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Lean Operations Implementation at an Indonesian Shoe Producer

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Abstract

Research Aims - We analyse the impact of lean operations implementation on the performance of an Indonesian shoe producer, identify key success factors of the implementation and propose further improvements to increase company performance.

Design/Methodology/Approach - A mix of quantitative and qualitative methods is employed. Comparisons of operational and financial performance before and after implementation are conducted to analyse the program's impact. In-depth interviews with six representatives from the shoe producer and its vendor are conducted to rank the key success factors and gain insights into their lean operations implementation.

Research Findings - The shoe producer experienced a significant increase in performance after implementing lean operations, and the five most important success factors of the implementation were management commitment and involvement, teamwork, communication, cultural-change management and sustainability of improvement activities. The current performance can still be improved by utilising information technology, implementing a Kanban system, providing direct delivery of raw materials and reducing lead times.

Theoretical Contribution/Originality - The paper provides new insights into the challenges faced by the Indonesian shoe producer, especially in its operations and highlights five critical success factors of lean operations implementation.

Managerial Implications in the Southeast Asian Context - Results of the present study can be used by other companies in a similar industry in the region to improve their operations and financial performance.

Research Limitations and Implications - The impact of implementing lean operations with the proposed improvements to the company's costs and revenues has not been studied in detail.

Keywords - Lean operations, Key success factors, Shoe producer, Footwear industry, Indonesia

INTRODUCTION

The shoe industry plays a significant role in the Indonesian economy. According to data from Statistics Indonesia, the leather, leather goods and footwear industries contributed approximately 0.27% of the Indonesian gross domestic product in 2018 (BPS, 2019). The Indonesian Minister of Industry, Airlangga Hartarto, stated that the number of footwear producers in Indonesia had nearly reached 33,000 in 2017, of which 49.62% were located in West Java, hosting around 115 000 employees (Rahman, 2017). He further noted that the Indonesian footwear industry was among the top 10 in the world and that the Government of Indonesia was committed to continuously creating programs to support small and medium enterprises in the footwear industry. Exports of Indonesian footwear increased by 2% to USD 4.7 million in 2017, and it was expected to increase at a rate of 3.5% in 2018, with the US and European countries being key export destinations (Aprisindo, 2018). How-

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ever, exporting to those countries encounters tight competition, especially from the Vietnam footwear market (Aprisindo, 2018). Therefore, Indonesian shoe producers must manage their businesses efficiently so that they can provide products with competitive prices.

GoodShoes[1] is a fast-growing Indonesian shoe-producing company established in 2010. The company designs shoes, partnering with local shoemakers for manufacture. The company began by marketing their products to friends and relatives. Then, it began to sell through social media. Currently, they sell through online stores and conventional retail outlets. They sold approximately 25 000 pairs of shoes in 2013 and almost 50 000 pairs in 2014. From 2015 to the beginning of 2016, the company experienced frequent stockouts that caused losses of sales opportunities, which led to a reduced net profit of −1.71% in the first quarter of 2016. The stockout of hot items was 81% in the first quarter on 2016. To overcome the problem, the management decided to adopt lean operations to eliminate waste and improve operational efficiency and profitability. The lean approach focuses on identifying and eliminating non-value-added activities in design, operations and supply chain management that directly affect customers (Womack and Jones, 1996). According to Abreu–Ledon, Lujan–Garcia, Garrido–Vega and Escobar–Perez (2018), there is a positive and moderate relationship between lean operations and business performance.

The company implemented lean operations during the second quarter of 2016, and an evaluation of the program's impact on the company's performance in operations and finance is required. Thus, the objectives of the present study are threefold. First, we analyse the program's impact on company performance by comparing the operations and financial performance before and after implementation. Second, we identify the key success factors of lean operations at the company. Third, we propose further improvements that can be made to operations to increase company profitability.

This paper contributes new insights to the challenges faced by shoe producers in Indonesia, especially in their operations. It also highlights the five critical factors determining the success of implementing lean operations and their impacts on the company's performance. Results of the present study can be used by other companies in similar industries to smartly improve their operations and financial performance. The remainder of the paper is structured as follows. Relevant literature is discussed in the next section, followed by explanation of the research method. Results and discussion are found afterwards, and conclusions are made in the final section.

LITERATURE REVIEW

The philosophy of lean operations can be traced back to the Toyota Production System, which was promoted by Taichi Ohno (Taj & Morosan, 2011) and implemented by the automotive industries in Japan in the 1970s and 1980s. The main objective of

[1]The real name of the company is not disclosed for confidentiality reasons

the philosophy was to eliminate waste and to provide customers with exactly what they want, when they want it, through continuous improvement (Heizer, Render, & Munson, 2017). Piercy and Rich (2015) specifically mentioned that an objective of lean operations was to use fewer resources to produce the same level of output.

According to Gupta and Jain (2013), lean operations are a management philosophy, not only a technique. The philosophy of lean operations has been highly sought to improve company performance by eliminating waste (Holweg, 2007; Shah & Ward, 2007). Lean operations are driven by customer orders through a pull system, and the fundamental issues of the approach are elimination of waste, removal of variability (i.e. deviation from optimal processes) and improvement of throughput (i.e. the rate at which units move through the process). The seven types of wastes, as identified by Taichi Ohno, are overproduction, queues, transportation, inventory, motion, over-processing and defective products. A broader perspective of eliminating waste shows that an efficient and sustainable production minimizes the input, maximises the output and wastes nothing (Heizer et al., 2017).

According to Womack and Jones (1996), there are five principles of lean operations. First, one must define the product value from the customer's perspective. Customer satisfaction is determined by good product quality, competitive prices and on-time deliveries. Second, one must identify and map the value-stream process for each product. Third, one must eliminate waste along the value stream. Fourth, one must implement a pull system to align the flows of material, information and final products. Fifth, one must implement continuous improvement (i.e. continuous evaluation of work processes to eliminate waste). In lean operations philosophy, product value is determined by the customers (Heizer et al., 2017), meaning that the company should know what the customer wants and be able to provide value immediately (Womack & Jones, 1996). Value-stream mapping (VSM), by contrast, is a tool that can be used to map all value-added and non-value-added activities along the value chain, so that improvements can be made and waste can be eliminated (Jacobs & Chase, 2014). Lastly, a pull system is a production system in which procurement, production and distribution processes are conducted based on customer orders (not forecasts), so that the company can eliminate wastes originating from unnecessary inventory (Hopp & Spearman, 2004).

There are several requirements for implementing lean operations in a company (Chen & Meng, 2010). First, the company must combine lean thinking with its business strategy. Second, the company must integrate suppliers and customers. Third, there should be a strong commitment from top management. Lastly, all company employees should contribute and be involved in the implementation of operations.

Piercy and Rich (2015) pointed out that, at the strategic level, implementation of lean operations requires changes in organisation. The strategic process must focus on policy deployment that urges the lower levels of the organisation to meet strategic goals. The organisational logic must change from focusing on management functions to focusing on cross-functional processes, spreading the changes to sup-

ply partners and forming a co-operative relationship. Furthermore, employees must be viewed as value-adding resources that must be trained, treated and paid better to engage continuous improvement. At the workplace level, however, Piercy and Rich (2015) identified three key areas of lean improvement: total quality management (tools and approaches that focus on quality improvement of materials and production processes), total preventive maintenance (all actions to ensure the reliability of production equipment, resulting in a dependable production quality and reliable production schedule) and flow production (activities focusing on altering how products and materials are handled and on changes toward inventory reduction).

The lean operations philosophy has been implemented in several industries in several countries. Several empirical studies that assess the impact of lean operations on the performance of those companies have been completed. Taj and Morosan (2012) assessed the impact of lean operations on Chinese manufacturing industries. Lean operations were represented by two practice constructs (i.e. supply chain and human resources), one of which was related to production and system design. Taj and Morosan (2012) used three factors to represent lean performance: flow, flexibility and quality. They assessed 65 manufacturing companies in electronics, telecommunication and wireless, computer, food and beverages, clothing, pharmaceutical and chemical, petroleum and other industries. Their results showed that human resources and the supply chain had significantly positive effects on material flows and production flexibility, whereas the production and system design had significantly positive effects on flow, flexibility and quality.

Nawanir, Teong and Othman (2013) studied the effects of lean practices on the operational and business performance of Indonesian manufacturing sectors. There were 139 respondents from different industries. The results indicated that lean practices had significant effects on both operational and business performances, and they mediated the relationship between lean practices and business performance. Sharma, Dixit and Quadri (2015) conducted research on the impact of lean practices on performance measures in the Indian machine-tool industry. They distributed questionnaires to 70 companies, and the results indicated that a strategic partnership with suppliers, cross-functional and cross-organisational design, and development teams significantly affected key performance measures.

Empirical studies on the impacts of lean operations have also been accomplished in the service industries (e.g. healthcare industry in the UK) (Matthias & Brown, 2016) and the retail industry in the US (Kroes, Manikas, & Gattiker, 2018). The former concluded that the benefit of the lean process had not been fully realised, whereas the latter concluded that operational leanness resulted in superior and lasting return for retailers.

Based on the literature on lean operations, Abreu–Ledon et al. (2018) identified six dimensions or practices of lean operations that were commonly used in previous empirical studies, including process control and improvement, just-in-time flow, workforce development, maintenance management, customer focus and sup-

plier relationship. Process control and improvement refer to the use of various tools (e.g. statistical process control and failure-mode effect analysis) to ensure quality. Just-in-time flow provides a set of activities to manage production flow, including reduction of setup time, arrangement of equipment layout, pull production, small-lot production and uniform levels of production. Workforce development refers to employee management based on empowerment, teamwork, employee knowledge, skills, performance, reward and recognition. Maintenance management, by contrast, means conducting maintenance activities to ensure that production equipment is always in working order. Customer focus indicates that the firm is always focusing on what customers need. Lastly, supplier relationship means the firm works together with its suppliers so that they can deliver the raw materials and other goods at the right quantity, at the right time and at the right location.

Other studies investigated the critical success factors of lean operations implementation at companies. Twenty critical success factors were mentioned in five previous studies, as shown in Table 1. There were 11 factors mentioned at least twice, such as management commitment and involvement, fit between strategy and long-term planning, employee participation, cultural-change management, training, benchmark and transfer of knowledge, communication, performance measurement, supplier involvement, sustainability of improvement activities and teamwork. These are listed in Table 1.

RESEARCH METHOD

To compare the performance before and after implementation, secondary data were collected to calculate the operational and financial performance measures (i.e. stock-

Critical Success Factors	Ramarapu, Mehra, & Frolick (1995)	Naslund (2008)	Chen & Meng (2010)	Marodin & Saurin (2013)	Netland (2016)
Management commitment and involvement					
Fit between strategy and long-term planning					
Employee participation					
Cultural-change management					
Training					
Benchmark and transfer of knowledge					
Communication					
Performance measurement					
Supplier involvement					
Sustainability of improvement activities					
Teamwork					
Inter-functional integration					
Customers' involvement					
Social responsibility and work safety					
Organisational infrastructure					
Project management capability					
String quality and process control					
Appreciation and recognition					
Structured approach and project priority					
The use of tools, techniques, and technologies					

Table 1.
Critical success factors of lean operations implementations

out rate of hot items, inventory turnover and net profit). We used data from the third quarter of 2015 until the first quarter of 2016 to determine the conditions before implementation. We used data from the second quarter to the fourth quarter of 2016 to determine the conditions after implementation. We also asked six representatives from GoodShoes and its manufacturing partner to rank the key success factors of lean operations implementation at the company. Out of 20 factors identified using the literature review, we asked them to choose the five most important factors from the list of 11. We conducted interviews to gain insights about the chosen factors and applied scoring as presented in Table 2. The total score was then calculated as the sum of the scores given by all informants.

RESULTS AND DISCUSSION

GoodShoes produces shoes of classic designs with good-quality leather. The target market of GoodShoes is men aged 19 to 35 years. The products' price range is from USD 17 to USD 85, and GoodShoes offers 200 different shoes of different sizes. The 'golden size' (or most-wanted size) ranges from 40 to 44.

As mentioned, GoodShoes partners with several manufacturing partners (i.e. shoemakers) in Bandung and West Java, and it markets its products directly to customers through its online and conventional retail stores. GoodShoes orders raw materials (e.g. leather and soles) from its suppliers, and they deliver the materials to GoodShoes' warehouse. GoodShoes then delivers the raw materials and the shoe designs to its manufacturing partners (vendor) to be converted to final products (shoes). The production process includes cutting the leather according to the shoe pattern, sewing the leather, assembling all upper parts of the shoe, and assembling all the shoe parts into the final product (final assembly). The final products are then shipped back to GoodShoes' warehouse. Customers can order products from the online store or they can buy directly at conventional retail stores. The supply chain is depicted in Figure 1.

Before the implementation of lean operations

Prior to lean operations implementation, a major problem was identified when the company evaluated its performance. The performance indicators before implemen-

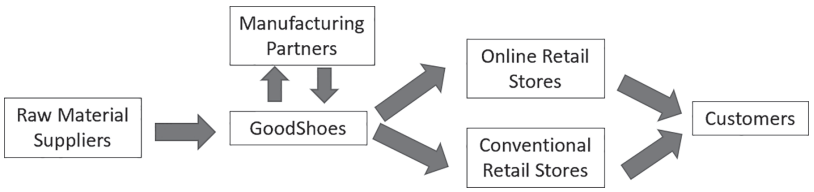


Figure 1.
GoodShoes' Supply Chain

Rank	**Score**
1	100
2	80
3	60
4	40
5	20

Table 2.
Scoring of factors

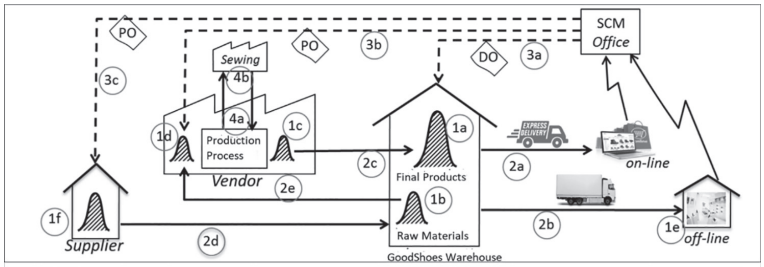
tation and the company's target are presented in Table 3. It can be seen that in the three quarters before the implementation of lean operations, the stockout rate of hot (high-demand) items increased to a level of 81% by the first quarter of 2016. However, the company's target was zero stockouts on online and offline stores, because stockouts discourage customers to buy and may cause reductions in sales volume in consecutive periods.

It can also be seen in Table 3 that the inventory turnover during the three periods was much lower than the target of eight times. This was caused by the fact that most products in the inventory were considered to be slow-moving items. Hence, the available products did not match customer wants. These circumstances caused financial loss to the company. The VSM of the operations system before implementation can be seen in Figure 2.

Raw materials, works in progress (WIP) and final products are stored at GoodShoes' and vendor's warehouses without proper arrangement and identification (Figure 2; points 1a, 1b, 1c and 1d) and without a first-in first-out (FIFO) mechanism. Data in Figure 2 also indicate that the lead time is quite long, causing inflexible production processes. Furthermore, production is conducted based on low-level-of-accuracy forecasting, causing a shoes-to-customer-need mismatch.

After the implementation of lean operations

Based on the mentioned problems, management took initiatives to implement lean operations. First, they implemented the '5-S' principles (i.e. sort/segregate, simplify/straighten, shine/sweep, standardise and sustain/self-discipline). Before implementation, the WIP or final product inventory was simply stored without any proper order and without proper identification (Figure 2; points 1a, 1b, 1c and 1d). After implementation, inventories were stored with proper identification at appropriate locations using a FIFO mechanism (Figure 3; points 1a, 1b, 1c and 1d).



Process LT		7 Days			
Delivery LT			3 Days		1 Day
Inventory LT		60 Days		120 Days	30 Days
Information LT	60 Days		30 Days		30 Days

Total LT = 331 Days

Figure 2.
VSM before Implementation

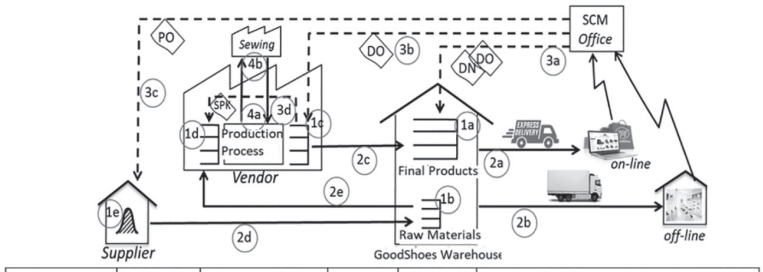
Table 3.
GoodShoes' performance and target before implementation

Performance Indicators	2015-Q3	2015-Q4	2016-Q1	Target
Stockout rate of hot items	67%	72%	81%	0%
Inventory turnover	1.9	1.2	2.9	8.0
Net-profit ratio	−1.5%	−1.5%	−1.71%	5%

Second, the company now implements a pull system by increasing the delivery frequency from vendor to the warehouse. Before implementation, the customer order was used as a trigger for production, and orders were processed once a month. Therefore, the delivery of final products was also limited to once a month (Figure 2, points 1d and 1c). After implementation, GoodShoes required its vendor to maintain at least 1 week of final product inventory and ensure the availability of fast-moving products. Therefore, when GoodShoes issued daily orders through their delivery-order (DO) system, products could be delivered promptly by the vendor. This mechanism enabled GoodShoes' warehouse to always replenish products that are sold to customers. Hence, the production order is issued according to daily customer order (Figure 3, point 3d).

Furthermore, GoodShoes asked its vendor to reduce their production lead time to 2 days by eliminating employee idle time, determining the correct production capacity based on bottleneck processes, producing lots in smaller sizes and standardising the production sequence. These activities caused the reduction of production (process) lead time by approximately 51% (Figures 2 and 3). Production planning is no longer based on forecasting but is instead based on customer order. The short production lead time allows production to become more flexible at the vendor site. Therefore, the performance indicators improved (Table 4).

As seen in Table 4, the stockout rate of hot items was reduced significantly, showing that the pull system worked well. Now, the company only produces what the customers need. Thus, they reduce potential losses. The results also show that the inventory turnover has improved, although it has not reached the company's target. The inventory level was reduced because of the improved ordering system and reduced lead time, resulting in increased production of fast-moving items. Lastly, in terms of financial performance, the target for net-profit ratio of 5% was reached in the fourth quarter of 2016, indicating that all the improvement activities resulted in an increased net-profit ratio.



Process LT		4 Days			
Delivery LT			3 Days		1 Day
Inventory LT		9 Days		74 Days	14 Days
Information LT	60 Days		2 Days		1 Day

Total LT = 168 Days

Figure 3.
VSM after Implementation

Performance Indicators	2016 Q2	2016 Q3	2016 Q4	Target
Stockout rate of hot items	58%	28%	7%	0%
Inventory turnover	6.5	6.9	6.0	8
Net-profit ratio	3.91%	2.65%	5.02%	5%

Table 4.
GoodShoes' performance and target after implementation

Key success factors of lean operations implementation at GoodShoes

We asked five representatives from GoodShoes (i.e. chief executive officer (CEO), chief operations officer (COO), business development director (BDD), supply chain manager (SCM) and marketing manager (MM)) and the company's one vendor to choose and rank the five most important factors that determined the successful implementation of lean operations at the company. The results are presented in Table 5. The five most important factors were management's commitment and involvement, teamwork, communication, cultural-change management and sustainability of improvement activities.

The first most important factor was management's commitment and involvement. In the interview, the informants stated that commitment from the top-management team (TMT) really helped implementation. Furthermore, direct involvement of the COO as the project leader helped by accelerating the process. The direct involvement of the TMT also encouraged the vendor to co-operate. The supply-chain manager even said, 'I think the commitment of the management is the most important thing in implementing the activities. If the management is not committed to making improvement decisions and policies, then the activities cannot go as planned'.

The TMT of GoodShoes also periodically reviewed implementation progress. Hence, important decisions were made immediately. Additionally, with direct involvement, the direction and target of improvements was adjusted to the company's long-term targets and needs. Thus, it showed positive impacts on company performance.

Key Success Factors		Informants						Total score	Overall Rank
		CEO	COO	BDD	SCM	MM	Vendor		
Benchmark and transfer of knowledge	Rank					5	2		
	Score					20	80	100	
Sustainability of improvement activities	Rank			5	3	2	3		5
	Score			20	60	80	60	220	
Teamwork	Rank	2	5	4		1	5		2
	Score	80	20	40		100	20	260	
Fit between strategy and long-term planning	Rank					3			
	Score					60		60	
Supplier involvement	Rank		4				4		
	Score		40				40	80	
Management commitment and involvement	Rank	1	1	3	1				1
	Score	100	100	60	100			360	
Communication	Rank	3	2				1		3
	Score	60	80				100	240	
Cultural-change management	Rank	5	3	1	2				4
	Score	20	60	100	40			220	
Employee participation	Rank			2	5				
	Score			40	20			60	
Training	Rank				4				
	Score				40			40	
Performance measurement	Rank	4				4			
	Score	40				40		80	

Table 5.
Key success factors of lean operations implementation at GoodShoes

The second most important factor was teamwork. It was needed in various improvement initiatives because it involved different GoodShoes divisions. Good teamwork results in team synergy. Therefore, when problems or obstacles occur during implementation, they can be resolved together.

The third most important factor is communication. The management of GoodShoes now conducts an open communication with the project team, initiative implementors and the vendor, so that there is a consistency between lean operations targets and activities. Communication is carried out formally (e.g. through reviews) and informally (after working hours). During a review, the vendor and the management openly discuss issues in the implementation and find ways to resolve them. Everyone is given the same opportunity to express their opinions. Informal communications, by contrast, are typically done casually. They can be carried out anywhere, mostly after working hours. According to the informants, informal communication is somewhat more effective, especially when team members want to express their complaints.

Cultural-change management was also considered to be an important key factor in lean operations implementation, because it is needed to prevent resistance to change. It is common for changes to be seen as an inconvenience. When implementing lean operations, the difficulties often faced are related to people. Changing people's habits is not a simple matter. 'The toughest challenge when implementing the improvements is dealing with humans as the subjects or the actors in the improvement activities', said the COO. People get used to doing things a certain way after a few years. Hence, it is difficult to ask them to immediately do things differently. For example, one of the improvement activities is to always follow predetermined standards. Production operators were used to working as they saw fit with suboptimal productivity. Thus, when the company adopted the new standards to increase productivity, the operators first resisted the initiative. However, after an informal approach, the change was accepted.

Sustainability of improvement activities was also considered to be a key success factor, because the initiatives must be implemented in their entirety and be done continuously. The application of lean operations caused problems to surface, and those problems were resolved quickly. Therefore, the sustainability of improvement activities is a must when lean operations are implemented. In the interview, the CEO said, 'Of course, this activity must be done continuously. We started when things were difficult, so we really understood the benefits of doing this for the company'. The COO said, 'Obviously, we will implement this improvement activity, because it is indeed in our grand strategy of improvement'.

Citing the mentioned five factors, the interview results also showed that knowledge and capability of operational employees and the improvement team must be increased continuously through training or even benchmarking to other companies that have well-implemented lean principles. One other important factor in implementing lean operations is co-operation with the vendor. The COO said, 'The first

initiative of improvement activities is to communicate and co-ordinate with the vendor, which is very crucial for the success of the implementation'. The application of lean principles must be extended to the vendor so that it results in significant benefits for the entire supply chain.

Proposed further improvements at GoodShoes

Although lean operations implementation has resulted in improved performance, further improvement initiatives can still be implemented. As can be seen in Figure 3, there are several improvement initiatives available, such as reduction of inventory, implementation of new technology, application of one-piece flow, implementation of the Kanban system and elimination of waste (Shah & Ward, 2007). Based on the literature and interview results, we identified four initiatives that should be applied by GoodShoes, including the use of IT e-ordering from retail outlets to the warehouse, implementing a Kanban system, the direct delivery of raw materials and further reduction of production lead times.

Currently, sales data from online and offline retail outlets are gathered using IT and used by the SCM's department to issue a DO and a delivery note (DN) to the warehouse as an order. This data collection takes 1 day, and the preparation of the DO and DN also takes a day. Thus, it takes 2 days to provide information of sold products from retail outlets to the warehouse. By implementing IT at the warehouse, order information could be received in real time (e-order).

The second improvement that should be implemented is the application of a complete pull system and a fill-up system to eliminate mismatches among final product delivery, production and raw-material requirements. Currently, product orders come from the SCM's division in the form of a DO, both for final products and raw materials. This may cause a mismatch among sales requirements, production process requirements and raw materials delivery. To eliminate the mismatches, a complete pull and fill-up system should be implemented in the company's production system. A pull system allows the customer or the next process to take what is needed, when it is needed, from the previous process. After goods are taken, the process refills stocks at the amount taken. This is called a fill-up system. Therefore, a Kanban system should be used on the production line so that shoes could be made according to the type, number and the time they are sold.

The third improvement that could be applied is the direct delivery of raw materials from suppliers. In the current situation, raw materials for production are delivered from suppliers to the vendor through GoodShoes' warehouse. As mentioned in the literature, all activities related to the movement of materials that do not have any added value are considered waste and should be minimised or eliminated. The direct delivery of raw materials from suppliers to the vendor would reduce transportation time and required floor space at GoodShoes' warehouse. The warehouse space could then be used for other needs, such as additions of new products.

The fourth improvement initiative involves the further reduction of production lead

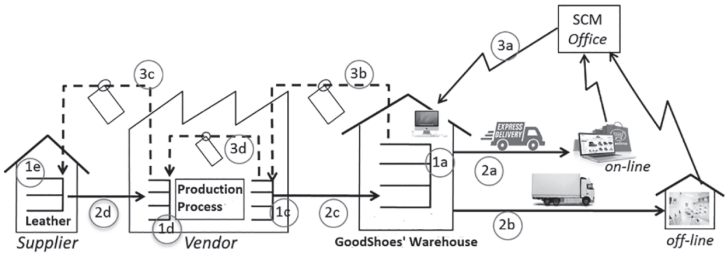
time. The current production lead time at the vendor is 4 days. This is because sewing operations are done by another company. Thus, additional transportation time is required to order and deliver goods daily. The long lead time is also a requirement, as shoes must be cooled for 24 hours so that the glue sticks perfectly. A reduction of lead time could be achieved by performing the sewing operation at the vendor's site and with the use of a chiller to shorten the cooling process. The target VSM after these potential improvements are implemented is presented in Figure 4. By implementing the four improvement initiatives, the lead time is reduced to 26 days, with the inventory lead time reduced by 76% (from 97 days to 23 days) and the information lead time reduced from 63 days to only 1 day.

MANAGERIAL IMPLICATIONS IN THE SOUTH EAST ASIAN CONTEXT

Results of the present study imply that every company must continuously evaluate and find ways to improve its operational and financial performance. Results also indicate that the successful implementation of lean operations requires top management's commitment and good communication within the improvement team and with production operators and the vendor. Good cultural-change management is needed to prevent rejection of improvement initiatives at the operational level, and commitment is required to continuously conduct improvement activities. These findings can be used by other companies in similar industries in South East Asia that are considering implementing lean operations.

THEORETICAL IMPLICATIONS

This study confirms the five most important factors of ensuring the successful implementation of lean operations in a manufacturing company. These include management commitment and involvement, teamwork, communication, cultural-change management and sustainability of improvement activities. However, the present study has limitations. The impact of lean operations implementation with the proposed improvements on company costs and revenues has not yet been studied in detail, because of the difficulty to obtain company data related to costs and revenues. A more comprehensive study is needed to fully comprehend the impacts of lean operations on the company's operational and financial performance.



Process LT		0.5 Day			
Delivery LT	0.5 Day		0.5 Day		0.5 Day
Inventory LT		2 Day		7 Days	14 Days
Information LT	0.5 Day		0.5 Day		

Total LT = 26 Days

Figure 4.
Target VSM when next Improvements are Implemented

CONCLUSION

The present analysed the impact of lean operations implementation at an Indonesian shoe manufacturing company, which we call GoodShoes. We identified the key success factors behind their implementation and proposed ways to further improve the company's performance. Analysis results showed that the implementation of lean operations improved the company performance by reducing the stockout rate of hot items and increasing inventory turnover, leading to a better financial performance with increasing net-profit ratio.

The results also indicate that the five most important factors needed to ensure a successful implementation of lean operations include management commitment and involvement, teamwork, communication, cultural-change management and sustainability of improvement activities.

Because lean operation implementation implies continuous improvement, the performance at GoodShoes could still be improved by implementing new initiatives, such as e-ordering from the retail outlets to the warehouse, implementing a Kanban system on the production line, direct delivery of raw materials from the supplier to the vendor, and further reduction of production lead time at the vendor sites. The proposed four initiatives should reduce the lead time significantly so that the company can quickly respond to market changes.

References

Abreu–Ledon, R., Lujan–Garcia, D. E., Garrido–Vega, P., & Escobar–Perez, B. (2018). A meta-analytic study of the impact lean production on business performance. *International Journal Production Economics*, *200*, 83-102.

Aprisindo. (2018). Industri sepatu diperkirakan tumbuh 3,5% pada tahun 2018 (The shoes industry is expected to grow at 3.5% in 2018). Retrieved from: http://www.aprisindo.or.id/component/content/article/37-daily-news/216-industri-sepatu-diperkirakan-tumbuh-35-pada-tahun-2018.

BPS. (2019). PDB triwulanan atas dasar harga konstan 2010 menurut lapangan usaha, 2014-2018 (Quarterly GDP at 2010 constant market price by industrial origin). Retrieved from https://www.bps.go.id/dynamictable/2015/05/06/827/-seri-2010-pdb-triwulanan-atas-dasar-harga-konstan-2010-menurut-lapangan-usaha-miliar-rupiah-2014-2018.html

Chen. L. & Meng, B. (2010). The application of value-stream mapping-based lean production. *International Journal of Business and Management*, *5*(6), 203-209.

Rachman, F. F. (2017). Industri alas kaki Indonesia terbesar ke-4 dunia (Indonesia's footwear industry is the fourth biggest in the world). Detik Finance. Retrieved from https://finance.detik.com/industri/d-3386946/industri-alas-kaki-indonesia-terbesar-ke-4-dunia.

Gupta, S. & Jain, S. K. (2013). A literature review of lean manufacturing. *International Journal of Management Science and Engineering Management*, *8*(4), 241-249.

Heizer, J., Render, B., & Munson, C. (2017). *Operations Management Sustainabil-*

ity and Supply Chain Management (12th Ed.), Boston, MA: Pearson Education Inc.

Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management*, *25*(2), 420-437.

Hopp, W. J. & Spearman, M. L. (2004). To pull or no to pull: What is the question? *Manufacturing and Service Operations Management*, *6*(2), 133-148.

Jacobs, F. R. & Chase, R. B. (2014). *Operations and Supply Chain Management* (14th Global Ed.), New York, NY: McGraw–Hill Companies Inc.

Kroes, J. R., Manikas, A. S., & Gattiker, T. F. (2018). Operational leanness and retail firm performance since 1980. *International Journal of Production Economics*, *197*, 262-274.

Marodin, G. A. & Saurin, T. A. (2013). Implementing lean production systems: research areas and opportunities for future studies. *International Journal of Production Research*, *51*(22), 6663-6680.

Matthias, O. & Brown, S. (2016). Implementing operations strategy through lean processes within healthcare: The example of NHS in the UK. *International Journal of Operations and Production Management*, *36*(11), 1435-1457.

Naslund, D. (2008). Lean, six-sigma and lean sigma: Fads or real process improvement methods? *Business Process Management*, *14*(3), 269-287.

Nawanir, G., Teong, L. K., & Othman, S. N. (2013). Impact of lean practices on operations performance and business performance: Some evidence from Indonesian manufacturing companies. *Journal of Manufacturing Technology Management*, *24*(7), 1019-1050.

Netland, T. H. (2016). Critical success factors for implementing lean production: The effect of contingencies. *International Journal of Production Research*, *54*(8), 2433-2448.

Piercy, N. & Rich, N. (2015). The relationship between lean operations and sustainable operations. *International Journal of Operations and Production Management*, *35*(2), 282-315.

Ramarapu, N. K., Mehra, S., & Frolick, M.N. (1995). A comparative analysis and review of JIT "implementation" research. *International Journal of Operations and Production Management*, *15*(1), 38-49.

Shah, R. & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management*, *25*(4), 785-805.

Sharma, V., Dixit, A. R., & Qadri, M. A. (2015). Impact of lean practices on performance measures in context to Indian machine too industry. *Journal of Manufacturing Technology Management*, *26*(8), 1218-1242.

Taj, S. & Morosan, C. (2011). The impact of lean operations on the Chinese manufacturing performance. *Journal of Manufacturing Technology Management*, *22*(2), 223-240.

Womack, J. P. & Jones, D. T. (1996). Beyond Toyota: How to root out waste and pursue perfection. *Harvard Business Review*, 140-144.