

ENABLING INITIATION OF A LEAN MANAGEMENT SYSTEM IN SME'S: A CASE STUDY OF A HIGH PERFORMANCE PLASTICS MANUFACTURER

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ABSTRACT

This paper investigates the challenges in developing a Lean Management System in a typical Small to Medium Size Enterprise (SME's) in the UK. Through a series of pilot projects measured and implemented by action research this case study reflects on the changes in mind-set and behaviours that are required on the part of the researcher in order to implement a Lean Manufacturing System. The implementation and suggestions by the researcher to adopt the observational methods such as visual data management and Hoshin Kanri were part of the action research. The data gathered influenced management strategy and planning to incorporate lean practices in the organisation. The actions and results were achieved by the workforce commitment to ensure embedding and sustainability for the future. Benefits realised included a 21% increase in on time delivery performance and cross functional problem solving actions resulted in a lead time reduction of 8 to 4 weeks.

Keywords: Lean Management System, Performance Management, Hoshin Kanri

1 INTRODUCTION

The research has been carried out as part of 30 month Knowledge Transfer Partnership between the University of Hertfordshire, School of Engineering and Technology and a partner company funded by the UK government. This paper has limitations as it is based on a single case study, although the discussions and conclusion are practical and have been observed over a 9 month period. The overall KTP project plan is to develop, pilot and embed a coherent manufacturing and operational strategy based on the Lean Manufacturing, for roll-out across all divisions within the company's business units. The identified opportunities are to address out of date practices and standardise for team management. It is anticipated that the company will benefit from not only having a team work approach to getting things done but also to improve profit levels through sustainable increase in efficiencies. These actions will allow the partner company to offer higher value service offering to current and future clients. It is imperative that the best use is made of the newly improved staff skills available through changes in methodology as the first step, rather than making changes in technology that might be cost prohibitive in the current economic climate.

Aligning data collection, analysis and problem solution to business strategy through the lean lens in this SME partner company required attention to PDCA (plan-do-check-act) in the form of observation of the current state of affairs, problem solving, visual outcomes, continuous review, and top level management leadership and recognition. SME's characteristics which constrain actions and implementation rate were found to be, in this study, leadership, organisational culture, financial stability, knowledge base, participative employees and lack of a performance evaluation system as supported by (Pius et al., 2006) (Sanjay & Burcher, 2006).

Another common theme in SME's is the idea of utilising performance improvement tools at local level for short term gains without streamlining the flow of work (Yang & Su, 2007). The notion of "being lean" opposes the scattered utilisation of lean tools where there is limited internal connections

which is referred to as “doing lean” (Seth et al., 2008). Therefore, as strategic performance management becomes more important to operate globally, the issues above and team performance management will become more critical. If this organisation is to sustain its competitive advantage, Hoshin Kanri approach and the Lean Management System practices would become vital to the modernising and success of this company (Chau, 2008).

Lean thinking emphasises not only utilisation of tools and methods but the closed feedback loop system required for the sustainability of improvements. It allows a continuous assessment of internal and external customer-supplier relationships, so a poor performance in one link of the value chain is realised and resolved. This case study tries to demonstrate the importance of universal employee engagement and strategic alignment for problem solving (Karim & Arif-Uz-Zaman, 2013).

2 PROBLEM IDENTIFICATION

As part of the Knowledge Transfer Partnership project over 30 months, one of the objectives was to increase the number of customers. From a traditional point of view and market orientation school of thought, this would have meant to developing capabilities to gain competitive advantage based on price, product diversification or response time. Although strongly applicable to the company, the approach would have enabled short term growth and increased the current skill deficiencies. As a result a resource capability development under the lean manufacturing systems framework was taken to enhance internal capabilities to result in growth.

The initial analysis of the business performance demonstrated a very poor delivery performance followed by notable quality issues with no corrective actions but a fire fighting attitude prevailed. This was realised through assessment of the information flow utilising value stream mapping whereby critically, lack of internal communication in some cases led to increased lead time for a client. In order to develop an understanding of the business performance a study of the current measures was carried out. Table 1, demonstrates the result of analysis.

Table 1: Status at analysis using performance measures

Current performance measures				Initial measurement		
Metric	Available measure	Target	Method of data collection	Measured value	Unit	Value
Delivery performance	None	None	ERP	On time delivery performance	%	53%
Quality	Number of customer complaints	None	Manual complaint register	Internal reject, Customer complaints, Re-occurrence of quality issue	%, Qty, Qty	7%, 16, 8
Inventory	Stock value	Less	ERP	Inventory on sales	Ratio	2.76
Maintenance	None	None	Not available	Availability index	%	97%
Material availability	None	None	ERP	Supplier delivery performance, Supplier quality performance	%	42%, 97%

Initially developed by The Bridgestone Tire Company in Japan, Hoshin Kanri was designed to align business goals and daily operations through eliminating waste in all business functions from customer relations and product design to supplier networks. A tailored Hoshin plan with defined impact levels was developed. The design of the Hoshin plan was refined to fill the knowledge gap. Using an interactive session, the full management team was involved in generating the strategy arms and conclusively agreeing the few vital factors of management.

This analysis allowed a development of top level policy as shown in Figure 1 with agreed metrics on a single goal of improving delivery performance. As ownership was instilled through the process of policy design, the clarity of leadership view was defined and issues with direct impact on the main goal were identified based on internal capability and relevant gaps.

Top level policy			
Entity	Plan owner	Created On	Last Revised
Business Situation: The objective is to improve our delivery performance while sustaining quality standards to enable future competitiveness within the market.			
Objective	Sub Level Function	Strategy	Performance metrics (Targets)
Establish ourselves as a company renowned for excellent delivery performance	Sales	Reducing Enquiry response time	Semi Finished 100% < 24 hrs Finished 100% < 5days Repeat jobs 100% < 24 hrs
	Production	Reducing scrap & rework to <2%	Reject rate < 2%
Performance Metrics (Targets)	Purchasing	100% material availability	No. of jobs delayed/released due to material availability (1Q:5, 2Q:0)
	Logistics	Reduce stock levels	Inventory on sales ratio of 1:1
On time delivery (90%)	Quality	Zero customer complaints	Number of customer complaints (1Q:6, 2Q:2)
	Maintenance	Availability of equipment	Number of delays due to availability (1Q:10, 2Q:4)

Figure 1: Top level policy derived from analysis

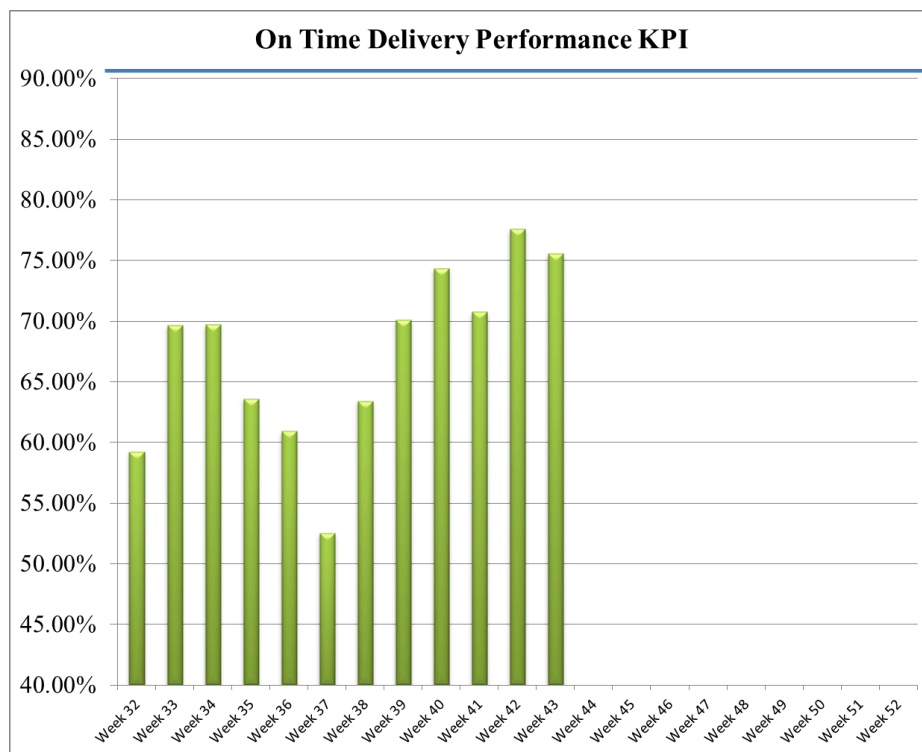


Figure 2: Policy Performance Metric Sheet

In order to maintain the cascade of responsibility each strategy owner then developed tactics to achieve the targets assigned. One of the objectives of the case study was to assess the increase in

awareness of the management team in relation to lean thinking and practicality of embedded operational strategy.

Engagement of the staff was observed resulting in an improved overall performance measure as shown in Figure 2. At time of this paper, there has been a direct feedback loop created to the board room and strategic decision making including new sales strategy, training and development requirements, capacity requirements, to an extent, are informed by this feedback of data.

To further enhance the process A3 thinking and problem solving (Shook, 2008) as the sheet in Figure 3 shows was introduced later to systematically address key issues and increase management focus on problems providing a platform for interactive problem solving in review meetings.

3 CHALLENGES

This type of research has some issues related to involvement of the researcher and the need to be mindful of the facilitation of the engagement of others in this situation as the paper on action research by (Snoeren, Niessen, & Abma, 2011) encourages the necessary engagement of the researcher. Action research is defined as follows in (Denscombe, 2007) practical, change, cyclical process and participation. These are all key characteristics of this study where the implemented actions and their influence is being measured with an expectation of delivering sustainable value and at the heart of all this there is change.

The research and the researcher in this case study faced a series of challenges including a lack of appropriate data collection systems and no cross functional problem solving. In addition, conflicts within teams hindered the process. The issue was magnified with initial avoidance of conflicts from Senior Management for progression of implementation of action items leading to visible frustration within the teams. An inherent lack of forward progress was blamed on the Senior Managers as there was a culture of making no decisions as there may be blame attached hence no decisions were made. This emphasises the need to recognise the key success factors in implementing Lean Management Systems in SME's such as leadership, matching of skills and performance evaluation systems.

4 RESULTS

This change allows the researcher to adopt the observational methods required to influence lean management thinking through visual data management and Hoshin Kanri. In addition, it implies that new methods, practices and improvements may be desired by stakeholders but the commitment of the workforce ensures sustainability for the future. Benefits realised as a result are as follows:

- 21% increase in on time delivery performance
- Significant cultural shift and an emergence of a collective management decision making system
- Development of training requirements at all levels of organisation
- Cross functional problem solving resulting in lead time reduction of 8 to 4 weeks
- Management ownership and target setting

5 CONCLUSION

For any industry, aligning business objectives within various functions of the value stream is of high importance in gaining a competitive edge. In high performance plastics manufacturing, this could be anything from the link between cost reduction policy and in process waste management, heat treatment variation and labour deficiencies or the relation of reduction in revenue generation due to response time to enquiries, quantitative and qualitative skill gap and high manufacturing lead time.

In summary, the main aspect of Hoshin Kanri, as a method for gaining competitive edge, is to focus on the very few and the cause and effect relationships underlying the effectiveness of an operational strategy. The case study found that by exposing the management team to a variety of sources of lean information and involvement in development of the operational strategy, the organisation enjoyed both financial benefits and emergence of lean thinking. The internal tacit knowledge was enhanced and knowledge transfer was embedded through involvement and engagement of employees as one and therefore "being lean".

Operation Excellence Report

Strategy: Raw material availa	KPI's and targets:							
	Supplier delivery performance		100%					
	No. of GRN's		0					
	Raw material availability		100%					
	Problem/Idea and effect (tangible & intangible)	Root cause/Opportunity		Counter measure & action		Progress/result/std. document number		
	Large number of jobs have been delayed due to material availability or late purchasing pattern for repeat items. For the past 3 months there has been an average of monthly 17 delayed jobs with value of £230000 wdue to material availability. Also, the stock value has been significant			Mimmium order quantity for all raw materials and intermediate products to be set in SAP using standard kanabn calculation model followed by local manager consultation.		Mimmium order quantity hase been set for the following group products		
							Prepared By	MJR

Figure 3: Company Operational Excellence Report

Future research opportunity is available to assess wider issues and practicality in other SME's of implementation of methods, tools and techniques leading to a Lean Manufacturing System for an SME.

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