

Case study 3: Seagate Technology

The company

Seagate's position as the world's largest manufacturer of disk drives, magnetic disks and read-write heads and a leader in Storage Area Network (SAN) solutions puts it at the heart of today's 'information-centric' world. Since its founding in 1979, Seagate has successfully relied on a strategy of vertical integration – designing, developing and producing the key enabling technologies that go into its storage products, rather than relying solely on outside suppliers.

At the core of Seagate's success is its advanced development of hard disk drive products. Seagate is the market leader in each of the segments in which it competes, ranging from price-sensitive desktops to performance-intensive network servers, and produces a broad range of disk drives in capacities ranging from 20 Gbytes to an industry-leading 180 Gbytes. In the growing market of consumer electronics devices, which includes personal video recorder (PVR) products, gaming consoles and digital audio jukeboxes, Seagate has shipped nearly three million disk drives and taken market leadership.

Seagate Technology is a global company employing nearly 50 000 people,

with R&D and product sites in Silicon Valley, California; Pittsburgh, Pennsylvania; Longmont, Colorado; Bloomington and Shakopee, Minnesota; Oklahoma City, Oklahoma; Springtown, Northern Ireland; and Singapore. Manufacturing and customer service sites are located in California, Colorado, Minnesota, Oklahoma, Northern Ireland, China, Indonesia, Malaysia, Mexico, Singapore and Thailand.

Drivers for change

Seagate is the world's leading provider of storage technology for Internet, business and consumer applications. Seagate's market leadership is based on delivering award-winning products, customer support and reliability to meet the world's growing demand for information storage.

Six corporate objectives drive all day-to-day activities within the company. They are:

1. Improve Time-To-Market (TTM) for all products
2. Lead the industry in key technologies
3. Create world-class manufacturing operations
4. Develop strategic relationships with vendors and key customers
5. Provide best-in-class product and process quality
6. Become an employer of choice.

Why implement Six Sigma? The market leadership of the company is continuously challenged in a highly competitive and dynamic environment, as is indicated by the following measures:

- Volume products remain in production for only 6–9 months
- Technology content doubles every 12 months
- Worldwide shipments of hard disk drives increases by 10–20 per cent per year
- Cost per unit of storage drops 1 per cent every year.

In 1998 Seagate's senior executive team was concerned that business performance was not on a par with expectations and capabilities. The quality group was charged with recommending a new model or system with which to run the business. The Six Sigma methodology was selected and launched in 1998 to bring common tools, processes, language and statistical methodologies to Seagate as a means to design and develop robust products and processes. Six Sigma helps Seagate make data-based decisions that maximize customer and shareholder value, thus improving quality and customer satisfaction while providing bottom line savings.

Six Sigma was one of the three key activities seen as essential for Seagate's continuing prosperity. The other two were:

1. Supply chain – how to respond to demand changes in a timely manner, execute to commitments and provide flexibility to customers
2. Core teams – how to manage product development from research to volume production.

For example, Seagate's lean manufacturing activities are a key part of Seagate's supply chain improvements and are increasingly tightly bound with Six Sigma. Lean manufacturing's value stream mapping approach and Six Sigma's analytical strength fit together extremely well to define, solve and then prevent problems.

As Six Sigma matures at Seagate, leaders are shifting their focus from reactive to proactive deployment and are placing further emphasis on weaving Six Sigma into business areas in addition to operations. The company also deployed Design for Six Sigma methodology (DFSS), providing new tools and an emphasis on designing products based on a systems engineering approach, so core teams are now starting to manage all drive, component and advanced development programmes using the DFSS methodology. The voice of the customer in the form of Critical To Quality parameters (CTQs) is assessed against existing capabilities using a flow-up and flow-down process to identify any gaps that must be bridged to provide solutions to the customers' needs.

Implementation design

The Six Sigma Academy was employed to guide the implementation and provide the initial waves of training for executives, champions and Black Belts through late 1998 and 1999. Black Belt candidates were trained in the USA and Singapore. The three-year deployment plan followed the path of manufacturing operations first, then process and support engineering, followed by design engineers, administration, sales and marketing, and then began to engage suppliers and customers as well. Over the four training phases of DMAIC each Black Belt candidate was expected to follow the 'Learn-Do' cycle, with a real project being worked on and reviewed both at the home site and in class. All sites were assigned Hands-on Champions, members of senior staff familiar with the operational requirements of the sites and trained in project selection and support.

Seagate has now developed and customized training materials so as to be self-sufficient in training up to the Master Black Belt level. Training centres of excellence exist in the USA, Europe and Asia-Pacific areas. Green Belt training is now required for all Seagate's professional and technical staff.

DFSS training was rolled out within design centres and functions, then through the advanced technology groups from 1999 to 2001.

Key benefits achieved

Go back to the year 1998 at Seagate. Upon hearing the term 'Six Sigma', the majority of employees probably stared blankly and asked, 'What in the world does that mean?' Four years later the snapshot is much different – Six Sigma,

a household word at Seagate, is now highly visible and is producing impressive results for the company, both in hard savings and in improved business processes.

In hard savings, Seagate has achieved nearly \$700 million. All savings are validated independently and audited by the finance team, using very strict criteria. It is also certain that the so-called ‘soft savings’ that Seagate has achieved but not counted far exceed this value.

Hard savings, although an essential metric to track the progress of the activity, are only a small part of the story. Seagate’s operational performance has improved tremendously on an overall basis. The company has moved into a technology leadership position that has in turn led to improved market share in an ever more demanding customer environment. While Six Sigma is not the sole contributor to this impressive performance, it has been an essential enabler. Six Sigma enables top-line growth as well as bottom-line savings.

As Six Sigma matures at Seagate, its leaders are shifting their focus from reactive to proactive measures – ‘We’ve done quite well at cleaning up problems, so now we can evaluate and prevent potential problems,’ says Jeff Allen, Vice President of Six Sigma and Design For Six Sigma. This leads directly into the increasing use of DFSS, to leverage the effort earlier in the product lifecycle.

Here are some measures of Seagate’s progress:

- Over 600 Black Belts have been trained or are in training, with many now reintegrated into business functions after their two-year full-time assignment.
- Over 2700 Six Sigma projects have been completed.
- Green Belt training is nearly complete, with over 5500 employees trained.
- Over 1500 Design for Six Sigma engineers have been trained or are in training.
- Seagate’s Six Sigma projects have delivered nearly US\$700 million of cumulative, validated financial savings.