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The Balanced Lean Sigma Scorecard

Peter G. Furst, Architect
MBA, CSP, ARM, REA, CSI
Liberty Mutual Group
Pleasanton, California

Introduction

The traditional safety scorecard is a representation of the companies previous year's incidents and/or losses. These values are compared to the Bureau of Labor Statistics' (BLS) calculated values for that industry. A value lower than that benchmark is deemed to be "good." So how much lower that the BLS values may indicate outstanding performance? There really is no accepted standard. So every company sets their own standard and pronounces that their program is "world class" upon reaching that goal. Another way to measure safety performance is to comparing oneself to one's own past performance. This may show improvement but not excellence!

One of the major drawbacks of this methodology is that these metrics are based on historic data and may or may not provide accurate information on what is not working effectively and more importantly what is truly driving performance. Another major drawback is the lag time between incidents and BLS reports, which may take over twelve months. Waiting that long to get information on which to act is unacceptable in this business environment and makes no economic sense. To achieve excellence in safety performance the organization needs metrics that provide just-in-time information to "fix" what is not going right. To achieve excellence in safety management needs "real time" information on the systems, processes and associated risks so that they may intervene immediately to correct the situation and eliminate the risk of incidents in the workplace.

Traditional Safety Practices

Organizations after studying their past year's performance records arrive at the more obvious areas that are performing the poorest and then devise a strategy for "fixing" them. They may also study their accident reports to get a better understanding of the causes of losses. Invariably the interventions fall into these general categories. These are training, priority programs, rigorous inspections, focusing on particular problem areas, writing new program elements, or more

training to name a few. These interventions have been tried for decades with little true success. Yet we continue to use them in spite of the fact that similar incidents keep reoccurring.

There are some inherent weaknesses in this approach. The past situations do not necessarily predict future conditions. There may be material differences not only in conditions but also in processes, procedures, practices, the workforce as well as operations. As these change so does the risk picture. So interventions based solely on past events will provide incomplete information and that certainly is not a recipe for excellence.

Another structural shortcoming is the major focus on workers and their behavior as an improvement strategy based on the premise that the worker has complete independent control. That is not strictly true. The worker has control of his/her actions but management controls virtually everything else. In fact management can largely influence the workers actions by the quality of its oversight, planning, equipment provided, operational plan, feedback given, things it rewards, relevant communication, quality of its leadership as well as the culture and climate it creates. This should indicate to the organization where the best opportunities are.

Framework for Excellence

For this framework to succeed it requires that the organization create a culture that values injury free work. The organization must create a safety culture that values certain fundamental beliefs. The first belief of the five is that safety is an integral part of all operations, processes and procedures. Secondly, that all injuries are preventable. The third being that safety excellence has a positive effect on the organization and its business goals, and that safety excellence is a mental state, a way of thinking and acting. There are five fundamental beliefs about safety management. The first is that senior management must espouse the vision of excellence in safety for the organization. All levels of management are responsible and accountable for safe performance. The next is the active involvement of management to garner commitment to safety excellence. This is followed by planning, risk assessment and training. And lastly creating a safety system, practice balanced flawlessly implemented with routine updating.

The Balanced Lean Sigma Scorecard creates a framework that brings together the best of Lean Enterprise thinking, Six Sigma statistical processes and the Balanced Scorecard's multiple perspective management. It combines the use of data to deploy strategy and drive improvement as well as streamlining internal processes and procedures to maximize efficiency and value, with an eye on meeting and exceeding all stakeholder needs. The Balanced Lean Sigma Framework is uniquely positioned to address much of the shortcomings in traditional safety management. Let us review the basics of Lean thinking, Six Sigma quality and the Balanced Scorecard management focus and their application to safety.

Six Sigma Basics

Total Quality Management (TQM) has morphed into Six Sigma. The Six Sigma process is a widely used data driven, quality improvement process, and has been successfully used by a number of multinational organizations to drive improvement though facts and information so as to drive better solutions. Sigma stands for standard deviation. It is a statistical means of describing how much variation exists in a set of data, or a process.

1 Sigma	38.85%	effective
2 Sigma	69.15%	effective
3 Sigma	93.32%	effective
4 Sigma	99.38%	effective
5 Sigma	99.997%	effective
6 Sigma	99.99966%	effective

The Six Sigma process is a customer focused data driven framework that aligns internal processes to achieve near excellent results. Six Sigma is:

- A statistical measure of the performance of a process, department, or organization
- A goal that strives to reach near perfection in performance and results
- A system of management that achieves self sustaining system improvement, business leadership, and organizational excellence.

Besides customer satisfaction Six Sigma strives: to improve, cycle time (making the organization nimble – responsive to change) and reduce defects (improve quality). Six Sigma not only is useful in the quality improvement process, but also is a powerful business initiative. Six Sigma is an organizational commitment to the philosophy of excellence, with a strong focus on the customer, internal process alignment and data driven decision making. Six Sigma is about aligning the organization to better meet the ever changing environment and customer's demands, as well as responding to the organizational, employee and shareholder needs.

Deming preached that most quality issues rose from the process used and not the people using the processes. It was his observation that 96% of the quality issues were built into the work systems and only 4% arose from the employees' actions or inactions. What this points out is that any improvement initiative needs to focus on the work systems where virtually all the improvement opportunities exist.

Lean Enterprise Thinking Basics

Lean has been around for many centuries. In 1104 the Venetians had set up a continuous flow process to mass produce war galleys. In 1574 they demonstrated their technique to King Henry III of France by producing a war galley in one hour. By 1765 French general Gribeauval using standardized interchangeable parts was effectively making repairs in the battle field. In England by 1807 Marc Brunel was making blocks for the navy by using 22 different kinds of machines in an assembly line configuration. In the United stats in the early 1800s the Springfield armory was mass producing gun stocks and interchangeable metal part in their weapons production. In 1914 Ford used the now famous assembly line to mass produce cars. In the late 1930 the German aircraft industry used Takt, a precise time measure, to assemble aircraft. Mitsubishi had a technical relationship with the German companies; transferred this technology to Japan. Toyota which was located nearby adopted this. By the 1950 Toyota combined Fords continuous flow with Takt time adding the concept of flexibility and the Toyota Process was born.

Manufacturing uses a discipline called Lean that focuses on process speed and efficiency. This is also known by other names, Lean Thinking, Lean Enterprise, Lean Manufacturing, Lean Transformation, etc. This process has assisted a number of innovative organizations in garnering tremendous efficiencies in their operations as well as becoming more nimble in product and process innovations. Lean Transformation starts with the elimination of the seven wastes, (over-

production, waiting time, transportation, processing, inventory, motion, and scrap). The implementation of the Five Ss, [Seiri (organization), Seiton (neatness), Seiso (cleaning), Seiketsu (standardization) and Shitsuke (discipline)] The Five S methodology is easy to understand and relatively straightforward to implement, and can add value as a stand alone improvement technique and also establishes the essential prerequisites of process thinking, and value mapping which are fundamentally necessary for supporting further systems improvement. Another Lean thinking tool is constant process analysis (Kaizen) and pull production (Kanban) as well as error-proofing the process (Poka Yoke)

Lean thinkers agree that Lean Transformation is not a collection of tools, but rather a holistic approach to an enterprise-wide process that is designed to vertically integrate the people with the strategy and horizontally align the customer with the internal processes. Key lean transformation principles include:

- Pull processing: products are pulled from the consumer's end, based on need and not pushed from the production end
- Perfect first-time quality - quest for zero defects (Six Sigma).
- Continuous improvement – increase productivity, quality, reducing waste and costs
- Waste minimization – eliminating all activities that do not add value
- Flexibility – product diversity
- Building and maintaining a long term relationship with suppliers through collaborative risk, cost and information sharing,

The critical point of lean thinking is value. It is the customer who defines value. Lean thinking requires a complete and critical review of the value stream. It involves a study of every step from conception, through design, production, information management, up until delivery to the customer. Continuous flow brings efficiency to the process. With the above three elements in place Lean thinking can shift to higher efficiency by being able to provide exactly what the customer needs without any backlog or inventory. Thus value is created; resource utilization and profits are maximized.

The Balanced Scorecard

Up to the early nineties business was predominantly managed by financial metrics. Our economy underwent a structural change about that time. We transitioned from a manufacturing economy to a service economy. Globalization and the internet also had a profound impact on business. This new reality required other types of metrics and information with which to manage the business effectively, efficiently and rationally. The first of the organizational scorecard concepts, the Balanced Scorecard (BSC) was introduced in 1992 by Kaplan and Norton. This spawned many different scorecards, which are in use in some form or another by virtually every major organization.

Kaplan maintains that, "In the same way that you can not fly an airplane with just one instrument gauge, you can't manage a company with just one kind of performance measure." (Kaplan 71) The BSC technique looks at the organization from four distinct perspectives:

1. The customer perspective
2. The internal business perspective
3. The innovation and learning perspective
4. The financial perspective

A central precept of management is the question of what are we trying to accomplish, what is our vision, our picture of a future state. Once we have defined that, the next step is what differentiating activities do we have to engage in to turn that future state into reality? That is our strategy. The next step is to establish objectives for how we are to go about getting there. And to drive the process we need information, measures and targets to tell us how well we are doing.

To appreciate the concept behind this model it is important to understand that each business is unique, and therefore may use more or less of the four perspectives put forth by the creators of the Balanced Scorecard. Kaplan selected four critical perspectives, so as not to overload management with too much information. According to Kaplan most organizations rarely suffer from not having enough measures – quite the contrary they suffer from information overload. The BSC technique focuses attention on the few critical measures.

Management needs metrics in order to manage. And management also knows that metrics drive organizational behavior. For metrics to aid in effective performance management they have to be predictive as well as prescriptive in nature. Measurement is difficult because it is not an exact science. There are no hard and fast rules, of how to go about setting up an effective measurement system. Another level of complexity in the measurement process is that it is difficult to predict the impact on individual behavior, the interactions and interrelationships between existing diverse variables, and the new ones produced by the new metrics. This is because people are involved and their actions are inherently unpredictable. Another thing that contributes to the complexity is that often important factors are hard to measure consistently and objectively. To effectively measure variability must be designed out of the system.

The scorecard also serves to bring together into one report several important but seemingly diverse aspect of the business, such as the external as well as the internal focus. Any organizational scorecard will influence the thinking of senior managers and force them to consider all the important operational measures holistically. It also allows them to see if improvement in one area is gained at the expense of another. “Even the best objectives may be achieved badly,” says Kaplan. Another important aspect of the organizational scorecard is that it creates a platform for alignment within the organization. This is important to strategy deployment, as well as guarding against sub-optimization.

The Balanced Lean Sigma Scorecard

Understanding the Scorecard

The foundation on which the Balanced Lean Sigma Scorecard concept rests is a culture that is supportive of an injury free workplace. As well as a climate that fosters cooperation of all the people within the organization to that end. The organization holds an injury free workplace as a core value and the people operate on this premise instinctually. The leadership communicates a clear vision of creating an injury free workplace and spells out a strategy of how to get there. To accomplish this, the organization must deploy and communicate a strategy based on data and

information and this should be utilized to drive the “right” organizational behavior so as the make the injury free workplace vision a reality.

Metrics & Information

Metrics

Metrics drive organizational behavior. Metrics provide the necessary information to drive the achievement of world-class performance. World class is defined as achieving or exceeding a performance goal that is near perfection (6 Sigma = 3.4 Defects per Million Opportunities) each organization must define what that is and how it will achieve this.

Metrics require dashboards. Dashboards are visual displays of critical information. Six Sigma metrics foster causal thinking, which is critical in safety to identify the underlying drivers of loss; as well as providing information on how the internal processes are going and therefore have the potential of providing management with “real-time” information for process improvement.

Dashboards

A dashboard is a visualization tool that enables an organization to articulate its strategy through a series of process-based causal relationships. A dashboard is a collection of related measures, (outcomes and drivers) that are derived from and directly linked to the organization's mission, vision and strategic objectives. A dashboard is used to monitor, analyze, and improve business drivers and their outcomes. A dashboard measures the progress of achieving the Organization’s goals. To be effective, dashboards must be, sensitive, balanced, clearly defined (“On Target”, “Caution”, “Needs Attention”) drive the “right” behaviors, aligned, and linked to recognition and rewards.

Building effective dashboards requires, knowledge of the stakeholder and what they value, knowledge of the processes that drive the desired results, knowledge of the best measures and how to use them, and knowledge of the organization’s skills and capabilities to meet the stakeholder’s needs. The number of dashboards depends on the organization and its needs. Five to ten; maybe fifteen would probably be the higher limit of the number of dashboards. Too many dashboards will overwhelm management. Dashboards need to be a mix of “leading” and “lagging” measures.

Dashboard management requires the collection of data for each metric in the dashboard (frequency varies by metric, i.e., weekly, monthly, quarterly, annually, semi annually, etc.). Dashboard should be color coded for quick visual assessment. Green indicated that things are within expected target ranges. Yellow indicted that these metrics need to be watched, and red indicted immediate attention. Action plans should be implemented when dashboard metrics are red. Formal reviews should e conducted (frequently) to review the dashboard metrics and action plans with senior management. .

Dashboards help management align the organization’s vision, with stated strategies, while providing metrics and targets to indicate status, progress and/or target achievement. Dashboards also identify specific opportunities for process improvement as well as share and distribute clear and consistent information. Dashboard also aid in focusing on the critical few drivers of results

and help understand cause-and-effect relationship between performance indicators. Dashboards also provide a framework for cross-functional alignment and integration of organizational resources. They also drive effective capital and resource allocation. Dashboards are invaluable in integrating the strategic business planning and execution processes

Framework

The four corner stones of the Lean Sigma Scorecard are stakeholder focus, internal organizational systems, operational processes and fundamental safety procedures. These rest on a foundation that is a supportive culture and are driven by data and information. The stakeholder cornerstone looks at the needs of all the organization's stakeholders and tries to address them. By aligning the organization's systems, supported by integrated operations and driven by data collected from the stakeholders results in a 360 degree holistic approach to the creation of an injury free workplace. This then feeds into a larger system of customers, competition, communication, finance, banking, etc to name a few. All these in some way exert some degree of influence over the decisions the workers make every day in performing their tasks responding to the actions and behaviors of supervision and management. Some of these decisions if made without an understanding or appreciation for the complex systems at work may lead to incidents and possible injury and looses.

The Injury Free Workplace

Measurement is necessary to effectively manage. Senior management understands this well, knowing that the measurement system influences and drives organizational behavior. Effective measurement has to be predictive as well as prescriptive in nature if it is to provide data and information for managing performance. Many organizations have discovered that measurement is difficult because it is not an exact science. There are no hard and fast rules, of how to go about creating metrics that provide the critical information necessary to mange effectively. To make things more complicated, it is difficult to foretell the impact on individual behavior, the interactions and interrelationships between existing diverse variables, and the new ones produced by the new metrics. This is because people are involved and their actions are inherently unpredictable. Another thing that contributes to the complexity is that often important factors are hard to measure consistently and objectively. To effectively measure this, variability must be designed out of the system.

Another benefit of the Balanced Lean Sigma Scorecard (BLSS) is that it provides real-time information of what needs to be addressed in order to improve safety results. Traditionally to improve safety we analyze our losses and from this we arrive at a plan to change some aspect of the effort going forward. This analysis establishes our improvement strategy and sets the direction, as to what needs to get done to improve the loss picture and control the cost-of-risk. This method of arriving at a strategy may not necessarily be in alignment with the overall operational goals and/or business objectives. This too, creates some of the difficulty safety faces in the business environment. Site audits also become the source of information that drives improvement strategy. Both audits and loss analysis may not provide the true picture of what exactly is driving the undesirable results by ignoring all the system drivers. This approach is out of alignment with the operational, business and organizational measurements which are used to manage. Integrated and aligned metrics will show managers that safety in fact has the "right" strategy in order to get the results needed or expected.

Applying the Balanced Lean Sigma Framework (BLSF) thinking to safety has tremendous possibilities and potential. The BLSF provides safety with a structure for integrating safety into operations. Safety finds itself addressed in tactical as well as strategic planning. The organizational systems that drive efficiency and quality are applied to the safety process. Safety goals are aligned with business objectives thereby creating a linkage between resource needs and allocation. The BLSF addresses the needs of all the organizational stakeholders and creates a holistic and integrated approach to managing safety. The result is that the process creates innovative solutions that not only meet but exceeds the stakeholder's as well as the organizational and business expectations.

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