Australian National University

Research School of Accounting

GROUP ASSESSMENT COVER SHEET

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THE AUSTRALIAN NATIONAL UNIVERSITY

Business Report for *Zoom Bikes*

BUSN 3003

ADVANCED MANAGEMENT ACCOUNTING

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I EXECUTIVE SUMMARY

As our client, Zoom Bikes, a premier manufacturer of motorbikes, try to achieve ‘perfection’ in their production and delivery process. Since they implemented just-in-time (JIT) system for materials and tried to warm up their economic situation, Zoom Bikes try to infiltrate lean culture into their various department especially supplier-related activities and production process.

In this report, we calculate some non-financial measures to help analyze the behaviour of two suppliers and give guidance of decision-making on suppliers, then demonstrate the lean system pursued by Zoom Bikes in perspectives of characteristics, advantages, disadvantages, differences from traditional system and significant challenges. Moreover, we provided some potential solutions for those obstacles in implementing lean operations based on some references. Finally, we introduce Six sigma as an alternative operating tool for Zoom Bikes to make continuous improvement.

II REQUIREMENTS

1 Determine, assess and compare the systems suppliers' performance

In order to manufacture its top-line motorbike, Zoom Bikes bought identical exhaust systems from two different suppliers namely Quantum Systems and King of Chrome. Based on the recommendation from the CFO Sarah, Zoom Bikes decided to use a series of non-financial and financial measures to evaluate the performance of the suppliers.

It is highly recommended to choose King of Chrome Systems as it performed better than Quantum Systems.

1.1 Total cost per unit for King of Chrome

In order to calculate the total cost per unit for King of Chrome, we apply ABC method by using the total cost divided by the cost driver of each activity, then multiplying the number of cost drivers to get the total cost for each supplier shown in Appendix Table A.

As for the activities in King of Chrome, Appendix Table B reveals the details. The receive late deliveries reduced to 12 and the production downtime due to late delivery also reduced to 30 hours of King of Chrome. The total cost per unit for King of Chrome is $ 210.18.

For comparison, the total cost per unit for Quantum Systems ($215.37) is also calculated in Appendix Table C. Thus, King of Chrome is cheaper given the identical exhaust system.

1.2 Changes to minimise supplier-related costs

In order to minimize and reduce the supplier-related costs, it is useful to classify activities into value-added and non-value-added activities.

In Appendix Table D, the issue worthy of note are as follows: The downtime costs are extremely high, which result from the late deliveries (12.84% of total cost) and return reject components (19.26%). Apart from these, dispute invoiced amount (0.21%) and quality audit of suppliers (2.68%) are also the non-value-added activities, which can be

eliminated without harming the customer value. Thus, it is vital to reduce external failure and manage the supply chain in an effective manner.

Specific strategies can be tried from the following aspects:

1. establish an effective supply chain organization mechanism.

2. negotiate a fair and reasonable agreement with suppliers, also specify the details of penalty for late deliveries and low-quality materials, as well as reward and incentive mechanism if suppliers perform very well.

3. establish a long-term and stable cooperative relations with suppliers.

1.3 Feasible performance measures

In Appendix Table E, the four major supplier performance criteria include delivery schedules (about JIT system), the accuracy of orders delivered, number of components rejected on delivery, and its achievements in reducing its production costs. According to these four performance criteria, it can determine whether the supplier can sign a long-term contract with Zoom Bikes.

To be more specific, in order to achieve high performance in the criteria about delivery schedules, the supplier should focus on delivering inputs on time. Quantum Systems has performed better as successfully delivering 93.33% of committed orders on time, compared to King of Chrome of 92%.

As for the criteria about the accuracy of orders delivered, King of Chrome prepared the appropriate materials and components needed for Zoom Bikes, 97.69% of which are consistent with the invoices. However, Quantum Systems only delivered 75% correct materials.

As for the criteria about the number of components rejected on delivery, it is significant for the supplier to enhance its Quality (more spending on the conformance costs, for instance) thus reduce the defective components. King of Chrome with acceptance of 89.33% performed better than Quantum Systems (83.33%).

Finally, as for the achievements in reducing its production costs, vendor's performance

index is an important measurement. Ideally VPI is equal to 1, King of Chrome had a VPI of 1.73 compared to Quantum Systems of 1.78, which means there exists a large amount of unnecessary costs caused by Quantum systems' non-performance.

By analyzing four aspects, King of Chrome slightly fall behind on delivery schedule, but performed much better in accuracy, acceptance and production price than Quantum Systems. Thus, it is recommended to choose King of Chrome.

1.4 Advantages of implementing the electronic systems

After implementing the electronic system in Zoom Bikes with its suppliers, the first and foremost advantage is that the electronic system can help to reduce the costs according to leveraging volume, avoiding duplicate spending and save the costs related to paper-based activities (Boariu, 2015). In addition, compared with the manual system, electronic system can dramatically increase the speed and flexibility for Zoom Bikes to interact with its suppliers. Furthermore, electronic system is beneficial to supply chain management. As transactions and supplier information can be stored in the supplier database, which results in a more reliable supplier relationship. Finally, implementing the electronic system to transact with suppliers can help Zoom Bikes to increase its productivity and reduce the errors. Because problems can be easily identified and solved. All in all, owing to having these merits of the electronic system, it is strongly recommended for Zoom Bikes to implement this system to transact with its suppliers.

2 Lean

Conceptually, the research that was conducted by Dekier (2012) points out that lean management refers to a classic business model aiming to eliminate the waste both in the processes and productions while meeting customers' demands and wants. In addition, Balocco et al. (2018) also put forward that according to reducing unnecessary costs related to the processes and production and satisfying customers, it can dramatically help the company to boost its sales and goodwill. Furthermore, based on the research conducted by Melovic et al. (2016), the main purpose of the lean operation model is to conduct continuous improvements and make sure the optimum operation and production efficiency and productivity. As a result, especially for manufacturing businesses such as Zoom Bikes, implementing the lean operation model is effective and necessary.

Back to this case, if Zoom Bikes implements the lean operation model throughout its all processes and production, there are some merits. In the first place, this operation model can help Zoom Bikes to significantly reduce waste costs. At the same time, it also can help the company to build a close and strong relationship with customers. Finally, the lean approach can help all employees in Zoom Bikes to actively engage their attention and enhance their belongings and responsibility to achieve continuous growth. However, there still exist some disadvantages. First of all, although lean operation can help Zoom Bikes to minimize waste, the failure of the workforce or equipment in the production would result in huge and serious disrupt and economic losses for Zoom Bikes. Another serious disadvantage is about missing deliveries. As this model lacks flexibility and margin of error, if Zoom Bikes missed delivery on time, it would cause both economic loss and reputation harm. All in all, after deciding to implement the lean operation model, Zoom Bikes should put more attention on how to avoid its disadvantages and enhance the merits.

3 Difference

3.1 Differences between traditional and lean manufacturing

Traditional manufacturing thinks production is driven by sales forecast while lean manufacturing views driver of production as customer demand. Traditional approaches viewed problem to be solved by mainly training and relying on people not to make mistakes in standardised work which had been decided through systems thinking. In contract, lean manufacturing view problems as opportunities for improvement. Lean manufacturing views the company as a series of interrelated processes that can be improved continuously through eliminating non-value-added activity to maximize process velocity. ZB created a culture of ‘perfection’ which indicates continuous performance improvement and eliminating all waste in their value stream. Moreover, they implemented JIT system which is a system to reduce holding inventory to zero indicates higher empowerment and inventory turns. However, implementing lean operations require constant effort and vigilance to perfect. Any failure on every employees’ participations and management will bring ZB obstacles in improvement process. Overall, lean manufacturing, a flexible system which uses considerably less resources than a traditional system, tends to achieve greater productivity, lower costs,

shorter cycle times, and higher quality (Lean Consulting Works. 2019). [More details about each manufacturing system's features generated from websites are listed in Appendix-Table F.]

Principles of lean manufacturing

The five principles we learned in week 5's lecture demonstrated clearly the way to embody lean system function in ZB's production process. First, identify customer values which means that what kind of bikes customers want from ZB and how customers distinguish good bikes from bad ones. Second, focus on processes where the activities are actually creating values to meet customers' needs. Third, eliminate non-value-added activities (like idle and waiting time from production process to process, unnecessary processing time in the assembly function, increasing defects and excessive inventories, problems taking too long to rectify and increasing waste, etc.) and create a more efficient flow of bikes production processes. Fourth, produce only according to customer demand means that every process in the flow aims to meet customers' needs. Fifth, striving for perfection means collecting feedback and continuously improving their processes.

3.2 The most important lean characteristics:

1) As we discussed before, lean culture refers to 'perfection' in the culture of this company. Minimal inventory had already been achieved since they used JIT system to their materials and components needed.
2) ZB faces a large challenge in accordance with Quick changeovers because of their low-level and resistance management. They cannot change the strategies in respect of improvements in production and quality management very quickly or effectively since the resistance and defensive management will increase the internal failure in ZB. The internal failure caused by low-level management will affect ZB's lean operations, supplier's evaluation and decision-making of suppliers.
3) High quality has been expected in ZB since they are afraid of ruining reputation by one mistake (relating to production downtime due to defective material/dispute invoiced amount/quality audit of supplier). From Table 2 in the original project, King of Chrome spent more on quality audit of supplier and order components from supplier than Quantum Systems. In this

perspective, KoC will be less likely to produce defective material compared to QS as they invested more in quality auditing and inspection.

4) Use of team has been emphasized in ZB's lean operations of improvement process. In order to find a solution of the resistance and defensive management, ZB procured consultation team to interview with production manager in a meeting.

4 Obstacles

4.1 Most significant challenges and possible solutions

The most significant challenges for implementing lean operations are resource management challenges and people management challenges.

1. **Resource management challenge**

- *Not Exaggerating inventory leanness*

Since ZB applied JIT system, suppliers hold they to ransom which means the price of ZB mistakes on delivery schedules and delivered orders is very high, and ZB would put lots of effort on eliminating the errors in ordering and delivery processes. However, suppliers' behaviour on adherence to delivery schedules and accuracy of orders delivered will influence ZB's ordering and delivery processes. Essentially, material flow in bikes assembly should have a buffer to make sure that materials needed for production is able to be determined before production assembly thus reduce the risk of part storages and shortage of components (A F H Fansuri et al. 2017).

Using buffers reduces the pressure and stress that is felt, while increased cycle times make it possible to speed up for a portion of the time and then rest for the remainder. When buffers are used between workstations, together with longer cycle time and job rotation, the employees will feel less stress and be more motivated to do their job. Alternatively, they can build up a contract with suppliers to discount on the 'ransom' in relation to the suppliers' behaviour in relation to those two influenced factors.

- *Stopping production when there is a quality issue*

Increasing quality inspection is one way to reduce defects but eliminating non-

value-added activities such as walking distance from assembly station to flow racks to pick materials could increase operator's concentration in installing parts and reduce production downtime due to defective material. This also helps reduce space occupancy in production area and creates clean work areas with better control providing leaner and easier training for assembly operator as the job scope for the operators is narrowed down.

2. **People management challenge**

- *Suppliers to cooperate*

For lean and especially Just-in-time to work in the whole product value chain, supplier involvement is crucial in the process of a lean implementation (Lyons et al. 2013). For a supplier to commit to becoming lean, it is important that there is mutual trust that the relationship will be lasting and beneficial. For that reason, there has to be good communication between both parties right from the start of the lean initiative.

- *Resistance from management*

Establishing clarity, purpose and priorities- important task of (senior) management, is to come up with a lean implementation plan with clarity and purpose. When goals are too vague, the motivation among the workforce will decrease fast.

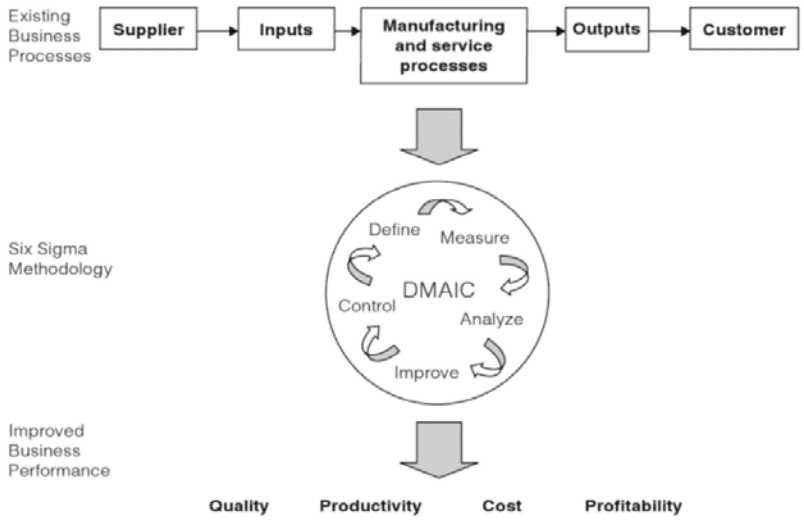
Addressing the issues that are of concerns such as fear of stock run-out in reducing the inventory, inherently preventing mistakes through re-engineering task to make sure mistakes are caught early and corrected are important. Showing people how they are going to benefit-Labor forces generally do not want to be cross trained so showing them the benefits of more variation in their work and extra skill development can be an effective method in winning the approval of most of the workforce.

Giving workforce authority for continuous improvement by the use of Kaizen events. Kaizen event is a focused and structured continuous improvement project, using a dedicated cross-functional team to address a targeted work area, to achieve specific goals in an accelerated time frame. It can result in a more

positive attitude towards lean which in turn can increase employee commitment, providing to the success of the program.

5 Six Sigma approach for process improvements

Six Sigma is a top-down approach for business improvement based on a statistical measure (Badiru & Kovach, 2012, p. 42). DMAIC is a data-driven quality strategy. Evans and Lindsay (2015, p.4) discuss the relationship between DMAIC and business process in the following figure:



Define Stage:

According to the dialogue with Andrew, the issue largely focuses on how to decrease unnecessary waste for continuous improvement. One of the main challenges is most employees show no passion for quality meeting at all even if this meeting can help them improve production.

Measure & Analyze stage:

On the basis of Andrew, most employees prefer not to attend the quality meeting. Even if they attend, many employees choose to hide the problems in production, which makes the quality meeting inefficient.

Improve & Control stage:

In relation to the implementation tips of DMAIC, ZB can implement a reward and punishment system to increase employees' enthusiasm for the meeting. In pursuance of the interview with the production manager, it can demonstrate that most employees are not willing to attend the productive meeting, even if they attend, they prefer to hide problems. Since the quality meeting can indeed improve the efficiency of manufacturing systems, it is necessary for ZB to take actions to encourage employees to present themselves actively in the meeting. For example, if an employee takes part in every productive meeting for a whole year or provides valuable problems in production, he will obtain more annual bonus. If someone reveals a valuable problem, he will get extra premium as well. From the perspective of control, if an employee can not come to the meeting up to a certain time without any special situation, his performance wage (or KPI) will be deducted.

(Word Count: 2563)

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APPENDIX

Table A

Cost per number in supplier-related activities

Activity	Total cost ($)	Number of activities	Cost per number in supplier-related activities
Order components from suppliers	1,800,000	6,000 orders	300
Receive order	9,000,000	10,000 deliveries	900
Return reject components to supplier	38,500	55 returns	700
Receive late deliveries	260,000	130 late deliveries	2,000
Production downtime due to late delivery	2,400,000	800 hours	3,000
Production downtime due to defective	3600000	3,000 hours	1,200
Process invoices and pay suppliers	1050000	3,000 invoices	350

Dispute invoiced amount	40000	50 disputes	800
Quality audit of supplier	500000	10 audits	50,000

Table B

Cost per unit for King of Chrome

Activities	**King of Chrome**	**cost per number in supplier-related activities**	**Total cost ($)**	**cost per unit ($/unit)**
Unit price			360,000	90
Order components from suppliers	130 orders	300	39,000	9.75
Receive order	150 deliveries	900	135,000	33.75
Return reject components to supplier	16 returns	700	11,200	2.80
Receive late deliveries	12 late deliveries	2,000	24,000	6.00
Production downtime due to late delivery	30 hours	3,000	90,000	22.50

Production downtime due to defective	28 hours	1,200	33,600	8.40
Process invoices and pay suppliers	130 invoices	350	45,500	11.375
Dispute invoiced amount	3 disputes	800	2,400	0.60
Quality audit of supplier	2 audits	50,000	100,000	25.00
Total cost for King of Chrome (4000 units)			$840,700	
Total cost per unit				$210.175 ≈ $210.18

Table C

Cost per unit for Quantum Systems

Activities	**Quantum Systems**	**cost per number in supplier-related activities**	**Total cost ($)**	**Total cost per unit ($/unit)**
Unit price			300,000	100

Order components from suppliers	90 orders	300	27,000	9.00
Receive order	90 deliveries	900	81,000	27.00
Return reject components to supplier	15 returns	700	10,500	3.50
Receive late deliveries	6 late deliveries	2,000	12,000	4.00
Production downtime due to late delivery	45 hours	3,000	135,000	45.00
Production downtime due to defective	20 hours	1,200	24,000	8.00
Process invoices and pay suppliers	12 invoices	350	4,200	1.40
Dispute invoiced amount	3 disputes	800	2,400	0.80
Quality audit of supplier	1 audits	50,000	50,000	16.67
Total cost for Quantum Systems (3000 units)			$646,100	
Total cost per unit				$215.37

Table D

Value-added cost and Non-value-added cost

	Zoom Bikes	**% of the total supplier-related cost**
Value-Added Activities ($)		
Order components from supplier	1,800,000	9.63%
Receive order	9,000,000	48.16%
Process invoices and pay suppliers	1,050,000	5.62%
Total Value-Added Cost	11,850,000	63.14%
Non-value-added Cost		
Return reject components to supplier	38,500	0.21%
Receive late deliveries	260,000	1.39%

Production downtime due to late delivery	2,400,000	12.84%
Production downtime due to defective	3,600,000	19.26%
Quality audit of suppliers	500,000	2.68%
Dispute invoiced amount	40,000	0.21%
Total Non-Value-Added Cost	6,888,500	36.86%
Total supplier-related cost	18,688,500	100%

Table E

Four supplier performance criteria

	Quantum Systems	**King of Chrome**	**Rule of Thumb**

Delivery schedules			
on-time delivery performance measure = Number of units delivered to customers)/(No. Of units committed to customers) =1-number of late deliveries/number of committed to customers	1-6/90=93.33%	1-12/150=92%	The higher, the better,choose Quantum Systems
Accuracy of orders delivered			
Accuracy measure = 1 - number of disputes/ total number of invoice	1-3/12=75%	1-3/130=97,69%	The higher, the better, choose King of Chrome
Number of components rejected on delivery			
Acceptance % = number of parts accepted/number of parts delivered=1-	1-15/90=83.33%	1-16/150=89.33%	The higher, the better,

number of defective components/number of received deliveries			choose King of Chrome
Achievements in reducing its production costs **Vendor's performance index = (cost of materials purchased + NVA cost)/Cost of material purchased**	(100+3.5+4+45+8+0.8+25)/100=1.78	(90+2.8+6+22.5+8.4+0.6+16.67)/90=1.73	The lower, the better, choose King of Chrome

Table F

Differences between traditional and lean manufacturing

	Traditional manufacturing	Lean manufacturing
Scheduling	**Forecast – push**	**Customer Order – pull**
Production	**Stock**	**Customer Order**
Lead Time	**Long**	**Short**
Batch Size	**Large – Batch & Queue**	**Small – Continuous Flow**

Inspection	**Sampling – by inspectors**	**100% – at source by workers**
Layout	**Functional**	**Product Flow**
Empowerment	**Low**	**High**
Inventory Turns	**Low – <7 turns**	**High – 10+**
→ Flexibility	**Low**	**High**
COGS	**High and Rising**	**Lower and Decreasing**