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CONTINUOUS IMPROVEMENT STRATEGY

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Abstract

Nowadays the companies live in a constant changing world where customers demand better products, higher quality and shorter delivery times. To achieve these customers requirements companies rely on Continuous Improvement to reach their goals but without having a clear strategy for it. In this paper it is discussed in a literature review, the origin, definition and most used tools of CI. Then it is analyzed if the Learning School for strategy fits with CI to help in the creation of a strategy for CI.

Keywords: Continuous Improvement, Learning School, Strategy

Introduction

Nowadays companies around the world face new challenges day by day; globalization has increased competition among them and eliminates commercial distance, any company may have a direct competitor that is located in the other side of the world. The market has evolved also, breaking the old paradigm where the manufacturer dictates the selling price, now, the market and/or costumers are the ones that establish the prices (Japan Management Association, 1989) and because they have multiple options as potential suppliers, they are also demanding higher quality, faster response time and better production flexibility. The world has changed and the managing paradigms have to change too, the way to make business is different and the companies must understand it to keep competitive.

All these requirements are forcing the companies to change the way they manage and the way they work; now the manufacturer must reduce the operations costs in order to increase or maintain the profit, as is explained by the Japan Management Association (1989), is not the same:

$$\text{Selling price} = \text{Cost} + \text{Profit} \quad (1)$$

Than

$$\text{Profit} = \text{Selling price} - \text{Cost} \quad (2)$$

Equations (1) and (2) may be mathematically equal, but they both represent the two paradigms stated before, equation (1) is the old paradigm where the selling price was controlled by the manufacturer of the good, and

equation (2) is the new paradigm, where the selling price is established by the customer (it is fixed to the manufacturer) and the only way to increase the profit is to reduce cost.

But it is necessary to understand that cost is not only the sum of materials, salaries, electricity, etc. Also, there are some hidden costs that every company must try to eliminate, some examples of those hidden costs are: poor quality, downtime, low efficiency, scrap, overtime, among others. All these costs are also called waste, and the Continuous Improvement process is focused on the elimination of those wastes (Suarez-Barraza, 2007 quoted by Suarez-Barraza and Miguel-Davila, 2009).

To help in the reduction of waste, a set of proven tools can be used and it can be found a lot of literature related to them, from the technical perspective to the implementation methodology; but how this CI process can be implemented? Or, what strategy can be followed to apply it? In this paper it is analyzed one of the strategic schools and finds out if it could apply to CI. Set the foundation for future research where CI and management will be studied together.

This investigation is divided as follows: An analysis of literature review for CI is presented (origin, definition and tools). The paper also presents a summary of the Learning Strategy School and how it is related to CI. Then, in the conclusions it is presented the findings between CI, the management theories and the strategic school. Finally it is presented the topics for future research.

Continuous Improvement

CI has been an important part of manufacturing history since the Stone Age, humans are always looking for a better way to do their jobs or improve their tools. But in this paper it will be discussed the CI process that has been developed in the last century and that is dedicated to industrial manufacturing.

Some of the first improvement programs appeared in the 1800s, where management encouraged the employees to provide process improvements, and motivate them with incentive programs (Schroeder and Robinson, 1991). In early 1900s the scientific management emerged and this involved developing methods to help managers analyze and solve production problems using scientific methods (Bhuiyan and Baghel, 2005). With these first two references it can be seen that management and CI have a strong relationship between them. CI methodologies continued evolving and manufacturing companies also started to improve their processes. As explained by Vinodh and Chintha (2011): “productive systems have evolved from the craft manufacturing era, where all the products are handmade, to mass manufacturing era, where manufacturing systems repetitively produced

same components in large quantities. This is followed by the emergence of Lean Manufacturing (LM) where the focus is on waste elimination thereby achieving cost reduction”. The examples mentioned previously are not the only improvements in the manufacturing industry, a lot of tools and methodologies have been design and implemented around the globe, some of those are Total Quality Management, Deming’s Cycle, Balanced Scorecard (Scott et al, 2009), and in recent times tools like Lean-Six Sigma (Bhuiyan and Baghel, 2005) as an integration of LM and SS.

But, how can be defined CI? Among the literature there is no clear definition for CI, different authors can call it a process, a methodology or a philosophy; for example: Caroly et al (2010) define CI as “a process that aims to optimize information, physical flows and products in order to control production costs and quality”. Another definition for CI is, “a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization” (Bhuiyan and Baghel, 2005). Another definition states CI as “a particular bundle of routines which can help an organization improve what it currently does” (Bessant et al, 2001). One more definition define CI “an initiative that implies bundles of practices, such as prescribed sequences of steps for carrying out projects, and sets of tools and techniques commonly used to execute these projects (Handel and Gittleman, 2004; Pil and MacDuffie,1996 quoted by Anand, 2009). For Imai (1987) quoted by Bessant (2001) is the western term for what is called “kaizen” in the Japanese culture. Zangwill y Kantor (1998) defines CI as an array of powerful techniques that has produced substantial improvements in numerous companies and organizations. The following table has the definitions of the authors reviewed.

Table 1. CI Definitions

Author(s)	Definition
Para Crosby (1979), Ishikawa (1986), Deming (1986) Garvin (1987), Juran (1990), Hakes (1991), Feigenbaum (1991), Dean y Bowen (1994), Oakland (1999), and Hellsten and Klefsjö (2000) quoted in Suarez-Barraza y Miguel-Davila (2009),	Kaizen or CI. May be understood as one more element of Total Quality Management (TQM), or as the basic platform for Toyota Production System (TPS) or Lean Thinking, characterized by the participation of the employees in problem solving or elimination of waste (Muda) that emerge from everyday work.
Deming (1986) and Imai (1986) quoted in Wei and Ling (2006)	A company-wide focus to improve process performance
Imai (1986) y Bessant and Caffyn (1997) quoted in Wei y Ling (2006).	Organizational activities with the involvement of all people in the company from top managers to workers
Imai (1987) quoted in Bessant et al (2001).	More recent discussion has been strongly influenced by experience in Japan of what is often termed ‘kaizen’ and which has generally been translated in Western parlance as ‘continuous improvement’.
Harrington (1991) quoted in Suarez-Barraza and Ramis-Pujol (2008).	Systematic methodology developed by to help an organization to have significant improvements in the way process is operated.
Bushell (1992), Bond (1999) y	Planned process, organized and systematic of a continual and

Terziovski and Sohal (2000) quoted in García-Sabater and Marin-Garcia (2011).	incremental change. It is based in Deming cycle that consist in four phases: 1) Study current situation, 2) Acquisition of sufficient data to propose improvements suggestions, 3) Implement selected suggestions to verify if they are giving the expected results, 4) Standardize the suggestions with the require modification.
Jha et al (1996) quoted in Terziovski (2002).	A collection of activities that constitute a process intended to achieve performance improvement.
Pil and MacDuffie (1996) and Handel and Gittleman (2004) quoted in Anand (2009)	CI initiative implies bundles of practices, such as prescribed sequences of steps for carrying out projects, and sets of tools and techniques commonly used to execute these projects.
Zangwill and Kantor (1998)	Continuous improvement (CI) is an array of powerful techniques that has produced substantial improvements in numerous companies and organizations. CI
Adams (1999)	CI is related directly with Lean Manufacturing and its origins in Toyota Production System.
Bond (1999) quoted in Carrascosa et al (2012)	CI is an organized, planned and systematic process of continual change, based in Deming cycle.
Caffyn (1999), Berling (2000) and Brunet and New (2003) quoted in Wei y Ling (2006)	CI is a gradual improvement through step by step innovation.
Pervaiz, Loh y Zairi (1999) y Delbridge y Barton (2002) citados en Wei y Ling (2006)	Process where learning and growing environment is created.
Samson and Terziovski (1999) citados en Terziovski (2002)	CI activities primarily involve simplification of production processes, chiefly through the elimination of waste.
Juergensen (2000) quoted in Bhuiyan & Baghel (2005)	Continuous improvement (CI) is a philosophy that Deming described simply as consisting of Improvement initiatives that increase successes and reduce failures.
Bessant et al (2001)	CI is a particular bundle of routines which can help an organization improve what it currently does.
Terziovski (2002)	The underpinning principle of kaizen (Japanese word of continuous improvement) is the use of various problem-solving tools for the identification and solution of work-based problems. Also signifies small improvements made in the status quo as a result of ongoing efforts.
Jorgensen et al (2003) quoted in García-Sabater (2009)	CI must be extended thru the whole company and must be realized by all the members in the organization.
Rijndersand Boer (2004) citados en García-Sabater (2009)	CI must be a sustained process and focused to the improvement of a specific metric.
Bhuiyan and Baghel (2005)	CI is a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization.
Imai (2006; 2007) quoted in Suarez-Barraza and Miguel-Davila (2009)	Kaizen means: continuous improvement, but improvement on every day, on each moment, realized by all the employees of the organization on any place in the Company. It goes from small incremental improvements to radical and drastic innovations.
Suárez-Barraza (2007) quoted in Suarez-Barraza and Miguel-Davila (2009)	A management philosophy that generates changes or small incremental improvements in the work processes that allows to reduce waste and as consequence improve work performance, taking to the organization into an incremental innovation spiral.
Torres & Yarto (2007)	CI is a process that describes the essence of quality and pretends to reflect what the companies need to do if they

	desire to be more competitive and productive along time.
Anand et al (2009)	Continuous improvement is defined as a systematic effort to seek out and apply new ways of doing work actively and repeatedly making process improvements
Carolyn et al (2010)	The continuous improvement process aims to optimize information, physical flows and products in order to control production costs and quality.

An analysis of different definitions was performed to establish a definition with the most common characteristics. The compose definition states, “CI is a systematic process of continuous and incremental improvements, supported in various tools previously establish”.

As mentioned in some of the definitions, CI can be supported by several tools or techniques. In order to find the tools that are most used, 23 authors regarding CI tools were analyzed. The analysis established that Lean Manufacturing (LM), Six Sigma (SS) and Balance Scorecard (BSC) are three of the most common tools used as stated by Bhuiyan and Baghel (2005).

Table No. 1 CI tools

Author(s)	CI tools
Zangwill and Kantor (1998)	TQM (Total Quality Management), kaizen, Deming cycle or PDCA (Plan, Do, Check, Act), Just in time (JIT).
Adams et al (1999)	Lean Manufacturing (LM), kaizen, Toyota Production System (TPS).
Bessant et al (2001)	LM, kaizen.
Terziovski (2002)	TQM, kaizen, JIT.
Bhuiyan and Baghel (2005)	LM, TQM, kaizen, Six Sigma (SS), Balanced Scorecard (BSC) y Lean Six Sigma (LSS), Total Quality Control (TQC)
Wei and Ling (2006)	SS, 8D, TQM, TRIZ (Inventive Problem Solving Theory), Failure Mode Effect Analysis (FMEA), Process flow.
Torres and Yarto (2007)	LM, kaizen, Harrington Process, PDCA, Quality Circles, Kaizen, Small Groups Improvement Activities (SGIA), Theory of Constrictions (TOC).
Fryer (2007)	TQM, kaizen, SS.
Suarez-Barraza and Ramis-Pujol (2008)	TQM, Harrington Process.
Suarez-Barraza and Miguel-Davila (2008)	TQM, PDCA, Harrington Process, EFQM (European Foundation of Quality Management)
Suarez-Barraza and Miguel-Davila (2008)	LM, kaizen, TQM, PDCA, JIT, Harrington Process, TQC, Total Productive Maintenance (TPM), Company Wide Quality Control (CWQC).
Anand et al (2009)	TQM, JIT, TPM.
Voss (2005) quoted by Anand et al (2009)	ME, SS.
Shewhart’s (1980) quoted by Anand et al (2009)	PDCA

Garcia Sabater (2009)	PDCA, Kaizen.
Scott (2009)	ME, TQM, PDCA, SS, CMI, Information boards.
Caroly (2010)	ME, Kaizen, PDCA.
Jaca et al (2011)	ME, Kaizen, PDCA, SS,
Linares (2011)	TQM, TQC.
Tolamatl (2011)	SS.
Carrascosa (2012)	ME, PDCA, SS, CMI, LSS.
Intra (2014)	ME.
Delgado (2014)	ME, TQM, SS, JIT, CMI, Information Boards, Business Re-engineering Process (BRP).

Source: Own elaboration

CI and the Learning School

As mentioned previously, nowadays the world live in constant movement, change is part of the daily routine for markets, economy, fashion, sports or any other thing that is part of this society. Companies must live with all this, and that is one of the reasons they support themselves with CI. But, how to manage CI to keep changing and adapting? What strategy can be used? There are various strategic schools to look over for an answer, and in this paper we will look how the “Learning School” can be related to a CI strategy.

Mintzberg et al (1998) mention in his book “Strategy Safari: A guided tour through the wilds of strategic management” several characteristics of the Learning School that are analyzed and then explained how can be related to the CI process. These characteristics are:

- *Learning is an important element in the creation of strategies* – In the BSC learning is part of the forth perspective (Kaplan and Norton, 1996), the four perspectives are the base of the BSC. For Teleghani (2010) one of the requirements in order to achieve the lean culture is to develop a learning environment and train the employees. Bhuiyan and Baghel (2005) indicate that LM, if applied correctly, results in the ability of an organization to learn. In Six Sigma, the creation of knowledge occurs through intentional or explicit learning that employs formal improvement methods (Linderman et al, 2003). These examples show the high importance that learning is for CI.
- *The Learning School propose the idea that significant strategic changes or redirection can occur due to a variety of little actions made by all sorts of different people* – CI is based on small changes that must be done in a regular basis and it requires the participation of all the personnel in the company, from workers to top management, some authors that support this statement are: Wei and Chen (2006) quote Caffyn (1999), Berling (2000), Brunet and New (2003), Imai (1986) and Bessant and Caffyn (1997) to describe CI as a gradual

improvement through step by step innovation, and includes organizational activities with the involvement of all people in the company from top managers to workers. Terziovsky (2002) indicate that kaizen (Japanese word for CI) signifies small changes made in the status quo as a results of ongoing efforts, Imai (1986) quoted by Terziovsky (2002) indicates that improvement activities involve everyone in the company in a totally integrated effort toward improving performance. It can be seen how CI concord with the Learning School regarding the participation of the employees and that big changes can be consequence of small improvements, this aligns with the term of “*Logical Incrementalism*” from the Learning School.

- *Overcome opposition* – This is a Logical Incrementalism prescription that states that managers must be going towards new concepts whenever is possible. This can be linked directly to CI, Anand et al (2009) define CI as a systematic effort to seek out and apply new ways of doing work. Look for new strategies and processes must be an integral part of any company and CI can provide this.
- *Structure flexibility* – Flexibility is an important asset that companies around the world are looking to have in their processes, Nordin et al (2010) performed a research on the implementation of LM on automotive industry and find out that one of the driving forces to implement it is to increase flexibility.
- *Engage in continuous change* – If CI is an active part of the strategy the continuous change will be a natural process in the companies.
- *The concept of emergent strategy, however, opens the door to strategic learning, because it acknowledges the organization's capacity to experiment* – As mentioned before, learning is an important part for the CI process, the personnel must be able to keep learning new ways to work and also to propose new ideas or improvements and experimentation is practical way to learn. Running experiments is very common in Six Sigma, actually one important statistical tool used is Design of Experiments (Zailani and Sasthriyar, 2011).

The following table is presented to wrap up the relationship between the Learning School premises and the CI process.

Learning School Premises	Continuous Improvement Process
Strategy must be a process of learning over time, in which, formulation and implementation become indistinguishable.	Continuous learning is fundamental in the CI process and all its tools.
Everybody in the company must be able to learn and cooperate: there are many potential strategists in most organizations	In the CI process everybody in the company must participate in order to be successful.

and at all levels.	
This learning proceeds in emergent fashion, through behavior that stimulates thinking retrospectively, so that sense can be made of action.	CI can be done by anyone in the company, from the operator to the managers.
The role of leadership is to manage the process of strategic learning, whereby novel strategies can emerge.	CI leaders must provide the training to create a learning environment and be ready to identify opportunities from any area.
Strategies appear first as patterns later, perhaps, as plans for the future, and ultimately, as perspectives to guide overall behavior.	Lean has a major strategic significance due to its valuable contributions.

Conclusion

Continuous Improvement (CI) is a process used by the companies around the world as a strategy to satisfy the highly demanding market. In CI exists a wide variety of tools and methodologies to improve the production processes and exist a vastly literature about them. But in the literature reviewed made so far, there is little information about CI strategy. For this paper the Learning School (LS) for strategy was analyzed and related with CI finding that it fit in some of their characteristics. Some of the most important characteristics that CI and the LS have are:

- The need of a continuous learning process over time.
- Everybody in the organization must be participant.
- Ideas could come from anyone in the organization.
- Keep looking for new opportunities.
- Empower the people to do experiments.

With these findings a strategy frame can be design for CI using the LS and have a clearer way to create it.

Future research

During the literature review for this paper it was not found investigations about CI management in a holistic way, it was found information about the management, methodologies or implementation for the different tools, but not for CI in a global perspective. For future research it is planned to find what management theories or tools may apply to CI.

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