 were below 75%, ergo not displaying consensus.

For statement 12, the original average was 3.44 (68.89% agreement). However, upon review of the data, it was found that participant-3 scored this statement 1 out of 5, thus indicating that they strongly disagreed. Participant-3 based this decision on their opinion that the Lean principle of stopping to fix the problem, should correlate with the Ubuntu principle of empowering employees. This was due to participant-3 believing that the Lean principle (stopping to fix the problem) empowered employees. Although this could be true, the focus of this Lean principle is primarily focused on the quality of processes (since it lies in the process section of the 14 Lean management principles). The principle explains that equipment should have features in order to stop the assembly line to get quality right the first time, which should be supported by visual management. It can be argued that employee empowerment is a biproduct or secondary focus of this principle. Therefore, it is justified to remove participant-3's data point for statement 12 and recalculated the average. Upon removal of this data point, the average was recalculated as 3.75(75%) and thus consensus was reached.

The original average of statement 13 was 3.67 (73.33% agreement). This statement discussed the comparison of Lean's "P6-Standardized tasks are the foundation for continuous improvement and employee empowerment" with the Ubuntu principle of "Empowering people". Upon investigation, it was revealed that participant-5 scored this statement 1 out of 5, indicating strong disagreement. This went against the trend by other participants in the scoring of this statement. It can be deduced that since participant-5 has only 0-3 years' experience working with Lean

philosophy, their perceptions and understanding of this Lean principle are not yet established. Accordingly, it is justified to remove participant-5's data point for statement 13 and recalculated the average. After the removal of this data point, the average was recalculated as 4 (80% agreement), thereby reaching consensus.

Statement 25's original average was 3.33 (66.67% agreement). Whilst analysing the data it was revealed that three participants (3, 5 and 9) disagreed with statement 25. Participant-3 explained their disagreement as the correlation being unclear and not direct, because they view it as an overlap(connection) between Lean and Ubuntu, but with room for more investigation. This explanation lends to the need for future research on this but indicates that the participant sees a correlation between the two concepts. Therefore, it is justified to remove this data point for statement 25 and recalculate the average.

In a similar vein to the response given in statement 13, participant-5 disagreed with statement 25. Therefore, it can be deduced that since participant-5 has only 0-3 years' experience working with Lean philosophy, their perceptions and understanding of this Lean principle are not yet established. Therefore, it is justified to remove participant-5's data point for statement 25 and recalculated the average. Additionally, participant-9 also disagree with statement 25, stating that they believe that the Ubuntu principle of shared vision is a forward (future) thinking idea, whereas Lean's continuous improvement is a backward (past) thinking idea. It is imperative to note that while Lean's continuous improvement approach requires a company to reflect on the past, it is in order to think about the future and plan for it to be better. Ergo, it can be argued that both Lean and Ubuntu share the forward (future) thinking idea. Therefore, it is justified to remove participant-9's data point for statement 25, based on their misunderstanding of the specific lean principle. Once the aforementioned data points were removed, the average for statement 25 was recalculated as 4 (80% agreement), thus proving consensus.

Thus, the **quantitative** results for statements 7-26 proved consensus amongst participants regarding the relationships within the Lean-Ubuntu analogy. Therefore, the correlations and variations between Lean and Ubuntu could be considered acceptable to "translate" Lean into the South African context.

The **qualitative** results, established from participant comments, provide future research suggestions for the relationship between Ubuntu and Lean:

- I can see how it could be described as analogous but can equally see differences. (participant-1)

- Lean mechanisms are more granular than the Ubuntu principles in some cases. I think that there are many cross-links that can be explored (participant-3)
- For future work, I would love to see how your work could become the basis for a new approach - not lean, but ubuntu. where we are not using ubuntu analogies to describe lean, but rather use ubuntu directly to achieve similar objectives as lean does. (participant-9)

6.3.3. Validation of research problem

Survey statement 27 are based on the existence of the research problem in South African Industries. The **quantitative** results for statement 27 proved consensus amongst participants on the misunderstanding of Lean principles during implementation. This statement's average was the highest with 4.67 out of 5 (93.33% agreement) from participants. No **qualitative** feedback (comments) were provided by participants on statement 27.

6.3.4. Validation of the artefact addressing the research problem

In order to evaluate if the Lean-Ubuntu analogy addresses the research problem, survey statements 28-29 were utilised. The **quantitative** results for statements 28-29 proved consensus amongst participants of the ability of the Lean-Ubuntu analogy to address the stated research problem. Thereby proving that this framework could be used to "translate" Lean into the South African context during implementation and aid in gaining employee buy-in.

The **qualitative** feedback (comments) confirm the ability of the Lean-Ubuntu analogy to address the research problem:

- This framework could assist practitioners in explaining Lean from a uniquely South African context, which will probably lead to an increase in sustainable Lean implementations. (participant-4)
- The work could be ground-breaking. I like that you intend to use Ubuntu principles as analogies for Lean practice. This could possibly create a global context for localising improvement, rather than importing Japanese practices (participant-9)

6.4. Chapter summary

This chapter discussed the approach, construction of and results of the survey. It explained the qualitative and quantitative feedback on all statements, illustrating that consensus was achieved amongst all survey statements. Furthermore, from the qualitative feedback future research was suggested.

CHAPTER 7

Verification and Validation

This chapter discusses how verification and validation was conducted during this research

7.1. Introduction

The overarching research study, as described in chapter 1 and 3, was verified and validated in various manners. The focus of this chapter is to summarise these verification and validation strategies

For the duration of this study, verification was conceptualised as conducting research or creating an artefact in the correct manner, thereby following a prescribed modus operandus (Arthur *et al.*, 1999). Whereas, validation was conceptualised as the ability of the developed artefact to address or solve the issue or problem in industry (Arthur *et al.*, 1999).

7.2. Verification

The verification process for the overarching research consisted of the following phases:

- **Results of SLR selection process** - The results from the SLR selection process (used to create the Lean-Ubuntu analogy) were verified by an independent fellow researcher, via a checklist. She was able to verify all search outcomes by following the selection process parallel to the study (**Chapter 5**).
- **Design of survey** – The design requirements for the survey design, based on literature, were verified by the researcher, via a checklist (**Chapter 6**)
- **Design requirements for the Lean-Ubuntu analogy**– The surveying of South African Lean experts verified that all design requirements were adhered to when creating the Lean-Ubuntu analogy, (**Chapter 6**).
- **Relationship between Lean and Ubuntu** – South African Lean experts verified (by means of the surveys) all the correlations and variations between Lean management principle and Ubuntu management principles (**Chapter 6**)

7.2.1. Results of SLR selection process

In order to verify the results from the SLR selection process, an independent fellow researcher conducted the search using the same search protocol. The outcome was confirmed using the checklist depicted in appendix C.

7.2.2. Design of the survey

When designing the survey, literature was utilised to develop a design requirement checklist. This checklist (table 10) was then utilised by the researcher to verify adherence to the design requirements of the surveys.

Table 10: Verification of survey design requirements

#	Design requirement	Achieved
1	Format is uncluttered and well spread	√
2	Instructions are included	√
3	A thank you message is included at the end of the survey	√
4	Make use of a pre-existing scale for responses	√
5	Statements are not vague or ambiguous	√
6	Statements are not leading or persuasive	√
7	Statements do not contain unexplained jargon or acronyms	√
8	Statements are as few as possible	√
9	Statements are as short as possible	√
10	Statements are not double-barrelled	√
11	Grouping is utilised for statements	√
12	Surveys maintain anonymity and confidentiality of the participant	√
13	Statements are composed in simple and basic English, and pitched at the right level	√
14	Each statement is relevant to the validation process	√

7.2.3. Design requirements for the Lean-Ubuntu analogy

The design requirements for the literature-based framework (the Lean-Ubuntu analogy) were verified by South African Lean experts, using the survey (as discussed in chapter 6). The survey made use of six statements to confirm that the design requirements were met (table 11).

Table 11: Verification of the analogy design requirements

Survey statement related to design requirements of the analogy	Results
1. The framework is simple in design	4.33
2. There is coherence amongst all the elements of the framework	3.89
3. The framework is visually intuitive at first glance	4.22
4. The framework is legible	4.44
5. The framework incorporates aspects of the original works into its design	4
6. The framework utilises a standard procedure for explaining relationships between entities	4.11

Since the average for each statement was above 3.75, it can be declared that consensus was reached, ergo verifying that the design requirements of the Ubuntu-Lean analogy were adhered to.

7.2.4. Relationship between Lean and Ubuntu

The Ubuntu-Lean relationships within the framework (the Lean-Ubuntu analogy) were verified by South African Lean experts, using the survey (as discussed in chapter 6). The survey made use of 20 statements to confirm that the relationship between the elements was correct. The results of these survey statements are stated in table 12. Since the average is above 3.75 for each statement, it can be declared that consensus was reached, ergo verifying that the design requirements were achieved.

Table 12: Verification of the relationship between Lean and Ubuntu

Survey statement related to design requirements of the analogy	Results
7. The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Loyalty to the organisation"	3.78
8. The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Strong values"	4
9. The Lean principle of "Creating continuous process flow" does not have a correlating Ubuntu principle.	4.11
10. The Lean principle of "Use 'pull' systems" does not have a correlating Ubuntu principle.	4.11
11. The Lean principle of "Level out the workload" does not have a correlating Ubuntu principle.	3.89
12. The Lean principle of "Building a culture of stopping to fix problems" does not have a correlating Ubuntu principle.	3.75
13. The Lean principle of "Standardized tasks are the foundation for continuous improvement and employee empowerment" correlates with the Ubuntu principle of "Empowering people"	4
14. The Lean principle of "Use visual control" does not have a correlating Ubuntu principle.	3.89
15. The Lean principle of "use only reliable thoroughly tested technology" correlates with the Ubuntu principle of "An effective team is a team with the right tools".	4.44
16. The Lean principle of "Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others" correlates with the Ubuntu principle of "Transformational leadership".	4.22
17. The Lean principle of "Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others" correlates with the Ubuntu principle of "Mentoring".	4.11

18. The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “People centred work culture”.	4.33
19. The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Sharing power and teamwork”.	4.22
20. The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Continuous employee support and development”.	4.67
21. The Lean principle of “Develop exceptional people” correlates with the Ubuntu principle of “Rewarding employees for application of the ‘right culture’”.	3.78
22. The Lean principle of “Respect your extended network of partners and suppliers” correlates with the Ubuntu principle of “Openness and honesty”.	4
23. The Lean principle of “Go and see for yourself to thoroughly understand the situation” correlates with the Ubuntu principle of “Collective decision making”.	4
24. The Lean principle of “Make decisions slowly by consensus, thoroughly considering all options” correlates with the Ubuntu principle of “Collective decision making”.	4.33
25. The Lean principle of “Become a learning organization through relentless reflection and continuous improvement” correlates with the Ubuntu principle of “Shared vision”.	4
26. The Lean principle of “Become a learning organization through relentless reflection and continuous improvement” correlates with the Ubuntu principle of “Continuous employee support and development”.	4

7.3. Validation

The validation process (as captured in figure 12) consisted of the following segments:

- **Research problem** – The gap analysis (**Chapter 4**) highlighted the existence of the research problem in industry. Furthermore, the research problem was validated by South African Lean experts, using the survey (**Chapter 6**).
- **Research design**–The validity of the research design was confirmed using the DSR guidelines, the ADR principles and a research validation matrix.
- **Research Output** – South African Lean experts validated (via the survey) that the Lean-Ubuntu analogy could address the research problem (**Chapter 6**)

7.3.1. Validation of research problem

As explained in chapter 1, the research problem is:

A misunderstanding of the Japanese Lean management principles in other cultural contexts, attributing to poor buy-in during Lean implementation.

The research problem was validated by a gap analysis and the survey, as discussed in the next sections.

7.3.1.1. Validation results from gap analysis

In chapter 4, a research paper reported on the gap analysis that was conducted during this study. The research paper utilised a case study to investigate the research problem, thus proving that a misunderstanding of the Lean management principles exists in some South African organisations.

Furthermore, the research paper pointed out the many challenges when implementing an adaptation of a Japanese philosophy (Lean) in the South African service industry, emphasizing the misunderstanding of Lean principles. Whilst, it highlighted the implications of a cross-cultural adaptations of Lean, within organizational cultures.

7.3.1.2. Validation results from survey

The research problem was further validated by South African Lean experts, using a survey (as discussed in chapter 6). The survey made use of a statement to test participants' agreement with the research problem (table 13). An average response of 4.67 was achieved for this question. Since the average is above 3.75, it can be concluded that consensus was reached, therefore validating the research problem.

Table 13: Research problem validation results from survey

Survey statement related to problem validation	Results
27. Lean is sometimes misunderstood during implementation	4.67

7.3.2. Validating the research design

This section discusses the validity of the research design that was followed, and is explained in three parts:

- DSR guidelines – Refer to section 7.3.2.1
- ADR principles – Refer to section 7.3.2.2
- Research validation matrix – Refer to section 7.3.2.3

7.3.2.1. DSR guidelines

Since the research was set within the DSR paradigm, the guidelines were used to validate the research method. Hevner *et al.* (2004) prescribed seven guidelines to aid researchers in the problem-solving process within the DSR paradigm. Throughout this research these seven guidelines were achieved and is captured in table 14.

Table 14: DSR guidelines validation

#	Guideline	Description	Validation	Available in
1	Design as an artefact	DSR must create a viable artefact in one of the forms (Construct, model, method or instantiation)	This research led to the creation of the Lean-Ubuntu analogy (a model) as an artefact.	Chapter 5
2	Problem relevance	The objective of DSR is to develop technology-based solutions to critical and appropriate business problems	The Lean-Ubuntu analogy address the relevant industry problem of the misunderstanding of Lean in other cultural contexts.	Chapter 5
3	Design evaluation	The utility, quality and efficacy of the artefact must be meticulously displayed via well-executed assessment methods	Surveys were utilised to verify and validate the usability, quality and efficacy of the Lean-Ubuntu analogy.	Chapter 6
4	Research contributions	Effective DSR must give a clear and verifiable contribution in the areas the artefact, design foundations and/or design methodologies.	The contribution of the Lean-Ubuntu artefact was confirmed during the surveys. Further contributions were confirmed by a research paper being published and one being submitted.	Chapter 6
5	Research rigor	DSR relies on the use of rigorous methods during the construction and evaluation of the artefact	Scientific research methods were used throughout the study: The information used to construct the artefact was obtained from the results of an SLR). The artefact was assessed by Lean experts during the surveys.	Chapter 5 Chapter 6
6	Design as a search process	The quest for an effective artefact requires using the available means to reach desired ends, whilst satisfying laws in the problem situation	A gap analysis was conducted during the problem diagnosing phase of this study, using scientific research methods.	Chapter 4
7	Communication of research	DSR must be presented effectively to technology-oriented and management-oriented audiences.	The output of this research (the Lean-Ubuntu analogy) was present to audiences using a 15 minute interactive electronic presentation. It was easy to read and understand. Moreover, this study is communicated in this dissertation	Chapter 6 Chapter 1-8

7.3.2.3. ADR principles

Considering that the overarching research was conducted by the ADR method, the principles were utilised for validation of the research method. Sein *et al.* (2011) prescribed seven principles for researchers using ADR, as a method for creating design knowledge by building and evaluating artefacts. Throughout this research these seven principles were achieved and is captured in table 15.

Table 15: ADR principles validation

#	Principle	Description	Validation	Available in
1	Practice-Inspired Research	Emphasis is placed on looking at industry or field problems as opportunities for knowledge-creation.	The gap analysis, confirmed an industry problem of the misunderstanding of Lean	Chapter 4
2	Theory-Ingrained Artefact	ADR artefacts are developed and evaluated based on theory	The SLR allowed for a literature investigation of the management principles of Lean and Ubuntu. This allowed for the artefact to be created combining the existing knowledge.	Chapter 5
3	Reciprocal Shaping	The two domains (artefact and organisation setting) should be virtually inseparable.	The surveys allowed for the feedback of Lean experts, who work with Lean daily in industry	Chapter 6
4	Mutually Influential Roles	It is imperative that symbiotic learning occurs amongst the various project participants, by sharing knowledge with each other.	The surveys allowed for the feedback of Lean experts, who work with Lean daily in industry. This allowed for the artefact to be shared with them, and from them to give feedback and input on it.	Chapter 6
5	Authentic and Concurrent Evaluation	Evaluation should be inherent the building stage, as opposed to being conducted separately.	The building stage was outside the scope of this study; however, evaluation was conducted using surveys for the conceptual design	Chapter 6
6	Guided Emergence	The collective artefact should reflect the initial design by the researchers and its continuous sculpting from organisational use, perspectives and participants	The surveys allowed for the feedback of Lean experts, who work with Lean daily in industry, during the concept phase.	Chapter 6
7	Generalised outcomes	By including the organisational changes that occurred during implementation, one is able to generalise outcomes. Ergo, one should “move from the specific-and-unique to the generic-and-abstract.”	The outcomes, conclusions and recommendation for future research is captured in chapter 8. Furthermore, the artefact is applicable to different organisations.	Chapter 8

7.3.2.3. Research validation Matrix

A final validation method was utilised in order to cross-validate if this research adhered to rigorous research design. The concept of this validation matrix was adapted from Coetzee (2018) and Holm and van der Merwe (2019). The true value of a research validation matrix lies in its ability to confirm that each research challenge does indeed address a research objective, whilst illustrating which research design steps are applied in order to achieve this (Coetzee, 2018; Holm & van der Merwe, 2019).

Figure 14 displays the research validation matrix utilised to validate the research method, which directly correlates with research design in Chapter 3 (figure 10). The first row and first column indicate the respective column and row numbers, for explanation purposes.

Row 1 of the matrix gives the overarching research problem statement, whilst row 2 and 3 illustrate how the problem is broken down into different segments for the various stages of the eADR method.

Columns 1 to 4 are dedicated to each of the various stages of the eADR method, with row 4 indicating which method was utilised at each stage in order to achieve the overarching aim (given in row 5).

The various research solutions (artefacts) for each stage are stated in row 6, with the corresponding evaluation technique in row 7. Finally, row 8 depicts the research output that was created based on the work captured in the upper matrix.

The aforementioned discussion regarding the matrix (figure 14) has proven that the followed research design method is rigorous, because the matrix illustrates that each research problem was addressed with a specific research solution (artefact). And that when all the solutions (row 6) are taken into account the research output is validated and verified.

Row	Column	1	2	3	4
1		**Problem statement:** There is a misunderstanding of the Japanese Lean management principles in other cultural contexts, attributing to poor buy-in during lean implementation.			
2	**eADR stages**	Problem Diagnosing (PD)	Concept Design 1 (CD 1)	Concept Design 2 (CD 2)	Concept Design 3 (CD 3)
3	**Problem formulation (Main problem segment)**	Lack of buy-in of Lean in South Africa	List of resources to understand Lean and Ubuntu are unknown	Unknown relationship between Ubuntu and Lean in a conceptual framework	The Lean-Ubuntu analogy is not verified and validated
4	**Method**	Gap analysis - DMADV	Systematic Literature Review (SLR)	Design requirements	Survey design requirements
5		**Aim:** To utilise the Ubuntu management philosophy to develop a South African analogy of the Japanese Lean principles.			
6	**Research solutions (Artefacts created)**	Gap analysis results table (Proving the existence of the misunderstanding of Lean in SA)	Results for SLR selection process (List of resources with explanations of Lean and Ubuntu)	A literature-based framework (The Lean-Ubuntu analogy)	A survey to verify and validate the Lean-Ubuntu analogy
7	**Evaluation technique**	Surveys via Delphi method	SLR selection process checklist (done by an independent fellow researcher)	Survey (completed by Lean South African Lean experts)	Survey design requirements checklist (done by researcher)
8		**Research Output:** A verified and validated Lean-Ubuntu analogy (Literature-based framework)			

Figure 14: Research validation matrix

In **column 1** of the matrix, the main research problem statement of the overarching research (**row 1**) is segmented into the problem diagnosing stage of eADR (**row 2**)**. Row 3** explains that the problem formulation was the lack of buy-in of Lean in South Africa, and in order to address the DMADV method (**row 4**) was utilised. The main aim of the overarching research is captured in **row 5**. The artefact creation (**row 6**) of a table proving the existence of the misunderstandings of Lean in SA was evaluated using surveys (**row 7**).

Column 2 of the matrix is dedicated to the concept design 1 (CD 1) stage of the eADR method (**row 2**). It focuses on the unknown list of resources to understand Lean and Ubuntu as the problem formulation (**row 3**). In order to tackle this problem, an SLR method (**row 4**) was selected, which resulted in the artefact creation (**row 6**) of the SLR selection process (a list of resources). This was evaluated (**row 7**) by an independent fellow researcher using a checklist.

In **column 3**, the concept design 2 (CD 2) stage of the eADR method (**row 2**) is centred on. The problem formulation (**row 3**) surrounds the unknown relationship between Lean and Ubuntu in a conceptual framework. It addresses this using design requirement as a method (**row 4**), which resulted in a literature based framework (the Lean-Ubuntu analogy) as an artefact (**row 6**). This was evaluated (**row 7**) by SA Lean experts using a survey.

In the last column (**Column 4**), the concept design 3 (CD 3) stage of the eADR method (**row 2**) is examined, with the problem (**row 3**) of the Lean-Ubuntu analogy being non-verified and non-validated. This was addressed with the design of survey as a way to do so, ergo survey design requirements was the chosen method (**row 4**). Therefore, the artefact created (**row 6**) was a survey to verify and validate the Lean-Ubuntu framework, which was evaluated (**row 7**) using a checklist. Based on all of the aforementioned elements within the matrix, the overarching research output (**row 8**) of a verified and validated Lean-Ubuntu analogy, therefore validating the research design.

7.3.3. Validation of the research output

In order to confirm if the research output (the Lean-Ubuntu analogy) was fit for purpose, Lean experts were asked to validate if it addresses the research problem. This was achieve using surveys. The average for each statement is displayed in table 16. Since the average is above 3.75 for each statement, it can be concluded that consensus was reached, ergo validating the research output.

Table 16: Research output validation results from survey

Survey statement related to problem validation	Results
28. The analogy could be used to “translate” the Lean management principles into a South African context, by means of Ubuntu.	4
29. The analogy could aid in gaining employee buy-in during Lean implementation.	4.22

7.4. Chapter Summary

This chapter has confirmed that the design Lean-Ubuntu analogy was verified and validated by utilising various techniques.

CHAPTER 8

Conclusions

This chapter concludes on this research, whilst providing recommendations for future research

8.1. Introduction

This chapter provides a research overview and paves the way for future research, by discussing the limitations and recommendations of this study. Lastly, this study is concluded with general remarks.

8.2. Research overview

The Lean philosophy has gain popularity worldwide, with numerous organisations attempting to implement it. However, with it has been noted that there are several implementation failures in various industries. Literature suggests that Lean is inherently Japanese, therefore misunderstanding of the concept and purpose of Lean, along with cultural difference when implemented outside Japan are barriers of Lean implementation.

Ergo this research addressed the problem of a *misunderstanding of the Japanese Lean management principles in other cultural contexts*, with the aim *to utilise the Ubuntu management philosophy to develop a South African analogy of the Japanese Lean principles.*

This research employed eADR as an overarching methodology throughout the study. With the first stage (Problem diagnosing) confirming the existence of the research problem in industry, via a gap analysis research paper using the DMADV method. Thereafter, an SLR was conducted during the Concept design 1 stage, where the relevant literature on Ubuntu and Lean were found. The Concept design 2 stage utilised the uncovered literature, along with design requirements to develop the Lean-Ubuntu analogy, in order to illustrate the relationship between Lean and Ubuntu. In order to verify and validate the Lean-Ubuntu analogy, surveys were designed in the Concept design 3 stage.

The Concept design 4 stage was predominant the main stage, as it encompassed the entire study (dissertation). This stage delivered the Lean-Ubuntu analogy that was verified and validated by South African Lean experts using the surveys.

8.3. Contribution

Against this research overview and by utilising DSR Knowledge contribution framework (Gregor & Hevner, 2013), that was discussed in chapter 3, the contribution of this study can be classified (depicted in figure 15). From figure 15, it can be deduced that this study fits into more than one quadrant.

This study overlaps the top left “Improvement” quadrant and the bottom right “Exaptation” quadrant. As, this research developed a new solution (*the Lean-Ubuntu analogy*) to a known problem (*Misunderstand of Lean*) by incorporating existing solution (*Cultural adaptions and Ubuntu management philosophy*) from other fields. The aim of the “Improvement” quadrant is to create improved solutions, ergo more efficient and effective products, processes, services, technologies or ideas (Gregor & Hevner, 2013). Whereas, the aim of the “Exaptation” quadrant is to adapt or exapted effective existing artefacts from other fields for related problems (Gregor & Hevner, 2013).

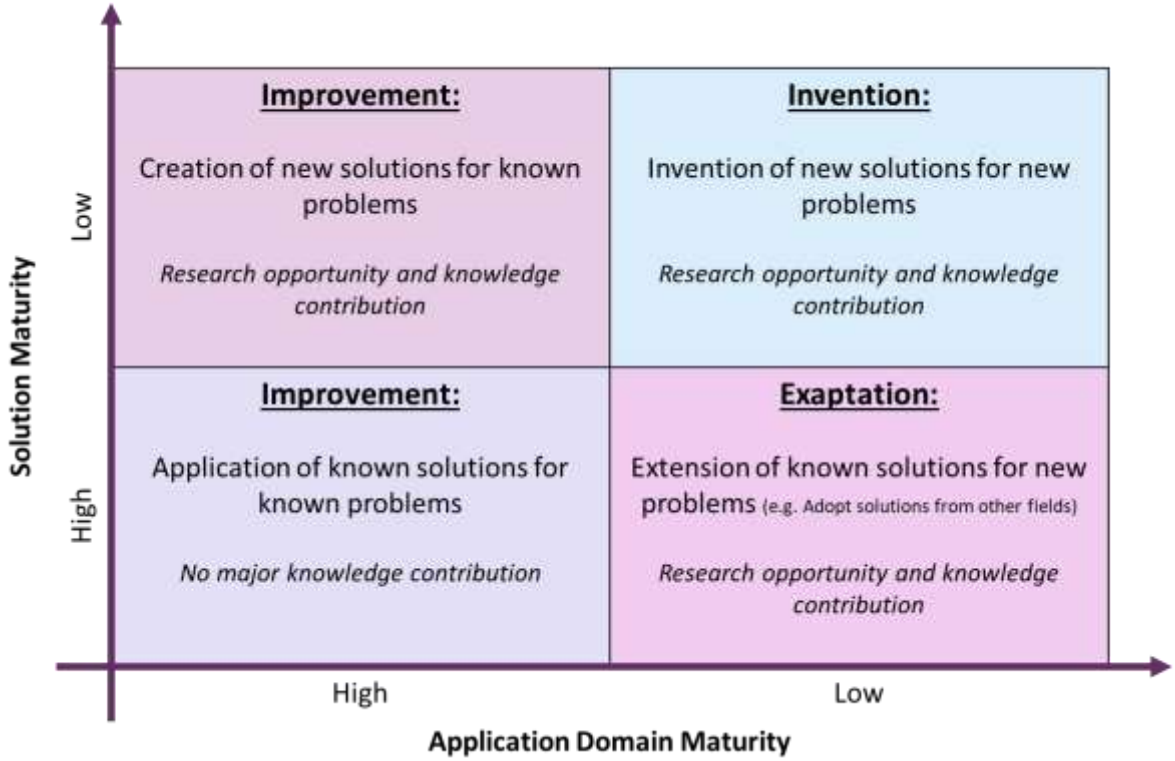

Figure 15: DSR Knowledge contribution framework (Gregor & Hevner, 2013)

8.4. Limitations and recommendations for future research

Although the research contribution was classified, various limitations and recommendations need to be explored. The overarching research resulted in the development of a novel literature-based framework (the Lean-Ubuntu analogy). This could be used to address the misunderstanding of the Japanese Lean management principles in other cultural contexts, which attribute to poor buy-in during Lean implementation.

The overarching study was comprised of two research papers: a gap analysis and an SLR. During the gap analysis research, it was found that when Lean tools and techniques are used verbatim, it may cause misunderstandings between the organisational culture and Lean principles. It is therefore recommended that further research be conducted on the effects of cross-cultural adaptations of Lean in different South African organisations. Moreover, while the gap analysis focused on a single case study, future studies should investigate the effectiveness of the adaptation and integration of Lean strategies in other South Africa organisations.

Whilst conducting the SLR, the importance of conducting parallel selection process verification was emphasised: Although the literature selection process occurred over a period of two weeks, the independent research conducted their search over a three-month period. This resulted in additional resources being added to the databases in that time, ergo making it difficult to verify the search results. It is therefore urged that the verification process occurs expeditiously in parallel.

During the SLR research, the Lean-Ubuntu analogy highlighted the correlations and variations between Lean and Ubuntu. However, while the correlations were investigated, the variations were merely stated. It is recommended that future research be done on investigating the potential connection for variations between Lean and Ubuntu.

Despite designing a Lean literature-based framework, the challenge of utilising an established research methodology was confronted. As no established methodology or design requirements for developing Lean frameworks were available in current literature. Consequently, it is advised that different methodologies and design requirements for developing Lean frameworks should be investigated. It is recommended that methodologies from other research fields (outside of engineering) be explored to find a design methodology, similarly to that which is characterised by the “Exaptation” quadrant of the DSR knowledge contribution framework.

This study was limited to only the conceptual design of the Lean-Ubuntu analogy. It is recommended that future investigations focus on the practical implementation of this framework, along with how to teach it to employees before and during Lean implementations.

While conducting the surveys, participants were able to provide qualitative feedback on various aspects of the Lean-Ubuntu analogy. Via this process, participants expressed that while some correlations are direct, other correlations are indirect or overlap to a certain extent. Ergo, it is advised that further studies be conducted on correlations that overlap to a certain extent, thereby investigating the “non-overlapping” parts of the correlation, in order to strengthen the correlations.

During the survey process the snowballing sampling method was utilised. At first impressions, this sampling method seems ideal to sample field experts, since it is a domino effect of experts suggesting more experts. However, it posed many challenges. Whilst it does allow one to sample field experts, it takes away some element of control from the principle researcher, as participants forward the survey to other participants directly. This means that often, the researcher is unaware of how many potential participants receive the survey from other participants, making it impossible to follow-up with the (added) participants. Thus, it is recommended that other sampling methods be investigated for sampling field experts.

Furthermore, while the selected panel of participants was a heterogeneous group (composed of Lean academic experts and Lean industry experts), the sample size can be considered to be relatively small. Therefore, it is suggested that in future research a larger sample size be utilised for more accurate averages.

Though the overarching research developed a Lean analogy for the South African context, it is proposed that studies be conducted on developing similar Lean analogies for other cultural contexts.

8.5. Concluding remarks

The research, embarked on in this dissertation, focused on addressing the misunderstanding, by utilised a cultural analogy in the South African context. By creating a platform for understanding and conveying foreign concept to local employees, one can increase the employee buy-in during Lean implementation, thereby improving the success rate of Lean in South Africa.

When people understand the value and contribution of Lean, they are more likely to contribute to the improvement of the organisation.

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This chapter concludes on the reference list from chapter 1-3 and 6-8. The reference lists for chapter 4 and 5 are contained at the end of the research papers.

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APPENDIX A

Survey Questionnaire

The Lean-Ubuntu analogy

Thank you so much for your time and participation in this study.
This survey forms part of the research dissertation: A South African Ubuntu analogy of Lean philosophy (Ethics reference number: NWU-00277-19-A1)
The purpose of this survey is to verify and validate the literature-based framework (The Lean-Ubuntu analogy) as part of the aforementioned study.
Please note the following:
You may ask the researcher any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you might be involved. Also, your participation is entirely voluntary. If you decide not to participate, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point.
By continuing with the survey, you agree to take part in the research study titled: A South African Ubuntu analogy of Lean philosophy. You declare that:

- You have read the information above
- You clearly understand the research
- You have asked questions to the researcher and all your questions have been answered.
- You understand that taking part in this study is voluntary
- You may choose to leave the study at any time and will not be handled in a negative way if you do so.
- You may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if you do not follow the study plan, as agreed to.

* Required

Participant information

Please provide the following details, which is for record-keeping purposes only. Please note that your biographical data will be kept confidential and will not be shared.

1. **a. Name and surname** *

2. **b. Email address** *

3. **c. How many years of experience do you have on Lean? (Please select one)** *
   Mark only one oval.

   - 0-3 years
   - 4-6 years
   - 7-10 years
   - 11-15 years
   - 21 years or more

Confirmation of the design requirements

Please rate your level of agreement to each of the following statements, regarding the design and appearance of the literature-based framework: The Lean-Ubuntu analogy

4. *
Mark only one oval per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. The framework is simple in design					
2. There is coherence amongst all the elements of the framework					
3. The framework is visually intuitive at first glance					
4. The framework is legible					
5. The framework incorporates aspects of the original works into its design					
6. The framework utilises a standard procedure for explaining relationships between entities					

5. **Comments**

Confirmation of relationships

Please rate your level of agreement to each of the following statements, regarding the correlations and variations between Lean principles and Ubuntu principles in the Lean-Ubuntu analogy artefact

6. *

Mark only one oval per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
7. The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Loyalty to the organisation"					
8. The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Strong values"					

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
9. The Lean principle of "Creating continuous process flow" does not have a correlating Ubuntu principle.					
10. The Lean principle of "Use 'pull' systems" does not have a correlating Ubuntu principle.					
11. The Lean principle of "Level out the workload" does not have a correlating Ubuntu principle.					
12. The Lean principle of "Building a culture of stopping to fix problems" does not have a correlating Ubuntu principle.					
13. The Lean principle of "Standardized tasks are the foundation for continuous improvement and employee empowerment" correlates with the Ubuntu principle of "Empowering people"					
14. The Lean principle of "Use visual control" does not have a correlating Ubuntu principle.					
15. The Lean principle of "Use only reliable, thoroughly tested technology" correlates with the Ubuntu principle of "An effective team is a team with the right					

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
tools".					
16. The Lean principle of "Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others" correlates with the Ubuntu principle of "Transformational leadership".					
17. The Lean principle of "Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others" correlates with the Ubuntu principle of "Mentoring".					
18. The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "People centred work culture".					
19. The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "Sharing power and teamwork".					
20. The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "Continuous employee support and development".					
21. The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "Rewarding employees for application of the 'right culture'".					
22. The Lean principle of "Respect your extended network of partners and suppliers" correlates with the Ubuntu principle of "Openness and honesty".					
23. The Lean principle of "Go and see for yourself to thoroughly understand the situation" correlates with the Ubuntu principle of "Collective decision making".					
24. The Lean principle of "Make decisions slowly by consensus,					

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
thoroughly considering all options" correlates with the Ubuntu principle of "Collective decision making".					
25. The Lean principle of "Become a learning organization through relentless reflection and continuous improvement" correlates with the Ubuntu principle of "Shared vision".					
26. The Lean principle of "Become a learning organization through relentless reflection and continuous improvement" correlates with the Ubuntu principle of "Continuous employee support and development".					

7. **Comments**

Confirmation that the Lean-Ubuntu analogy addresses the research problem

Please rate your level of agreement to each of the following statements, regarding the ability of the Lean-Ubuntu analogy to address the research problem

8. *

Mark only one oval per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
27. Lean is sometimes misunderstood during implementation					
28. The analogy could be used to "translate" the Lean management principles into a South African context, by means of Ubuntu.					
28. The analogy could aid in gaining employee buy-in during Lean implementation					

9. **Comments**

Closure

Thank you very much, once again, for your time and effort in completing this survey. I really appreciate your valuable input into my research.

10. **i. Would you be available for follow-up questions relating to this survey** *
    Mark only one oval.
    - Yes
    - Maybe
    - No

11. **ii. Would you like to receive an electronic copy of this research**
    Mark only one oval.
    - Yes
    - No

12. **ii. Any comments or remarks**

APPENDIX B

Participants' feedback – Questionnaire

Section	#	Survey statements	Participants										Original		Post analysis	
			1	2	3	4	5	6	7	8	9	10	Averages	Percentage	Averages	Percentage
Experience	0	Years of experience	7-10 Y	21 Y+	4-6 Y	7-10 Y	0-3 Y	11-15 Y	11-15 Y	0-3 Y	11-15 Y	7-10 Y				
A. Artefact design requirements	1	The framework is simple in design	4	4	4	5	5	5	4	4	4	4	4.3	86.00%	4.3	86.00%
	2	There is coherence amongst all the elements of the framework	4	4	4	5	2	4	4	4	4	4	3.9	78.00%	3.9	78.00%
	3	The framework is visually intuitive at first glance	4	4	5	4	3	5	5	4	4	5	4.3	86.00%	4.3	86.00%
	4	The framework is legible	4	4	5	5	5	4	4	4	5	5	4.5	90.00%	4.5	90.00%
	5	The framework incorporates aspects of the original works into its design	4	4	4	4	4	3	5	4	4	5	4.1	82.00%	4.1	82.00%
	6	The framework utilises a standard procedure for explaining relationships between entities	4	4	4	5	3	4	5	4	4	5	4.2	84.00%	4.2	84.00%
B. Relationship between Lean Principles and Ubuntu Principles	7	The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Loyalty to the organisation"	5	3	2	5	2	5	5	5	2	4	3.8	76.00%	3.8	76.00%
	8	The Lean principle of "Base your management decisions on a long-term philosophy" correlates with the Ubuntu principle of "Strong values"	3	3	5	5	5	5	3	5	2	4	4	80.00%	4	80.00%
	9	The Lean principle of "Creating continuous process flow" does not have a correlating Ubuntu principle.	4	5	5	4	4	3	4	5	3	4	4.1	82.00%	4.1	82.00%
	10	The Lean principle of "Use 'pull' systems" does not have a correlating Ubuntu principle.	4	5	5	4	4	3	4	5	3	4	4.1	82.00%	4.1	82.00%
	11	The Lean principle of "Level out the workload" does not have a correlating Ubuntu principle.	4	5	5	2	4	3	4	5	3	4	3.9	78.00%	3.9	78.00%
	12	The Lean principle of "Building a culture of stopping to fix problems" does not have a correlating Ubuntu principle.	2	5	1	4	4	3	4	5	3	4	3.5	70.00%	3.777778	75.56%
	13	The Lean principle of "Standardized tasks are the foundation for continuous improvement and employee empowerment" correlates with the Ubuntu principle of "Empowering people"	2	3	5	4	1	5	3	5	5	4	3.7	74.00%	4	80.00%
	14	The Lean principle of "Use visual control" does not have a correlating Ubuntu principle.	5	5	2	4	4	3	4	5	3	4	3.9	78.00%	3.9	78.00%
	15	The Lean principle of "use only reliable thoroughly tested technology" correlates with the Ubuntu principle of "An effective team is a team with the right tools".	5	5	5	4	3	4	4	5	5	4	4.4	88.00%	4.4	88.00%
	16	The Lean principle of "Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others" correlates with the Ubuntu principle of "Transformational leadership".	5	5	5	4	2	4	4	5	4	4	4.2	84.00%	4.2	84.00%
	17	The Lean principle of "Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others" correlates with the Ubuntu principle of "Mentoring".	5	3	4	4	4	4	4	5	4	4	4.1	82.00%	4.1	82.00%
	18	The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "People centred work culture".	5	5	5	4	1	5	5	5	4	4	4.3	86.00%	4.3	86.00%
	19	The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "Sharing power and teamwork".	5	3	4	4	2	5	5	5	5		4.222222	84.44%	4.222222	84.44%
	20	The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "Continuous employee support and development".	4	5	5	4	5	5	4	5	5	4	4.6	92.00%	4.6	92.00%
	21	The Lean principle of "Develop exceptional people" correlates with the Ubuntu principle of "Rewarding employees for application of the 'right culture'".	2	3	5	5	2	5	4	5	3	4	3.8	76.00%	3.8	76.00%
	22	The Lean principle of "Respect your extended network of partners and suppliers" correlates with the Ubuntu principle of "Openness and honesty".	5	3	4	5	2	4	3	5	5	4	4	80.00%	4	80.00%
	23	The Lean principle of "Go and see for yourself to thoroughly understand the situation" correlates with the Ubuntu principle of "Collective decision making".	5	3	5	5	3	5	4	5	1	4	4	80.00%	4	80.00%
	24	The Lean principle of "Make decisions slowly by consensus, thoroughly considering all options" correlates with the Ubuntu principle of "Collective decision making".	5	5	4	5	5	4	4	5	2	4	4.3	86.00%	4.3	86.00%
	25	The Lean principle of "Become a learning organization through relentless reflection and continuous improvement" correlates with the Ubuntu principle of "Shared vision".	5	3	2	3	2	5	3	5	2	4	3.4	68.00%	4	80.00%
	26	The Lean principle of "Become a learning organization through relentless reflection and continuous improvement" correlates with the Ubuntu principle of "Continuous employee support and development".	5	3	4	5	3	5	4	5	2	4	4	80.00%	4	80.00%
C. Research Problem	27	Lean is sometimes misunderstood during implementation	4	4	5	5	4	5	5	5	5	4	4.6	92.00%	4.6	92.00%
D. Artefact addressing the problem	28	The analogy could be used to "translate" the Lean management principles into a South African context, by means of Ubuntu.	4	4	4	5	2	5	4	4	4	5	4.1	82.00%	4.1	82.00%
	29	The analogy could aid in gaining employee buy-in during Lean implementation.	4	4	4	5	5	5	4	3	4	5	4.3	86.00%	4.3	86.00%

Participant	Comments
P1	7. Somewhat but I am not certain. I can see how it could be described as analogous but can equally see differences. 8. The correlation here is less strong for me. It surely depends on the values? 12. I could see how stopping to fix problems could align with a long term view for the company and therefore loyalty to the organisation - Lean principle 1.? 13. The last part yes but I can't see that Ubuntu advocates that this is through standard work as Lean does. 17. by understanding Lean, yes but your description of the Lean principle does not include any aspect of developing people or mentoring. 19. Again, in principle yes but by understanding Lean not from reading your description which could perhaps be adapted to include the teamwork and sharing power aspects. 21. I am not sure that I have ever seen Lean explicitly describing how employees are rewarded. It would be interesting to understand Ubuntu's view on what rewarding employees actually means. 25 and 26. I can see how collective decision making could also relate to this lean principle.
P2	None
P3	Many of the lean principles can be seen as mechanisms to achieve certain things that is subsidiary to the process improvement of the organisation. One example is the Lean principle of building a culture where things are stopped to be fixed. This lean principle/mechanism has a massive effect on empowering people. I therefore think that many of the lean principles should be regarded as mechanisms to achieve certain Ubuntu principles. From my experience in industry, employees often regard the lean mechanisms (as I call them) as an enabler towards their empowerment. In other words the lean mechanisms are more granular than the Ubuntu principles in some cases. Also, I think that there are many cross-links that can be explored. (i,e. UP x may correlated to LP y+z or LP y may correlate to UP x and UP m). Some correlations are not too clear i.e.Q7. Well done on excellent work and a novel concept!!!
P4	Question 11: I believe "level out the workload" could correspond to "shared power and teamwork", and even "people centred work culture", as this leveling of work not only talks about leveling work from an operational perspective, but it also takes into consideration the well-being of employees by ensuring they are not unequally tasked. It also considers OHSE issues such as ergonomics, etc. This framework could assist practitioners in explaining Lean from a uniquely South African context, which will probably lead to an increase in sustainable Lean implementations.
P5	None

P6	I know much about Lean, but I am not an expert on Ubuntu. That is why it is not possible for me to comment on 9, 10, 11, 12, 14. You need to ask "Ubuntu-experts" to comment on those. 13. I think there is more to empowering people than just standardizing tasks, by I do agree that these principles correlates. Maybe, I just did not concentrate hard, but I did not pick up about UPs for which there are no LPs? 18. I do not know Ubuntu. I am not sure if it is so much about developing EXCEPTIONAL people, rather that having HAPPY/ CONTENT people. 19. and 20. Similar than previous comment. I am sure if Ubuntu strives towards exceptional people or just happy people. 25. Related - yes, but it is not the same. You can share a vision, without learning to get there. You can be a learning organization, without a shared vision ... I think. To me this is the most important three questions for purpose of your thesis and I hope you can get useful feedback and possible follow-up from respondents to strengthen your empirical research - maybe a mini case study?
P7	None
P8	I'm not sure that Ubuntu is really a philosophy that is adhered to in the workplace - this needs to be confirmed
P9	The Ubuntu shared vision idea is a forward directional place you want to go to as an organisation, whereas Lean contiuous improvement and reflection is backward looking. Obviously it both focuses on an ultimate goal. Lean implies working on exisiting stuff whereas Ubuntu implies more a vector from now outward. Ubuntu's shared vision is on a strategic level but Lean's CI is tactical and operational. Thank you, this is a terrific piece of work, and I want to congratulate you on this fresh take on lean in SA. The work could be ground-breaking. I like that you intend to use Ubuntu principles as analogies for Lean practice. I am by no means an Ubuntu expert, but have learnt a lot from watching your work and reading up a bit in preparation. I would encourage you to be cautious of forcing correlations. This loses the value of the places where the correspondence is strong. I wonder whether you can bring into your discussion, not that Ubuntu is the tool that makes the Lean puzzle piece fit into the SA industrial space (although it does, often and successfully) but actually that a discrete puzzle piece for a home-grown lean philosophy, in Ubuntu could actually be the efficiency and performance driver here, that Lean is in Japan, contextualised by their particular culture. This could possibly create a global context for localising improvement, rather than importing Japanese practices The analogies are strong - but in places forced. I don't want you to deviate from the purpose of your research, but for future work, I would love to see how your work could become the basis for a new approach - not lean, but ubuntu. where we are not using

	ubuntu analogies to describe lean, but rather use ubuntu directly to achieve similar objectives as lean does.
P10	None

APPENDIX C

SLR selection process checklist

The search for Lean management principles						
#	**Database**	**Keywords searched or Action**	**Comments**	**No. of results**	**Selected results Titles**	**Check**
1	Science Direct	"Lean philosophy" AND "Management principles" AND "Toyota"	---	32	---	√
1.1.	Science Direct	Screen and quality check the 32 results	**Inclusion:** Relevant to 14 management principle of Lean; "Lean" in their title, abstract or keywords **Exclusion:** Lean literature based on weight-loss/obesity; literature that only discusses the 5 principles of Lean; Literature that misunderstood or incorrectly listed Lean principles	1	1. Strengths and weaknesses of small and medium sized enterprises regarding the implementation of lean manufacturing	√
2	Emerald Insight	"Lean philosophy" AND "Management principles" AND "Toyota"	---	88	---	√
2.1.	Emerald Insight	Screen and quality check the 88 results	**Inclusion:** Relevant to 14 management principle of Lean; "Lean" in their title, abstract or keywords **Exclusion**: Lean literature based on weight-loss/obesity; literature that only discusses the 5 principles of Lean; Literature that misunderstood or incorrectly listed Lean principles	4	1. Ethics and Lean Management – a paradox? 2. Lean production and leadership attributes – the case of Hungarian production managers 3. Lean production in agribusiness organizations: multiple case studies in a developing country 4. Managing for continuous improvement in off-site construction	√ √ √ √
3	IEEE Xplore	"Lean philosophy" AND "Management principles" AND "Toyota"	---	1	---	√
3.1.	IEEE Xplore	Screen and quality check the 1 result	**Inclusion:** Relevant to 14 management principle of Lean; "Lean" in their title, abstract or keywords **Exclusion:** Lean literature based on weight-loss/obesity; literature that only discusses the 5 principles of Lean; Literature that misunderstood or incorrectly listed Lean principles	0	---	√
4	Web of science	"Lean philosophy" AND "Management principles" AND "Toyota"	---	2	---	√
4.1.	Web of science	Screen and quality check the 2 results	**Inclusion:** Relevant to 14 management principle of Lean; "Lean" in their title, abstract or keywords **Exclusion:** Lean literature based on weight-loss/obesity; literature that only discusses the 5 principles of Lean; Literature that misunderstood or incorrectly listed Lean principles	0	---	√
5	Scopus	"Lean philosophy" AND "Management principles" AND "Toyota"	---	61	---	√
5.1.	Scopus	Screen and quality check the 61 results	**Inclusion:** Relevant to 14 management principle of Lean; "Lean" in their title, abstract or keywords **Exclusion:** Lean literature based on weight-loss/obesity; literature that only discusses the 5 principles of Lean; Literature that misunderstood or incorrectly listed Lean principles	1	1. A complex systems theory perspective of lean production	√
6	EBSCOhost – Select: *Academic Search Premier, Africa-wide information, Applied Science & Technology Source, Business Source Premier, eBook Collection, E-journal, MasterFILE premier, Philosophers Index with full-text*	"Lean philosophy" AND "Management principles" AND "Toyota"	---	1	---	√
6.1.	EBSCOhost	Screen and quality check the 1 result	**Inclusion:** Relevant to 14 management principle of Lean; "Lean" in their title, abstract or keywords **Exclusion:** Lean literature based on weight-loss/obesity; literature that only discusses the 5 principles of Lean; Literature that misunderstood or incorrectly listed Lean principles	0	---	√

The search for Ubuntu management principles						
#	**Database**	**Keywords searched or Action**	**Comments**	**No. of results**	**Selected results Titles**	**Check**
1	Science Direct	"Ubuntu" AND "Management principles"	---	0	---	√
2	Emerald Insight	"Ubuntu" AND "Management principles"	---	19	---	√
2.1.	Emerald Insight	Screen and quality check the 19 results	**Inclusion:** relevant to management principle of Ubuntu; "Ubuntu" in their title, abstract or keywords **Exclusion:** Literature based on Theology/ religion; literature based on legislative principles and software/programming	1	1. South African management development in the twenty-first century	√
3	IEEE Xplore	"Ubuntu" AND "Management principles"	---	0	---	√
4	Web of science	"Ubuntu" AND "Management principles"	---	0	---	√
5	Scopus	"Ubuntu" AND "Management principles"	---	20	---	√
5.1.	Scopus	Screen and quality check the 20 results	**Inclusion:** relevant to management principle of Ubuntu; "Ubuntu" in their title, abstract or keywords **Exclusion:** Literature based on Theology/ religion; literature based on legislative principles and software/programming	0	---	√
6	EBSCOhost – Select: *Academic Search Premier, Africa-wide information, Applied Science & Technology Source, Business Source Premier, eBook Collection, E-journal, MasterFILE premier, Philosophers Index with full-text*	"Ubuntu" AND "Management principles"	---	6	---	√
6.1.	EBSCOhost	Screen and quality check the 6 results	**Inclusion:** relevant to management principle of Ubuntu; "Ubuntu" in their title, abstract or keywords **Exclusion:** Literature based on Theology/ religion; literature based on legislative principles and software/programming	1	1. The application of post-war Japanese management principles to post-apartheid South African information services: a viable option?	√
7	ProQuest Ebook Central	"Ubuntu" AND "Management principles"	---	25	---	√
7.1.	ProQuest Ebook Central – Refine search by selecting subject: Business and economics/leadership	Screen and quality check the 1 result	**Inclusion:** relevant to management principle of Ubuntu; "Ubuntu" in their title, abstract or keywords **Exclusion:** Literature based on Theology/ religion; literature based on legislative principles and software/programming	2	1. UBUNTU: Management Philosophy 2. Ubuntu: Shaping the current workplace with (African) wisdom	

APPENDIX D

Ethics Approval

Private Bag X1290, Potchefstroom
South Africa 2520

North-West University Engineering Research Ethics Committee (NWU-ENG-REC)

Tel: 018 299-2645
Email: ENG-REC@nwu.ac.za

10/31/2019

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the North-West University Engineering Research Ethics Committee (NWU-ENG-REC) on 10/18/2019, the NWU-ENG-REC hereby approves your study as indicated below. This implies that the NWU-ENG-REC grants its permission that, provided the general and specific conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title:
A South African Ubuntu analogy of Lean philosophy

Principal Investigator/Study Supervisor/Researcher: R Coetzee

Student: Mia Mangaroo-Pillay (25038230@nwu.ac.za)
Ethics number: **NWU-01768-19-A1**
Institution-Study Number-Year-Status
Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application Type: Single
Approval date: **10/18/2019**
Expiry date: 8/23/2020
Risk: **Low**

Approval of the study is provided for a year, after which continuation of the study is dependent on receipt and review of annual monitoring report and the concomitant issuing of a letter of continuation.

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The principal investigator/study supervisor/researcher must report in the prescribed format to the NWU-ENG-REC:*
  - *Annually on the monitoring of the study, whereby a letter of continuation will be provided annually, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the principal investigator/study supervisor/researcher must apply for approval of these amendments at the NWU-ENG-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for active monitoring.*
- *The date of approval indicates the first date that the study may be started.*
- *In the interest of ethical responsibility, the NWU-ENG-REC reserves the right to:*

- *request access to any information or data at any time during the course or after completion of the study;*
- *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
- *withdraw or postpone approval if:*
  - *any unethical principles or practices of the study are revealed or suspected;*
  - *it becomes apparent that any relevant information was withheld from the NWU-ENG-REC or that information has been false or misrepresented;*
  - *submission of the annual monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and/or*
  - *new institutional rules, national legislation or international conventions deem it necessary.*

- *NWU-ENG-REC can be contacted for further information via ENG-REC@nwu.ac.za or 018 299 2645*

Special conditions of the research approval (if applicable): NA

Special in process conditions of the research for approval (if applicable): NA

The NWU-ENG-REC would like to remain at your service and wishes you well with your study. Please do not hesitate to contact the NWU-ENG-REC for any further enquiries or requests for assistance.

Yours sincerely,

Dr Rojanette Coetzee
Chairperson NWU-ENG-REC

Current details:(25767984) \NWUNextCloud\ENG-REC\Letters sent\[Date]\9.1.5.4.3_NWU-ENG-REC_REC_EAL_[student surname_name]

File Reference: 9.1.5.4.2