

Putting Numbers to Value: Going Simplistic for Reaching Lean Manufacturing

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Abstract—An explanation about the relevance of Lean Accounting, Lean production and Lean thinking working as a whole is provided. A case of study is analyzed showing the problems that organizations nowadays face when Lean alignment is nonexistent. The findings will be useful for organizations experiencing drawbacks in their Lean transformation.

Index Terms— Lean Accounting, Lean transformation, Value Stream, Continuous Improvement.

I. INTRODUCTION

LEAN production is a superior way for humans to make things. It provides a wider variety of better products at a lower cost. Equally important, it provides more challenging and fulfilling work for employees at every level, from the factory to headquarters. It follows that the whole world should adopt Lean production, and as quickly as possible [1].

Operational excellence and the elimination of waste should lead to an improvement in efficiency, a reduction in cost and eventually an increase in net profit. But this is not the case and many firms find that their accounting methods clash with their Lean manufacturing initiatives and this may discourage the adoption of Lean manufacturing [2, 3], Western-trained business people are accustomed to believing that what matters in a business is ultimately expressed and controlled through the language of quantitative data, especially accounting data [4], we are seeing now that companies opting for Lean transformation and Lean practitioners are starting to notice the error on the belief that financial or other quantitative data can be used to explain, motivate, control or lead the fiscal success of a business. There is more to understand from the simple “Lean” concept and the pieces that make it work as it is meant to be.

Manuscript received December 21, 2014; revised March 11, 2015. This work was supported in part by the Ministry of Education, Culture, Sports and Sciences of Japan, MEXT.

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II. TRADITIONAL IS NO LONGER APPLICABLE

Recent Authors [5] support the existence of issues resulting from a failure to adapt costing systems to Lean manufacturing, despite its practical relevance; it also has been scarcely discussed in the academic literature. However since the 90’s Womack and Jones [1] have questioned what kind of management accounting system would be right for Lean companies. Traditional accounting control systems have been the principal enemy of operations management for at least 50 years [4]. That said, is not that accounting operations or tasks are useless, as we in fact need to cover financial duties and comply with laws and regulations depending on the country or place of each organization in a particular case; this has to do with the fact that leaders tend to use the information accountants prepare for setting goals, driving improvement and monitoring performance. Such information often comes in the form of reports that most people in the organizations do not understand and tend to make a subject too complex for discussions about points that are, in most cases, irrelevant to the original purpose or topic.

Traditional, transaction- orientated accounting contains a large amount of waste in the eyes of Lean thinking [6]; As traditional accounting is more orientated to a context of mass production than to the more actual Lean production environment where inventories are low - as high ones are perceived as “Muda” - direct labor is low and overhead becomes important [5], the focus is on customer satisfaction and there is a high emphasis in value-adding activities and the elimination of what is a non-value-adding, or an activity that our customer is not willing to pay for. Traditional accounting in their financial reports may show that bad things are happening when very good Lean change is in process, which tends to discourage people who are in the way of achieving Lean transformation [7]. Traditional accounting also uses standard product costs which are misleading when making decisions related to quoting, profitability, sourcing, make/ buy, product rationalization, and so forth [8]. Almost all companies implementing Lean Accounting are making poor decisions: turning down highly profitable work, outsourcing products or activities that could be developed in-house, manufacturing overseas that could be competitively manufactured at home.

Traditional accounting supports the creation of high inventories, as its origin was under a mass production context that is of course not a rare thing. However, is time for a change and evolution. Overall, no matter the industry, the worldwide trend in manufacturing is aspiring for lower volumes, greater variety and the incorporation of high tech

manufacturing techniques. Contemporary manufacturing now pays more attention to the design of operations and looks for efficiency under low costs from the early stages.

Consultants and practitioners of Lean Accounting have drilled down their vision and developed a guide of principles, practices and tools [7, 8, 9] making it a reality under the next statements. Lean accounting must:

- Provide accurate, timely and understandable information to motivate Lean transformations and make decisions that lead to increased customer value, growth, profitability and cash flow.
- Use Lean tools to eliminate wastage from accounting processes while maintaining financial control.
- Fully comply with generally accepted accounting principles (GAAP), external reporting regulations, and internal reporting requirements.
- Support the Lean culture by motivating investment in people, providing information that is relevant and actionable, and empower continuous improvement at every level of the organization.

Accounting will have to follow the cause of Lean. Seeing Lean as a wealth creator and as a strategy and not as a series of tools, focusing on process not results; that is when Lean Accounting comes into being and traditional accounting may be no longer applicable.

III. LEAN ACCOUNTING, LEAN PRODUCTION, LEAN THINKING; WORKING AS A WHOLE.

In a more modern definition [10] Lean is explained as an overarching philosophy or system focusing on delivering value to the customer, improving flow of products or services, and eliminating waste, while maintaining respect for people. Lean is not an effort to downsize the organization; instead, Lean is more concerned with exploiting excess or wasted capacity. Lean leads to manage systematically focusing on lower resource consumption to achieve customer demand by enhancing product value to customer. By analyzing Gerald K. DeBusk statement on Lean definition is clear that the pursue of Lean includes a set of different “pieces” that must fit together, we are talking about tools, product value and people; learning to see the part that each one of them plays in the whole process is the key to achieving success when applying the Lean concept. Organizations may often misunderstand and miss the essence of this schema, thus it will be hard to understand how an organization can be fully successful on Lean production without a Lean thinking behavior and beyond without switching to Lean accounting. The Lean movement started to apply improvements in the manufacturing area, most common known as “shop floor”, that could be the reason why, for most of the organizations the start up point is there. Next step is focusing on tasks, to notice how people behavior makes an influence in the improvements, then proceed to work with people and their mind set, further a stable and controllable process is needed to apply Lean Accounting and Lean accounting need to support the Lean

transformation as much as people must support the Lean efforts with the good habits and systematic continuous improvement behavior.

Lean accounting focuses on measuring and understanding the value created for the customers and uses this information to enhance customer relationships, product design, product pricing, and Lean improvement [8]. Under Lean Accounting, cost and profitability reporting is done using value stream costing, a simple summary of direct costing of the value streams.

The value costs are collected on weekly basis; there is little or no allocation of overheads, which allows financial information to be understood by everybody in the value stream; this consequently results in greater use, and more accurate and suitable decisions. It is worth mentioning the use of information is still current, as Maskell and Baggaley mention in their Lean accounting principles. Few understand that the Lean philosophy toward waste elimination is mainly focused on eliminating barriers to flow.

It is a common fact that, in practice, organizations lose their ability to differentiate and confuse metric with assessment. Organizations pursuing Lean must use different measures depending on their own goals and strategies. The most suitable measure to be applied will depend on said company’s objective function before improvements have begun [11]. Often these measures are nonfinancial, but they are useful in driving future financial results. What is the point of calculating cost if is not going to be reduced? As Taiichi Ohno said: “Costs do not exist to be calculated. Cost exists to be reduced”. The first thing to keep in mind is that those organizations adopting Lean Accounting typically have mature Lean implementations. They have reorganized around value streams, gained control over their processes, and have also driven their inventories down to a low level [10].

Modern companies should be value-oriented and implement those manufacturing strategies that organize production in such way that creates greater customer value [11]. Value created for the customer contributes to better result for the organization; delivering more value, drives the companies to make their own activities more valuable, is a whole integration.

IV. PROBLEMS FACED WHEN ALIGNMENT IS NON-EXISTENT INSIDE AN ORGANIZATION; A REAL CASE IN AN AUTOMOTIVE MANUFACTURING COMPANY.

When an organization is not fully aligned, either on their organizational goals or in Lean philosophy, we can see everyday activities are guided by different forces depending on the department or individual. Some may be focused on achieving PPMs target for the month, others on maintaining the on-time delivery metric, inventory level, reach the daily production quota, reduce cost or sales target; the list is endless, in which each individual is working on their own to hit “the numbers” under the ones is being measured. But is anyone making sure that all of those targets - “the numbers” - are being directed to the same point, parallel and not otherwise?, as much daring as it could be to make the following statement: “commonly no one inside the

company is making sure consistency and alignment exist”, as example the case of study analyzed.

Within organizations, achieving customer satisfaction tends to be a huge trigger on how operations and interactions are deployed. For an Automotive Manufacturing supplier, delivering “just in time” plays a huge part not just in working with a major assembler house but also because time is constantly measured in money, every minute of delay not only loses money but also demeans the supplier and customer relations, thereby damaging previously impeccable performance profiles and trust which took years of good scores and wise actions to build.

In the particular company in question (which, for privacy matters, this paper will refer to as Company C), the focus was done on the Materials area which is commonly the one that has direct contact and interaction with most of the areas inside the company, such as Accounting, Quality, Production, Focus Management, Customer Service, just to mention the ones involved in the problem statement that will be analyzed.

For Company C’s Materials area in particular, the main daily goal is to maintain steady production, which translates in production plan and Heijunka being in place no longer than before first operators break ends. Once operators come back from lunch, new production plan with an extension of at least 24 hrs – production schedule is updated, Heijunka is loaded with accurate inventories and demands, so anyone in the company not just in the production floor can see the “where they are” state in terms of achieving commitments with current productions schedule. On a daily basis, morning meeting takes place, at which the main topic is “yesterday’s problems” followed by “today’s picture”. When this is presented, materials area shows the current inventory levels and inventory days (equal to on-time delivery status with clients) of each one of their products, and also advises about current or potential shortages that may get in the way of achieving or maintaining a good performance. In this way, support areas can be warned and take joint actions that lead to improved efficiency, those actions must be supported for the majority and higher hierarchical level; if there is not a common decision or the team cannot get to an agreement, the final word is said by higher leader.

During previous weeks of a higher sales season such as end of the year, there is constantly what it’s call “pulls” made by the customer, which means the requirements increase as customers try to keep their inventory levels safe for the high sales and upcoming shutting down plans in their plants. Here is where Materials reaches a crossroad, as must cover all short- and long-term demand by customer as high as it is (contracts prevent denial), load demand in MRP system to drive demand and set forecast for its own suppliers, order material for current and future requirements, trying to minimize the lead times impact on final product, even in some cases is quite late as a component lead time may be higher than a final product lead time.

In the given situation, Focus Management takes the posture of: producing what the customer wants and creating inventory that is needed in order to fill all the customer’s needs, maintaining production lines with a steady plan and avoid stopping the lines even when demand is covered and

inventory days are achieved, pulling production orders if is necessary, same thing in case of any material shortage to avoid having people and processes in idle. Material management will adopt the position of: stopping the production of extra inventory, “as their metric may look bad under the corporate eyes”, avoiding suppliers complains and questions on the pulls, “as they perhaps could increase the prices or make changes on MOQs (minimal order quantity)”. Material management does not want to get extra inventory or expend money on high amount of raw material, that could make the company to have potential obsoletes, if there is a shortage and orders are completely filled, their order is stop production, finish goods inventory becomes in too much money they cannot have under the material department’s account. The position of Accounting will be no more than to question and ask for reasons on obsolete material when it occurs, high expenses, excesses in accounts (if any) and high bills for high buys- pulls; in this case in particular, all the different postures end up questioning and pointing to whether or not the Materials department is doing not a good job but “its job”. Final decisions or paths to take in these situations for Company C are made by consensus from all parties present at the discussion moment, but constantly the nonconforming or absent people may affirm the way things were decided are not the best or more suitable, consequences on those decisions are something they constantly may reproach and carry unpleasant. Currently inside company C, there is a continuous improvement (CI) area, CI leader is aware these unhealthy practices take place and remarks that the business priority of company C had done company C to limit their thinking, focusing just on the production area improvements, “putting out fires” using wrongly Lean as their “tool”.

The fact that these practices are happening and demean the efforts and gains done in the production floor, makes CI area to wonder if they can be called “a Lean company”. Company’s C CI area is concentrating efforts on getting help from leaders across the company to make a full commitment and re start their Lean transformation.

Organizations like Company C need to be strategic before being tactical, use creativity before capital and that means seeing the problems and challenges under creativity before money. We are the organization, what works and what does not work [12], not separated parties competing for the truth, an integration of the whole value stream is indeed needed, that way the path taken is the more suitable for the organization strategic plan. Lean is a transformation not a transition. Lean operations are continuously driving to optimize their total fulfillment value stream.

In cases like Company C, Culture Management plays a big role, it needs to be for results but these results are the way people think and the way people act being one force. The rules followed, take the form of habits acquired. Habits of thought and action. And most of the habits are beyond our daily awareness.

V. DISCUSSION, CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH.

Lean organizations understand the importance and power of data and information, they do not want to work with

artificial efficiency, equipment utilization or any other data that at the end they know is not accurate for corrective and improvement purposes. The need of more trustworthy information for better business decisions at any time is a fact. There is probably no organization yet that has been able to migrate to a way of thinking that eliminates the thinking about eliminating waste, that should be the ideal state any high performance and wealth creator company must be looking to achieve. When a future improved state is generated, the need for external controls is obviated, as well as the need for external management accounting controls. The main aim of this paper was to help Lean thinkers under organizations to understand the importance of a Lean integration. The case of study was used to exemplify in order to help the understanding as companies may relate their current state with Company's C situation. Companies need to focus on a new way of measuring performance and accounting for profits that is found in Lean Accounting. Future research will be oriented to develop a scheme for Automotive Manufacturing companies to follow on the path of their Lean transformation; such scheme should include Lean Accounting principles. Main goals to achieve with the scheme to be proposed are: being able to Capture the economic value of the flow deviation and mitigate negative culture influence in improvements acquisition.

Date of modification. 11 March 2015

Brief description of the changes:

The heading of Section III was changed from "LEAN ACCOUNTING, LEAN PRODUCTION, LEAN ACCOUNTING; WORKING AS A WHOLE" to "LEAN ACCOUNTING, LEAN PRODUCTION, **LEAN THINKING**; WORKING AS A WHOLE."

ACKNOWLEDGEMENT

C. Z. thanks her advisor for the support and guide given so far and for what will be needed through the research process in Japan.

REFERENCES

- [1] J.P. Womack, D.T. Jones, and D. Ross, *The Machine that Changed the World*, Rawson Associates, New York, 1990.
- [2] Ahlstrom, P. and Karlsson, C., "Change processes towards Lean production: the role of the management accounting system", *International Journal of Operations and Productions Management*, Vol. 16 No. 11, pp. 42-56, 1996.
- [3] Meade, D., Kumar, S. and Houshyar, A., "Financial analysis of a theoretical Lean manufacturing implementation using hybrid simulation modeling", *Journal of Manufacturing Systems*, Vol. 25 No. 2, pp. 137-152, 2006.
- [4] Johnson, H Thomas, "Lean Accounting: to Become Lean, Shed Accounting", *Cost Management. ProQuest Central*. Pp. 6 -17, 2006.
- [5] Patxi Ruiz de Arbulo Lopez, Jordi Fortuny Santos, Lluís Cuatrecasas Arbós, "Lean manufacturing: costing the value stream", *Industrial Management & Data Systems*, Vol. 113 Iss: 5, pp.647 – 668, 2013.
- [6] Wang Lin, Yuan Qingmin, "Lean Accounting Based on Lean Production", *Institute of Electrical and Electronics Engineers*. Pp. 2028 – 2031, 2009.
- [7] Maskell and Baggaley, *Practical Lean Accounting .The principles, practices and tools of Lean accounting*, 2004.
- [8] Maskell and Baggaley, "What's Lean Accounting All About?" *Association for Manufacturing Excellence's Target Magazine*. First issue, 2006.
- [9] Maskell and Baggaley, *Practical Lean Accounting: A Proven System for Measuring and Managing the Lean Enterprise*, Volume 1, 2011.
- [10] Gerald K. DeBusk, "Use Lean accounting to add value to the organization", *Journal of Corporate Accounting & Finance*. Volume 23, Issue 3, pp. 35–41, 2012.
- [11] Danijela Gracanin, Borut Buchmeister, Bojan Lalic, "Using Cost-time Profile for Value Stream Optimization", *24th DAAAM International Symposium on Intelligent Manufacturing and Automation*. Volume 69, 2014, Pp. 1225–1231, 2013.
- [12] Stenzel, Joe, *Lean Accounting: Best Practices for Sustainable Integration*. New Jersey. John Wiley & Sons, 2007.