



# WHAT CHRISTIAN LEADERS CAN LEARN FROM **LEAN**

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## ▶ ABSTRACT

The term “Lean” was coined by researchers at MIT in the 1980s to describe the methods developed by Toyota in post-war Japan to first survive, then thrive, and ultimately dominate the global automotive industry. Beyond shop floor techniques for setup reduction or just-in-time inventory control, Lean evolved into a management system with principles that apply in any context. This paper presents the foundational principles of Lean and explores their striking similarities with biblical teachings. These similarities are both noteworthy and surprising, since Lean was developed in a non-Christian cultural and religious context. We contend that Christian leaders can learn from Lean and suggest ways of applying Lean principles that will strengthen their work, be it in business, ministry or church.

## ▶ INTRODUCTION

**W**e live in an unpredictable, complex, competitive, pluralistic and divided world. Increasingly, successful businesses and organizations require leaders who understand the times and who can inspire and guide their teams to design and deliver superior valuable products and services for their customers. Christian and non-Christian leaders alike can base their leadership on the experience and thinking of pioneers who have developed concepts and tools that – when properly understood and applied – dramatically increase the likelihood of success of an organization. When we look across the wide variety of management systems, Lean stands out above the rest. With significant input from the West, Lean was developed and refined in Japan, and most successfully at Toyota.<sup>1</sup> What

may be called The Toyota Production System<sup>2</sup> or The Toyota Way<sup>3</sup> we call Lean, as it was first named by John Krafcik<sup>4</sup> in 1988 and spread more widely by Womack and Jones in *The Machine that Changed the World*.<sup>5</sup> Whether they call it Lean, *Kaizen*, Continuous Improvement, or something else, most successful corporations these days apply the concepts and tools of Lean in their operations.

Many have studied the origins of Lean. Most writers recognize the strong influence that Japanese culture and religion played in the development and acceptance of the Total Quality Management, Toyota Production System (TPS), *Kaizen* and Lean.<sup>6</sup> In addition to the well-known Japanese fathers of the TPS (Sakichi Toyoda, Eiji Toyoda, Taiichi Ohno and Shigeo Shingo, to name a few), several writers<sup>7</sup> also note a strong influence from the West, most notably from people like Henry Ford, Edwards Deming (a man of strong Christian faith<sup>8</sup>), Homer Sarasohn<sup>9</sup> and Peter Drucker, to name a few.

One Japanese manager explained to one of our friends on a Lean tour that what Toyota developed is not so much a reflection of Japanese thinking and culture, but a compilation and systematization of what works, based on years of tireless experimentation.<sup>10</sup> Therefore, one can say that Toyota discovered truths about how organizations can succeed and organized these into a management system that delivers superior results.

In this article we begin by introducing the reader to Lean. Next, we present some striking parallels between Lean principles and Christian principles. These similarities give Christians confidence that they can learn from Lean and fruitfully apply Lean principles in their work and personal lives. Finally, we give specific suggestions on how to do this.

## ▶ WHAT IS LEAN?

Lean can be thought of as a set of principles that are supported by practices applied by people. Some reduce Lean/TPS to just two principles (just-in-time production and respect for people),<sup>11</sup> or “(1) the reduction of variability and removal of waste for cost cutting purposes and, (2) the full utilization of workers and employee fulfillment for human development purposes.”<sup>12</sup>

We propose seven principles of Lean that make it more understandable and applicable to a wider variety of organizations, along the lines of those cited above who studied the origins of Lean.<sup>13</sup> They are:

1. We exist to provide value to our customers.
2. Waste is the greatest hindrance to achieving our goals.
3. A good root produces good fruit.
4. The greatest long-term gains are achieved incrementally and continuously.
5. Capable and empowered employees will achieve great things.
6. We achieve better results when we work together.
7. Value is created, learning happens and relationships develop where the action is.

To lay the foundation for further discussion, we briefly explain and summarize each principle below.

### 1. WE EXIST TO PROVIDE VALUE TO OUR CUSTOMERS.

Every organization exists because it provides valuable products and services to its customers. This is true not just for for-profit companies, but also for non-profits, churches, parachurch organizations, schools, and even governmental entities.<sup>14</sup> An organization asks and finds out from its customers what they need, what they want, and how they use the organization’s products and services. The organization then develops processes to design, produce and sell (or freely provide) products and services that customers want. Profits and growth are not reasons to exist, but are indications that an organization is providing superior customer value.

### 2. WASTE IS THE GREATEST HINDRANCE TO ACHIEVING OUR GOALS.

Organizations operate mostly through processes – repeated sequences of steps that transform inputs into outputs and create a valuable result for a customer. Processes may be for internal customers, such as a hiring process that delivers a qualified new employee to a hiring manager, or for external customers, such as the development and delivery of a training course for an external customer.

Toyota found that the greatest performance improvements could be found not by creating new and better ways of adding value, but by identifying and eliminating waste in their processes. They identified three types of waste: *Mura* (unevenness – significant fluctuations in the amount of pro-

cess output required over time), *Muri* (overburden – excessive demands/loads placed on people or machines), and *Muda* (waste – any time or use of resources beyond the minimum required to add value.)<sup>15</sup> Taiichi Ohno identified seven types of muda waste: waiting, defects, inventory, over-processing, motion, overproduction, and transportation.<sup>16</sup> Many add an eighth type of waste: underutilized people – when people’s creativity and full energy are not engaged.

Spear and Bowen noted that Toyota and other Lean organizations are “ruthless and relentless” about eliminating waste from their processes.<sup>17</sup> They don’t accept waste in their processes. Instead, they prevent or detect it and make it visible, so they can get rid of it.

### 3. A GOOD ROOT PRODUCES GOOD FRUIT.

Lean organizations know that a good process gets good results, and that a bad process will get bad results. Therefore, they do not pursue excellence by using inspectors to find poor quality work, and then fixing or scrapping them. Instead, they develop reliable processes that safely produce good products and services every time. They build into their processes the means to automatically prevent or detect poor quality. And when there is a problem, they do not blame people, but find and address the root causes of poor quality.

### 4. THE GREATEST LONG-TERM GAINS ARE ACHIEVED INCREMENTALLY AND CONTINUOUSLY.

While Lean organizations also develop major innovations that radically alter how they operate and create new ways of adding value for customers, they know that the greatest long-term improvements come from each employee (or volunteer) making small, incremental improvements or innovations every day in how they do their work. Even major innovations need to be refined and optimized over time. Therefore, they set expectations and stretch goals for continuous improvement of processes and performance.

### 5. CAPABLE AND EMPOWERED EMPLOYEES WILL ACHIEVE GREAT THINGS.

Lean organizations truly believe and act on the fact that their employees are their greatest resource. They know they must

have committed, skilled employees who understand their work and how they add value to their customers. They know these employees best understand the challenges they face and are best positioned to identify and solve the problems that cause waste. Because of this, Lean organizations train their people, provide them with resources they need to succeed, coach them, and set ambitious goals with them. They expect and empower their people to make decisions about improvements to their work. This is a significant part of what Toyota calls “respect for humanity.”<sup>18</sup>

### 6. WE ACHIEVE BETTER RESULTS WHEN WE WORK TOGETHER.

Lean organizations depend on the synergy that comes from people creating, working and solving problems together, whether teams of people doing similar work or cross-functional teams that bring together people from very different backgrounds and perspectives. Therefore, Lean organizations promote teamwork and team problem solving.

### 7. VALUE IS CREATED, LEARNING HAPPENS AND RELATIONSHIPS DEVELOP WHERE THE ACTION IS.

*Gemba* is the Japanese word for “where the action is” and refers to the workplace. Problems occur and are best solved in the *Gemba*. Because of the importance of the *Gemba*, leaders (senior leaders, managers and team leaders) go to the factory, offices and other workplaces to see and understand the context of work and what is actually happening. At where people work, leaders get to know their people, and their people get to know them. This allows them to develop meaningful relationships of trust and gain valuable insights.

## ▶ CHRISTIAN PARALLELS TO LEAN WISDOM

Given the Japanese manufacturing context of the development of Lean, a Christian leader may be reluctant to adopt Lean personally or in a Christian ministry out of fear that Lean is only for manufacturing or is culturally or religiously inconsistent with Christian faith or practice. Instead, the increasing adoption of Lean in an ever-widening variety of industries and now also in all geographic regions (the

Lean Global Network) demonstrate that Lean has discovered some wisdom for the workplace – fundamental principles and practices that apply (with some variation) to almost all organizations and contexts.<sup>19</sup>

In this section, we explore some of the key Christian/biblical parallels to Lean principles that we expect many of our readers have already noticed. We note the topic of each principle and then cite the most relevant passages from the Bible that teach on the topic. In doing so, we demonstrate that Lean principles are, in the end, truths supported and affirmed by biblical teachings and, as a result, Christian leaders can fully endorse and practice.

## 1. WE EXIST TO PROVIDE VALUE TO OUR CUSTOMERS

This first Lean principle is about purpose and providing value to others. When we examine biblical passages that address purpose and value, we find that the Apostle Paul often exhorts believers to find out and do what pleases God (2 Corinthians 5:15, Ephesians 5:10 and 17, Colossians 1:9-10 and 3:17 & 23-24). The commandment to love our neighbors as ourselves (Leviticus 19:18 and Matthew 22:39) requires us to learn and do what is good for them – what is valuable to them. In the well-known Old Testament passage of Micah 6, the prophet asks what he should do to please God (v. 6-7), and then reflects, “He has shown you, O mortal, what is good. And what does the Lord require of you? To act justly and to love mercy and to walk humbly with your God” (v. 8). These passages reflect the Christian idea that we (and our organizations, by extension) are to please God and to serve others, both of which are similar to the Lean idea of providing customer value.

We note earlier that Lean focuses only on the earthly customers (those who pay for and/or benefit from the organization’s products and services). At best, Lean might consider service to God to be a type of required, non-value-adding work (from the customer’s perspective). However, Christians are exhorted to do everything first and foremost for God (as our primary Customer).

## 2. WASTE IS THE GREATEST HINDRANCE TO ACHIEVING OUR GOALS

This second Lean principle is about the things that hinder fruitfulness. Biblical passages on this topic teach that there

are things (such as anxieties and cares of this world) and sin that prevent us from living a fruitful Christian life, and that we should strive to avoid and rid ourselves of them.<sup>20</sup>

The author of Hebrews writes: “Therefore, since we are surrounded by such a great cloud of witnesses, let us throw off everything that hinders and the sin that so easily entangles” (Hebrews 12:1a). In Matthew 13, Jesus’ parable of the sower and the seed teaches the same message. The Apostle Paul exhorts believers many times to stop sinning, as in Ephesians 4:31, “Get rid of all bitterness, rage and anger, brawling and slander, along with every form of malice.” Even God gets rid of waste in us. In John 15, Jesus states, “I am the true vine, and my Father is the gardener. He cuts off every branch in me that bears no fruit, while every branch that does bear fruit he prunes so that it will be even more fruitful” (v. 1-2).

Interestingly, while Lean recognizes many different types of waste, it does not recognize sin as a waste or a source of waste. However, consider the arrogant, hurtful and violent things that people do, the harm that these things cause, and the enormous amounts of time and resources spent trying to prevent, restrain or recover from evil. One quickly sees that sin is possibly the greatest waste that any individual or organization has to deal with!

## 3. A GOOD ROOT PRODUCES GOOD FRUIT

This third Lean principle is about the source of good fruit. In the Old Testament (Ezekiel 36:26-28) and the New Testament, we find passages that teach that a bad or a good heart is the source of bad or good deeds.

In Matthew 12:34-35, Jesus affirms this principle and applies it to what people say and do, “Make a tree good and its fruit will be good, or make a tree bad and its fruit will be bad, for a tree is recognized by its fruit.... For the mouth speaks what the heart is full of. A good man brings good things out of the good stored up in him, and an evil man brings evil things out of the evil stored up in him.”

## 4. THE GREATEST LONG-TERM GAINS ARE ACHIEVED INCREMENTALLY AND CONTINUOUSLY

This Lean principle is about personal and corporate growth. It aligns with the expectation that God has for his people (individually and as the body of Christ) to grow and to be-

come more mature over time, with the result that we will bear increasing fruit. While salvation is an event, sanctification is a process that happens over time. The Apostle Paul repeatedly writes about believers growing in faith and character (Ephesians 4:15, Colossians 1:10, 2 Thessalonians 1:3, 2 Peter 3:18). Jesus commissioned his disciples to make disciples (Matthew 28:16-20), and discipleship is always a “growing-learning relationship.”<sup>21</sup> In Matthew 2:52, we find that even “Jesus grew in wisdom and stature, and in favor with God and man.”

This principle of incremental growth and its fruit is most fully described in 2 Peter 1:5-8: “For this very reason, make every effort to add to your faith goodness; and to goodness, knowledge; and to knowledge, self-control; and to self-control, perseverance; and to perseverance, godliness; and to godliness, mutual affection; and to mutual affection, love. For if you possess these qualities in increasing measure, they will keep you from being ineffective and unproductive in your knowledge of our Lord Jesus Christ.”

One key difference on this topic between Lean and Christianity is that Christians receive supernatural strength and assistance in our growth, through the Holy Spirit, as explained in Philippians 2:12-13 and Colossians 2:19.

## 5. CAPABLE AND EMPOWERED EMPLOYEES WILL ACHIEVE GREAT THINGS

This Lean principle is about those who are more mature building up those who are less mature so they grow and make a valuable contribution. It can be best seen in how Jesus took a rag-tag group of twelve followers and taught and disciplined them to become the leaders of his church. Our Lord Jesus asked many more questions than he answered, and almost always answered a question with a question or with a mysterious answer for his interlocutor to think and reflect. His interaction with the Samaritan woman at the well in John 4 exemplifies this.

Jesus made disciples and continues to trust and empower everyday believers to do his work on earth, for he said: “Very truly I tell you, whoever believes in me will do the works I have been doing, and they will do even greater things than these, because I am going to the Father” (John 14:12).

In Ephesians 4:11-12, Paul affirms this idea of empowering believers when he explains that God gives people specific roles to build up the church: “So Christ himself gave the apos-

ties, the prophets, the evangelists, the pastors and teachers, to equip his people for works of service, so that the body of Christ may be built up.”

## 6. WE ACHIEVE BETTER RESULTS WHEN WE WORK TOGETHER

This Lean principle is about the importance of people working fruitfully together. It aligns with the biblical teaching that believers need one another and should work together, without divisions that might separate us.

Jesus saw the importance and fruit of unity when in John 17:20-23 he prayed for the complete unity of all believers and explained the impact this will have: “Then the world will know that you sent me and have loved them even as you have loved me.” Likewise, in Romans 12 and 1 Corinthians 12, Paul wrote extensively about the body of Christ, the unity of believers, and the necessity of each part of the body to cherish one another and to contribute their part.

## 7. VALUE IS CREATED, LEARNING HAPPENS AND RELATIONSHIPS DEVELOP WHERE THE ACTION IS.

This Lean principle is about where a leader should spend his or her time. In the Bible this can be seen both in the *Incarnation* of Jesus – his coming to the *Gemba* of mankind – and in the *incarnational* presence of Christians in the world – our life in the world. Jesus left his glorious “office” in heaven, made himself nothing, was born, lived, suffered and humbly died in our world (Philippians 2:6-8). Jesus taught, disciplined, healed, performed miracles and gave us an example of how to live (John 1:18, 1 John 1:1-2). In his high priestly prayer, Jesus stated that he sent his followers into the world and gave to them the glory the Father had given to him (Joh 17:18-22). Jesus tells his disciples (and us) to be the salt of the earth and the light of the Word, so that others “may see your good deeds and glorify your Father in heaven.” (Matthew 5:13-16). The extent to which the Bible affirms Lean principles gives Christians confidence that the Lean principles practiced by Toyota, Google and countless other corporations is not primarily a Japanese or Buddhist management system that may conflict with Christian beliefs. On the contrary, this affirmation demonstrates that Lean principles reflect Christian values and principles that we already seek to live out in our personal and professional lives.

## ▶ WHAT CHRISTIAN LEADERS CAN LEARN FROM LEAN

Christian leaders, workers and organizations can have confidence that they can learn from and apply Lean wisdom to help them succeed in their work and even to strengthen their Christian identity and mission.

Our experiences in Christian ministry have shown us that Christian organizations often struggle with the very things that Lean focuses on.<sup>22</sup> The concepts of “value,” “customer,” and “waste” are hard to understand and apply in Christian church and ministry contexts because these are arguably the most gut-wrenching ideas to apply anywhere. Allowing customers (external stakeholders and God himself as revealed through Scripture) to define value for us will inevitably conflict with long-held internally-driven beliefs about what we think is important. If we take Lean principles seriously, we will need to question established traditions, outdated programs, burdensome administrative procedures, excessive centralized control, unfruitful committees, superfluous activities, elaborate facilities, some staff positions and our inadequate understanding of and outreach to non-Christians.

Most importantly, Lean reminds Christian leaders to prioritize the parallel Christian principles that they already know, yet may have forgotten or neglected. Secondly, Lean provides principles and tools that Christian leaders can apply as they lead others, whether in business, ministry or church.<sup>23</sup> Toyota and many others have thought and written about what Lean means for leaders.<sup>24</sup> In line with these insights, we propose these priorities for Christian leaders derived from the seven Lean principles:

### 1. FOCUS ON PLEASING GOD AND PROVIDING VALUE TO YOUR CUSTOMERS.

It is easy for an organization to lose its direction, to focus on policies and bureaucratic procedures, rather than on pleasing

God and serving people. Christian leaders should take time to find out or to rediscover their personal purpose and the purpose of their organization and every department, committee or other entity in it. What pleases God can be found through prayer, reading the Bible, learning from and discussion with others, and reflection. Have your teams meet with and ask their customers what they value and what they want from the goods and services your organization offers or can offer.

### 2. IDENTIFY AND ELIMINATE WASTE AND SIN.

Knowing your purpose, facilitate a review of how your organization (or your part of it) provides value to your customers. As you do this, identify all the obstacles that hinder you personally and your organization from pleasing God and delivering value. Identify unevenness, overburden, the eight types of waste and administrative burdens; then find ways to elim-

inate or at least reduce them. Stop what does not bear fruit, and prune what is bearing fruit for greater fruitfulness.

Leaders should also look in their own life to identify

the cares of this world, the anxieties and the sins that hinder them and trip them up. Sin not only causes great hurt and loss to others, but it also harms the sinner (Proverbs 5:22) and separates us from God (Isaiah 59:2). With humility and wisdom, leaders should also partner with others to identify and eliminate organizational sin, such as various forms of discrimination and unfair treatment of employees.

### 3. WORK ON THE ROOT.

When we are busy and we encounter a problem, we often feel we don't have the time to stop, identify the root cause of the problem, and prevent it from happening again. We make a quick fix and endure the same problems again and again. However, leaders should encourage their teams to prevent their recurrence through root cause analysis and mistake-proofing, or applying the Plan-Do-Check-Act problem solving cycle. Once the best-known way to do something has been found, it should be documented and shared to become

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“standard work,” which serves both as a great way to train new people and as a springboard for continuous improvement.

The same principle applies to a leader’s character and behavior. Rather than continuing to sin and asking for forgiveness, leaders must work – with God’s strength and the encouragement and wisdom of others – to purify their hearts and overcome sin, and in so doing become more like Christ.

#### 4. STRENGTHEN CONTINUOUS IMPROVEMENT AND GROWTH.

Christian Leaders should develop a vision and a strategy with and for their organization, and then set stretch goals for the continuous improvement of their activities, processes, outputs and outcomes. They should expect every person and every part of the organization not just to do their work, but also to grow (personally and professionally) and to do their work better over time. What really helps in this is to document improvements, to share success stories and to recognize people and teams to continuously improve. Frequent and compelling communication of the vision, the strategy, and progress is essential.

#### 5. BUILD CAPABILITY OF AND EMPOWER YOUR PEOPLE.

Leaders should ensure that everyone receives training and coaching so that they are equipped and inspired not only to perform their work as best they can, but also to improve it. Initially, Christian leaders may rely on external expertise to provide training and coaching in the principles and tools of Lean, but over time they should develop internal expertise in Lean and expect managers and team leaders to coach their teams to improve. Leaders must also give their people authority and responsibility to improve.

#### 6. PROMOTE UNITY AND COLLABORATION.

Christian leaders must take very seriously Jesus’ words on the importance of unity of believers and the importance of working together with others. Therefore, they build bridges that connect people and serve as peacemakers when there is division. They do what they can to live at peace with everyone (Romans 12:18). They ask and encourage their people and teams to collaborate and partner with other individuals, teams and external partners.

#### 7. SPEND TIME IN THE *GEMBA*.

Like Jesus, Christian leaders go to the workplace to know and to be known, to develop relationships and to build up people. For all Christians, the larger *Gemba* is the home, community, country and world in which we live. Christian leaders courageously, sacrificially and humbly go and challenge their people to go into the world, in order to learn, to bear witness to Jesus through word and deed, to live fully for God (Colossians 3:17), to build relationships of trust, to be peacemakers, to reconcile, to act justly, to love mercy and to walk humbly with their God (Micah 6:8).

### ▶ CLOSING REFLECTION

Chiarini et al. argue that non-Japanese organizations which adopt Lean do not need to change their society, culture or religion, but to change their frame of mind about how they manage. They stated, “Lastly, it could be interesting to investigate whether, in some way, there is a sort of Western approach for implementing Lean-TPS based on the same tools and techniques but with different principles more pertinent to our culture.”<sup>25</sup> In this article, we argue that Christianity – while fundamentally very different from Japanese religions – aligns well with Lean principles and thus provides a welcoming and fertile different context for Lean. Lean principles remind Christian leaders to take the difficult steps to periodically reassess whom they are serving and challenge long-held notions of value versus waste as we seek to achieve our overarching mission of glorifying God and serving the world in His name.



## ABOUT THE AUTHORS



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## NOTES

<sup>1</sup> "History of Toyota", accessed February 24, 2020, <https://global.toyota/en/company/trajectory-of-toyota/history/>.

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<sup>3</sup> Jeffrey Liker, *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer* (New York: McGraw-Hill, 2004).

<sup>4</sup> John Krafcik, "Triumph of the Lean Production System," *MIT Sloan Management Review* 30, no. 1 (1988): 41.

<sup>5</sup> James Womack, Daniel Jones and Daniel Roos, *The Machine That Changed the World*, 1st ed. (New York: Harper Perennial, 1991).

<sup>6</sup> Examples include Christian Wittrock, "Reembedding Lean: The Japanese Cultural and Religious Context of a World Changing Management Concept," *International Journal of Sociology* 45(2) (2015), 95-111.; Andrea Chiarini, Claudio Baccarani, Vittorio Mascherpa, "Lean Production, Toyota Production System and Kaizen Philosophy: A Conceptual Analysis from the Perspective of Zen Buddhism," *The TQM Journal* (2018); and Poropat, Arthur, and John Kelllett. "Buddhism and TQM: An Alternative Explanation of Japan's Adoption of Total Quality Management," in *Proceedings of the 20th ANZAM Conference*, Australian and New Zealand Academy of Management (2006).

<sup>7</sup> Examples include Japan International Cooperation Agency (JICA),

*Kaizen Handbook* (2018); and Takahiro Fujimoto, *The Evolution of a Manufacturing System* (Oxford University Press, 1999).

<sup>8</sup> Robert B. Austenfeld, Jr., "W. Edwards Deming: The Story of a Truly Remarkable Person," *Papers of the Research Society of Commerce and Economics* 42(1) (2001).

<sup>9</sup> See Richard Donkin, "Whatever Happened to Homer Sarasohn?" In *The History of Work* (London: Palgrave Macmillan, 2010), 202-215, and N. I. Fisher, "Homer Sarasohn and American Involvement in the Evolution of Quality Management in Japan, 1945 – 1950," *International Statistical Review* 77(2) (2009), 276–299.

<sup>10</sup> Steven Spear and Kent Bowen, "Decoding the DNA of the Toyota Production System," *Harvard Business Review* 77 (1999), 96-106.

<sup>11</sup> Y. Sugimori, K. Kusunoki, F. Cho & S. Uchikawa, "Toyota Production System and Kanban System Materialization of Just-in-Time and Respect-for-Human System," *The International Journal of Production Research* 15(6) (1977), 553-564.

<sup>12</sup> Thomas M. Smith, "Lean Operations and Business Purposes: A Common Grace Perspective." *Journal of Markets & Morality* 18(1) (2015), 139-162. In addition, Womack and Jones identify five that are more generally applicable to non-production contexts; see James Womack and Daniel Jones, *Lean Thinking* (New York:

## NOTES (CONTINUED)

Simon and Schuster, 1996).

<sup>13</sup> Masaaki Imai, *Gemba Kaizen* (New York: McGraw-Hill, 1997), and Liker, *The Toyota Way*.

<sup>14</sup> Womack et. al., *The Machine*.

<sup>15</sup> "Muda, Mura, Muri," accessed February 24, 2020, <https://www.lean.org/lexicon/muda-mura-muri>.

<sup>16</sup> Taiichi Ohno, *Toyota Production System: Beyond Large Scale Production* (Boca Raton, FL: CRC Press, 1988).

<sup>17</sup> Spear and Bowen, "Decoding the DNA."

<sup>18</sup> Yasuhiro Monden, *Toyota Production System, An Integrated Approach to Just-in-Time* (Springer Science & Business Media, 1994).

<sup>19</sup> Torbjørn H. Netland and Daryl J. Powell, *The Routledge Companion to Lean Management* (New York: Routledge, 2017), and "Lean Global Network Institutes," accessed 16 June 2010, <http://leanglobal.org/affiliates/>.

<sup>20</sup> John Piper discusses this in his book, *Don't Waste Your Life* (Crossway Books, 2007).

<sup>21</sup> Eugene Peterson, *A Long Obedience in the Same Direction: Discipleship in an Instant Society* (InterVarsity Press, 1980).

<sup>22</sup> See Andrew Parris, "Improving Processes for Good in East Africa", *The TQM Journal* 25(5) (2013), 458-472; Don Pope, Andrew Parris and Kent Smith, "The Lean Church." *Regent Business Review* 10 (2004), 11-16; and Charles Duffert, *Lean Ministry: Implementing Change in the 21 st Century* (ChurchSmart Resources, 2011).

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<sup>25</sup> Chiarini et al., "Lean production."