

Measuring Manufacturing Operation Using Balanced Scorecard - A Case Study

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ABSTRACT: Manufacturing industries have difficulty in keeping pace with corporate reality because the business horizon is changing and becoming more complex with many boundaries. Traditionally industries performance is measured based on cost accounting systems to control, monitor, and improve the operations. However it does not address overall performance measurements and future growth strategy. Hence it is essential to focus on complete systems optimization and addressing the dynamics of changing systems instead of only supporting activities improvements. It needs to look again how the company's performance is measured and reported. Reengineering of business process is conceived as an approach in management, and redesigning the processes and activities of organizations with the purpose of achieving higher results. This paper is analyzing the key performance indicator of Beverage manufacturing industry operation's value chain using Balanced scorecard and identifying critical factor which affects to achieve.

KEYWORDS: Business Process Reengineering; Value Chain Analysis; Performance Measurement; and Balanced Scorecard.

I. INTRODUCTION

The way Industries have managed its day-to-day activities have changed. Executives have no time for mundane activities. Most of that goes in keeping a tab on cash flows and operational activities. Matrices and reports that were usually checked once in a week now get seen daily (Amit, R.R 2009). Industries will have to vigorously pursue the three internal sources for cash – earnings from operations, working capital (inventory and receivables) and saleable assets. Even the biggest industries plan to meet their cash requirement from operations. “We have taken steps to reduce our overheads ideas from internal sources to converse cash” says Karl Slym, president and managing director of General Motors. Operational efficiency can be shored up by reducing the breakeven point. At a time when demand is an unpredictable, fixed costs need to be brought down. And this has caused the paradigm shift. Industries have brought down rents, trimmed wage and travel bills, consolidated operations, sold off non-core businesses, brought in supply chain efficiencies and reined in interest payouts- all to prevent unnecessary cash burn (Bhupesh et al., 2009). As per the study conducted by business standard research bureau the operating profit rose by 20 per cent because Industries curtailed total expenditure by about 7 per cent. “A large number of companies have cut their inventory-right from raw materials and work in progress to finished goods and achieved anywhere from 10 to 15 per cent inventory cut is what manufacturing”, Deloitte India Director K Kumar.

Traditional businesses have been under pressure, with dwindling margins, due to increase volatility in commodity prices. Leading companies are not cutting back on demand-generation (front-end) investments indiscriminately. What has been observed, however is that to protect margins, expenditure on demand fulfilment (back end) are being tightly controlled and inefficiencies are being squeezed out. This entails better planning across the value chain to keep industry operation cost to the minimum. Mere operational improvement is not enough to win the game. Excellence in execution can win a close game, but it can't break a game wide open and turn it into a rout. The only way to get and stay ahead of competitors is by executing in a totally different way – that is, through building best operational controls. But

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operational reengineering entails a departure from familiar norms and requires major changes in how departments conduct their work and related to one another. It is truly deep change, affecting the very essence of a company: how its work is done. The effects of operational reengineering ripple outward to all aspects of the enterprise, from measurement and reward systems and job designs to organizational structure and managerial roles (Hammer, M. 2004). It is essential to focus on monitoring and controlling to promote overall systems optimization and addressing the dynamics of changing systems instead of supporting process improvements. Manufacturing industries have to adopt themselves to the changing conditions and evaluate their Key Performance Indicator; KPI with Balanced Scorecard; BSC. To succeed, industries have to ensure the smooth operation at the time of sustainable growth of the business.

II. LITERATURE REVIEW**2.1 BUSINESS PROCESS REENGINEERING (BPR)**

About two decade ago all leading corporate have been engaged in a relentless effort to improve the performance of their business. Pressured by suddenly powerful international competition and ever more demanding customers, companies embarked on crusades to lower costs, improve productivity, increase flexibility, shrinking cycle times, and enhance quality and service. Companies rigorously analyzed their operations, dutifully installed the newest technological advances, applied the latest management motivational techniques, and sent their people through all fashionable training programs- but to little avail. Business reengineering in many ways is a natural evolution and practical strategic application of a number of management approaches that recently have made an impact on the mangers look at end change organizations. Such approaches include TQM, Time-Based competition, customer focus and more recently BPR. BPR is a holistic approach that can provide a process, to link the competitive strategy of an organization to its people and processes, a linkage enhanced by using the information and communication technology available today. The difference that BPR has from other approaches is that it radically changes the way an organization works, it achieves large improvements, and it is very difficult to do well (Hammer, M. 2003).

All organizations need to change to remain competitive, to embrace the technology of the day, and to get the best out of the improved abilities of their people. They also need to achieve a state of continual change. Organizations that successfully manage to reengineer themselves find that not only do they achieve dramatic short-term results. They also turn themselves into flexible organization that continues to change. A high reliance is placed on an open, informal culture, with excellent communication, backed by a high degree of information and communication technology. The teams are networked using IT, and the organization links the strategy, technology, and people into a triangle model that ensures flexibility and responsiveness to change (Nick O,1994).

Hammer, M (2003) defines “BPR is not the elimination of jobs; it is the elimination of non-value-added work. As this work disappears, jobs often go along with it, transforming the organization into leaner and more efficient enterprise. But what happens next? Only hopelessly unimaginative companies will remain in their newly reduced circumstance. The rule for business enterprises, as for all forms of life, is to grow or die. And as new efficiencies make them more competitive, they will grow and add jobs. A long record of growth in sales, earnings, and dividends indicates that a company will continue to be successful. The foundation of this theory is that consistent financial performance reflects enduring operational strengths that financial results do not come about by themselves but as byproducts of operational excellence. Operations are still the essence and finance the manifestation, but the past no longer predicts the future. The way of doing business that accounted for past financial success will not necessarily lead to similar results in the future. Indeed in a world of constant, rapid change, what accounts for yesterday’s success may be the very thing that produces tomorrow’s failure.”

2.2 VALUE CHAIN

Michael E Porter’s 2004 “Competitive Advantage” defines the organization function activities into two: Primary activities and Supportive activities. According to Porter “Every firm is a collection of activities that are performed to design, produce, market, deliver, and supports its product. All these activities can be represented using value chain. Value chains can only be understood in the context of the business unit”. Value chain groups all the resources necessary to deliver a service or product, including the end customer, behaving as an extended enterprise and operating

as an integrated organization (Barry Mills, 2001). The value chain is a graphical representation of a firm's activities, arranged in such a way as to show the sequence of these activities. The value chain provides a powerful framework for identifying and appraising the resources and capabilities of a firm, in part because it emphasizes the linkages between the different activities, and also because it facilitates comparisons between firms, regarding both individual activities and structuring of activities (Philip Sadler, 2004). In a complex manufacturing environment with challenging product life cycles, collaboration across the industry, value chain is a key element for creating successful business propositions. Optimizing the value chain can result in increased revenue, decreased inventory levels and improved operational effectiveness (CEM, 2003).

Development of information and communication technology removed all barriers such as time and distance. Information is now able to link cross-company functions as well as provide value-chain linkage from raw materials to final customer usage (Upton and McAfee, 1996). IT has opened a whole new opportunity for manufactures to offer customized products faster, cheaper, and more cost effectively using "build-to-order" techniques facilitated by internet (Pralhad, C.K. and VenkatRamaswamy, 2006). Every process is liable to change because of the development of information technology and communication. People once were standing in a long queue for booking their ticket either cinema, bus, train, and air travel can book anywhere in the universe. Figure 1 shows the process value chain of petrol filling operation. It was pay and fill process changed to fill and pay. It is changed to process as you like while the business remain same. Payment value chain is extended from cash to cheque, credit/debit/petro card, and coupon. Each change in process added value to customer and process owner. It has increased the speed, time, and quality. Customer has variety of choice to choose product like petrol, premium, hi-speed, extra premium etc. To survive in the market and increase customer base companies are striving hard to innovative the process while the task remains same.

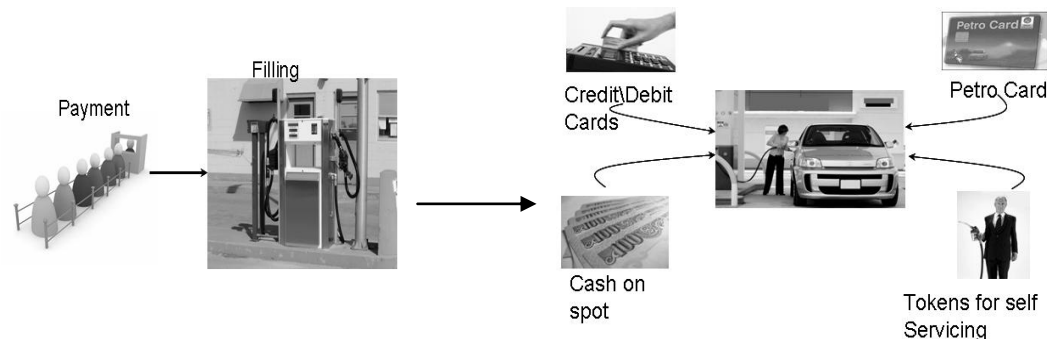


Fig 1 : Petrol filling business process value chain

2.3 BALANCED SCORECARD

Tools like Activity-based Costing and Management; ABC, Economic Value Added; EVA, Quality Management; QM, Customer Value Analysis/Customer Relationship Management; CVA/CRM, Performance prism, and Balanced Scorecard; BSC are used to measure industry performance. While firms will likely benefits from ABC, the system is mainly an accounting and cost-based method of viewing and analyzing an organization and its activities. ABC also lacks the strategic and nonfinancial elements that are captured in the BSC. EVA is a financial performance metric that is most directly linked to the creation of shareholder value over time. EVA is being a very complex framework that relies on complicated calculations. The "cost of capital" is particularly difficult to calculate and prone to errors that lead grossly misleading results. Although Quality Programs focus a firm on continuous improvement, they are not well suited to measuring relative performance among differing enterprises in different industries. CVA/CRM techniques are enabling businesses to improve performance, to measure that improvement, and to focus a firm on value of its customer with better data integration and, hence, better measurement regarding customers. However they fail to account for important noncustomer aspects of a business. BSC measures performance across a number of different perspectives – a financial, customer, internal business process and an innovation and learning (Christian, C. Johnson. 2007) .

BSC of performance management has become a hallmark of a well-run company. A recent study by Cranfield University showed that more than 50 percent of large enterprises use some type of a balanced scorecard. In order for

your business to succeed, you need a way to consider the factors that influence the overall performance (Frank Buytendijk, 2008). BSC represents a first step in holistic thinking by recognizing the existence and importance of the full breath of operational aspects of business and the idea of measuring future potential (Eric, W. 1998). BSC offers a mean to maintain balance between financial and nonfinancial measures and connect strategic and operational standards. It is based on the critical success factors, objectives, performance measures, targets, improvement actions discussed (Rampersad, H.K. 2003). Most companies operational and management control systems are built around financial measures and targets, which bear little relation to the company’s progress in achieving long-term strategic objectives. Thus the emphasis most companies place on short-term financial measures leaves a gap between the development of a strategy and its implementation (Kaplan, R S. and Norton D P. 1996a). The concept of BSC provides a balanced picture of current operating performance as well as the driver of future performance (Kaplan, R S. and Norton D P. 1996b). BSC facilitates activities with value-adding potential, such as making strategy operational by translating strategy into action; focusing the entire organization on what must be done to create breakthrough performance; acting as an integrating device, an umbrella, for a variety of diverse, often disconnected corporate programmes such as quality, reengineering, process redesign, and customer service; translating corporate level measures into at lower levels in the organization so that local managers, operators, and employees can see what they must do well in order to improve organization effectiveness; and provide a comprehensive view that overturns the traditional idea of the organization as a collection of isolated, independent functions, and departments (Shanahan, Y.P. 2006).

III.CASE STUDY

A study was conducted on a leading beverage manufacturing industry in Chennai, Tamil Nadu. The major operations are re-distillation, bottling, packing and shipment. The cost production consists of spirits -35%, packing materials-30%, power -10%, fuel-15% , over heads 10%. Figure 2 shows the industry value chain.

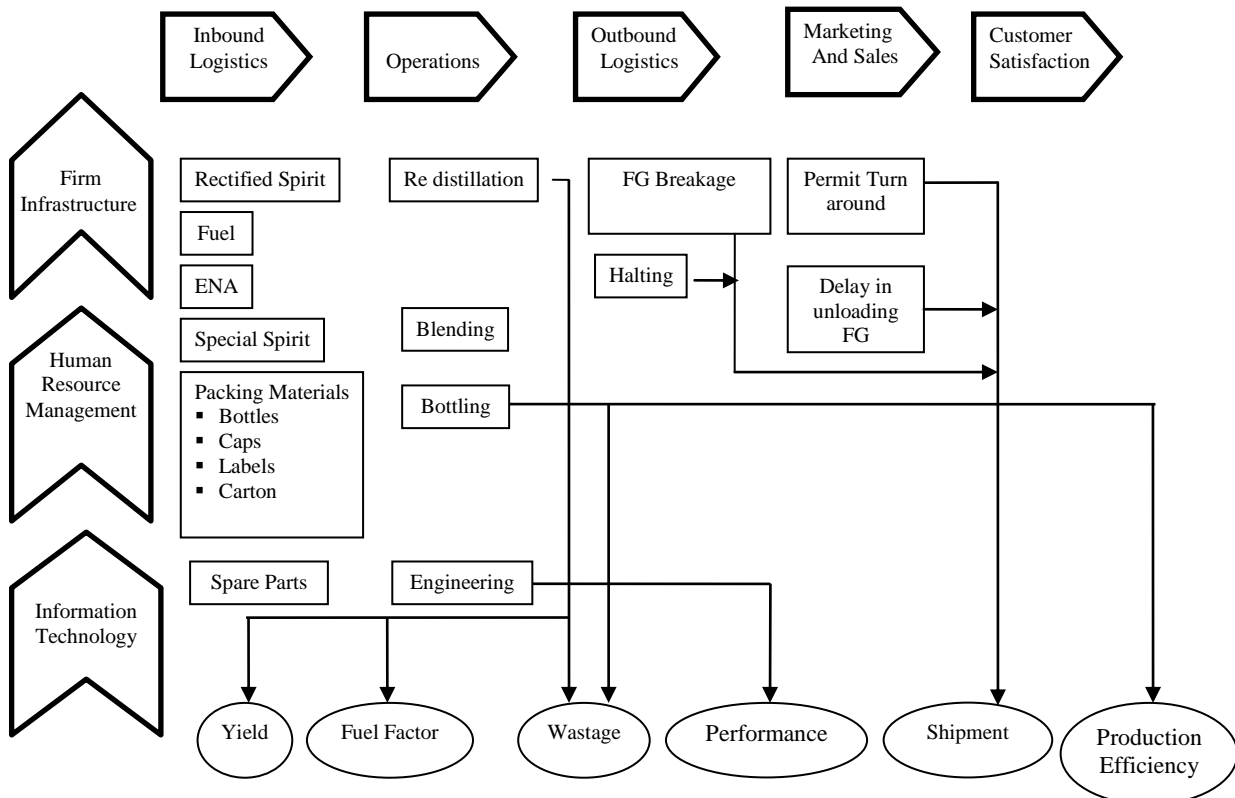


Fig 2 :Beverage Industry Operation Value Chain

The key performance indicators(KPI) are identified. As per the value chain industry should focus on controlling inventory, improving the yield, improving the fuel efficiency, reduce the permit turnaround time and transit breakage.

IV. RESULT AND DISCUSSION

The industry has carried out several reengineering process changes from time to time to achieve its strategy. The critical factors are analysed and balanced scorecard is used to measure the KPI and targets. Table 1 and 2 explains the industry KPI achievement.

FINANCIAL				
Critical Factors	Strategic Objectives	KPI	Targets	Improvement Actions
<ul style="list-style-type: none"> Final product price is controlled by Government Availability of Spirit Availability of Glass Bottle 	<ul style="list-style-type: none"> Maximizing Operating profit Increase cash Flow 	<ul style="list-style-type: none"> Sales growth Permit Turnaround Unloading Warehouse 	<ul style="list-style-type: none"> 10% increase every year 80% 90% 	<ul style="list-style-type: none"> Achieved growth rate of 10 to 15% every year. Increased to 40 % from 16% of order received Increased to 60 % from 30 % after dispatch from factory
CUSTOMERS				
Critical Factors	Strategic Objectives	KPI	Targets	Improvement Actions
<ul style="list-style-type: none"> Market is controlled by Government New Entry into Market WTO Low priced product 	<ul style="list-style-type: none"> Increase Market share 	<ul style="list-style-type: none"> Premium Product 	<ul style="list-style-type: none"> 40% Increase in premium product. Achieve 35% market share 	<ul style="list-style-type: none"> 20 % increase New premium Brand Achieved 24% market share.

Table 1: Beverage Industry Operation Balanced Scorecard

INTERNAL PROCESS				
Critical Factors	Strategic Objectives	KPI	Targets	Improvement Actions
<ul style="list-style-type: none"> Can't determine requirement in advance Oil price is based on International market. Spirit availability is based on sugarcane cultivation Improper filling in carton Pilferage while transporting finished goods Government official apathy. Fleet availability 	<ul style="list-style-type: none"> Operation efficiency 	<ul style="list-style-type: none"> Production efficiency Break down Fuel factor Sensory Yield Water conservation Electrical Energy Halting Charges Breakage of finished goods Wastage of packing materials 	<ul style="list-style-type: none"> 95 % 0.75% machine hour 180 liter per KL of ENA 7.5/10 scale 99 liter of ENA 3 volume per volume of liquor 0.17 Kwh/case 0.07 Kwh/ltr of ENA 3.5 kwh/ltr of Diesel 0.25 per case 0.12 per load 0.50 per case 	<ul style="list-style-type: none"> Automation excise label printing Automation product detail printing on the body of the label. Replace high capacity bottling equipment Routine preventive and predictive maintenance Re – distillation capacity increased to 40 KL of ENA to 100 KL per day. Quality checking at supplier premises Measuring Wastage from washing, filling, sealing, and Labeling Daily process wise consumption is analyzed Energy conservation steam

				Turbine is installed
KNOWLEDGE AND LEARNING				
Critical Factors	Strategic Objectives	KPI	Targets	Improvement Actions
<ul style="list-style-type: none"> Senior Management personnel are retiring within a year time. Job opportunity is more due to economy 	<ul style="list-style-type: none"> Employee Satisfaction Decision making power Environmental free atmosphere 	<ul style="list-style-type: none"> Accidental free Periodical training in Safety, Quality, and Environment 10 % Attrition 	<ul style="list-style-type: none"> 5 % Attrition 	<ul style="list-style-type: none"> SAP Implemented Workmen Involved in Safety and Water conservation committee.

Table 2: Liquor Industry Operation Balanced Scorecard

V. CONCLUSION

Reengineering requires a cross-functional effort usually involving innovative application technology. Reengineering is an attempt to change the way work is performed by simultaneously addressing all the aspect of work that impact performance. This includes the process activities, people’s jobs and reward systems, and the roles of process performers and managers, the management systems and the underlying corporate culture that holds the beliefs and values that influence everyone’s behavior and expectation. Reengineering makes a significant break with previous performance improvement approaches by requiring a high level of state-of-the-art IT awareness among the entire reengineering team prior to, rather than after, the definition of process changes or improvements. Value chain analysis links each process of the operation changes, measure, and evaluate. It improves productivity, cost reduction and profitability. The expected improvements are very much drastic in equipment efficiency, quality, down time, inventory cost, and shipment.

Company needs to understand and measure the value which it derives from its entire key performance indicator. BSC mechanize the process of decision-making and minimize human judgment are equally critical to ensure that the growth strategy remains on track. Simple holistic performance evaluation helps a company to understand its major critical factors of its future growth. The BSC frame work is defined for this liquor industry and it will vary based on industry nature.

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