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What comes after the transformation?

Characteristics of Continuous Improvement organizations

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Abstract.

Continuous Improvement initiatives are diverse, encompassing, amongst others, lean management, six sigma, TPM and TQM. Striking is that the Continuous Improvement literature focuses mainly on the transformation process itself, with little attention given to its outcome. This study addresses this gap by examining the characteristics of organizations after the continuous improvement transformation. A review of scientific papers and management books yielded eight elements characterizing a continuous improvement organization. These elements were described using 25 main characteristics, thus bringing clarity to academics and practitioners about the definition and attributes of becoming a continuous improvement organization.

Keywords: Continuous Improvement, Lean Management, Organization.

1 Introduction

According to Gupta and Sharma multiple academics and practitioners have attempted to define lean management [1]. Some focused on the customer perspective, others on the waste reduction perspective. However, there is no apparent consensus on the definition of lean. Partly, this is caused by its evolution over a long period, partly because of its mistaken equivalence with other quality-related approaches [1]. On top of that, based on their literature review, Bhuiyan & Bagchel [2] found no theoretical basis for continuous improvement (CI), so CI should be used as a general term that has acquired many of its attributes from other quality initiatives. A clear definition of continuous improvement is thus missing.

Literature study from Jurburg, Viles, Tanco and Mateo [3] shows that, from the second half of the twentieth century, companies worldwide have started to adopt CI systems, with many benefits. An analysis of 1090 papers on CI topics shows that 76% of the articles about lean management, continuous improvement, six sigma, and so forth are about implementation. The other 24% discuss philosophies, culture, concept, and innovation [4]. Despite all the focus on implementation, implementing CI remains difficult. For organizations, it seems evident that implementation is hard for them, but do they know where they are going? What kind of organization do they want to become?

Many companies are trying to adopt CI due to changes in the business environment, the emergence of new management systems, and the importance of quality management [4]. At the same time, a proper definition within organizations is missing, and the design of a CI organization is unclear. Therefore, this study aims to find out what a CI organization is, to help academics and practitioners. Academics need a clear definition of CI and CI organization characteristics to avoid empirical testing of vague and imprecise concepts leading to a body of research that examines a different aspect of the same underlying constructs, masked by different terminology [5]. Practitioners need to know where they are heading to maintain focus in their organizational transformation, e.g., by creating or using a so-called maturity model. Knowing what a CI organization is, also helps process improvement teams, for they must understand the definitions of the methodology, tools, and change vehicles of quality tools to avoid mismatches which can be fatal to a fledgling improvement program [6].

The main question in this study is: “What are the characteristics of a continuously improving organization as emerging from literature? From this question, several sub-questions arise:

1. What the definition of CI?
2. What are the improvement approaches related to CI?
3. What are the CI characteristics according to these approaches, and how can they be combined into a model?

2 Methodology

2.1 Methods

Two literature reviews were conducted to find the characteristics of a CI organization. The first one focused on the definition of CI and improvement approaches that match with CI. This review was used to select the literature for the second review, focusing on finding the characteristics of a CI organization. A problem with literature study is that most research is carried out in developed economies [1], possibly leading to biased results.

2.2 Definition of CI and related improvement approaches

Articles reviewing CI literature were searched, using databases like Emerald, ScienceDirect, and Springer, and looking for keywords like ‘continuous improvement’ and ‘lean management’. In addition, the so-called ‘snowball effect’ was used, in which the articles found are used as a source to find others. Based on these articles, a theoretical definition of CI was created. Practitioners play an essential role in the development of CI [4]. Therefore this definition was challenged with those from CI practitioners, that were obtained from websites created by practitioners.

In combination with the definition of CI, the findings of the first literature review were used to define and scope the second literature review. A problem with this approach is that areas that are not mainstream or emerged too recently are missed. To

use as many related approaches as possible, the improvement approaches found were discussed in the research group Improving Business of Avans University of Applied Science and complemented with related approaches.

2.3 Characteristics of a CI organization

In the search for scientific papers and relevant management books, to find the characteristics of a CI organization, the following keywords were used: 'TPM', 'TQM', 'six sigma', 'theory of constraints', 'QRM', 'agile', 'scrum' and 'lean'. This search may result in a list of irrelevant publications, while the influential ones are missed. Therefore, another search with Google was done, using the following keywords: 'best lean books', 'most sold lean books' and 'top 50 bestselling management books of all time'. The sources identified were tested against the definition of CI.

Selected books and articles were studied to find characteristics in a sequence of steps. First, the sources were scanned. If they were found to include characteristics, they were added to the literature list. After training and briefing, the research team members examined each source in the list, inventorying characteristics of a CI organization after the implementation or transformation. Their findings were inventoried in a list. As the literature review progressed, the list was evaluated regularly to see if every team member had correctly identified the characteristics. Differences of opinion were discussed and resolved in the team. After the reading phase, all characteristics were coded. For every code, the characteristics were analyzed to remove double characteristics and come to each code's core: one or a few short descriptions summarizing the code. Finally, these descriptions were iteratively recombined into a model of a CI organization consisting of eight elements.

3 Results

3.1 Definition of CI and related improvement approaches

Definition of CI

CI tends to be used as a general term. It has acquired many of its attributes from other improvement approaches such as Total Quality Management (TQM) and lean manufacturing, and it is often defined as a culture of continuous improvements of any size that includes all different levels in an organization [2]. Based on a literature review of three decades of CI, Sanchez & Blanco conclude that every author has their definition, but they highlight three characteristics [4]:

- Continuous improvement as a cycle; not as an only act;
- All people from the organization should participate;
- The aim is to improve by focusing on eliminating waste and identifying new areas of improvement.

Singh & Singh also mention the relevance of sustained improvement and improvement in all organizational systems [7]. Zollo & Winter similarly mention two different

elements in their definition, namely the systematic generation and modification of operating routines and the pursuit of improved effectiveness [8]. Finally, Jurburg, Viles, Tanco & Mateo mention a systematic approach in the whole organization with everyone achieving greater business productivity, quality, safety, ergonomics, and competitiveness [3].

Based on these definitions, CI is defined as *a systematic and cyclic approach to eliminate waste by involving everyone in improving operating routines in all the systems of an organization and come to sustained improvements regarding effectiveness and efficiency.*

This academic definition was challenged by contrasting it with practitioners' definitions. A casual Google search came up with 404,000,000 results regarding 'definition continuous improvement'. By focusing on definitions from more reputable practitioners (thus excluding websites like Wikipedia and retaining only websites with named authors), further analysis revealed that after seven websites, definitions started to repeat. The keywords derived from the definitions of practitioners on these websites were [9-15]:

- never-ending, long term;
- strive for perfection in everything you do;
- continuous (happening all the time) versus continual (not going on all the time);
- adding more value by improvement of products, services, or processes;
- raising performances regarding efficiency, effectiveness, quality, speed, flexibility, cost, and sustainability;
- perfecting on-the-go instead of one-off initiatives;
- improvements can be incremental (over time) and breakthrough (all at once);
- responsibility of everyone in the company;
- not something you “do”, but a way a company operates;
- condition to become an agile company.

Testing the definition of CI resulted in the following definition (the changes are underlined): *a never-ending, systematic, and cyclic approach that is happening all the time, striving for perfection by adding more value and eliminating waste, where everyone is involved in improving products, services or processes in all the systems of an organization, thus coming to sustained improvements regarding effectiveness and efficiency, e.g., quality, speed, flexibility, cost, and sustainability.*

Related improvement approaches

Several authors discuss possibly related approaches regarding CI, e.g., kaizen, lean, and TQM [1] [16], or the similarity of various lean production models [17]. Similar is the discussion about lean, six sigma, and lean six sigma: While they have different objectives, together or separately, they can improve business processes [18-19].

Studying variants of the Toyota Production System (TPS), Netland [20] determines that companies do not develop these variants from scratch; they are influenced by

existing best practices in their industry, resulting in similar variants when it comes to content. Therefore, even differences across different industries are hardly present.

This phenomenon also seems to apply to CI. For example, companies merge different CI initiatives, resulting in a combined CI program, of which lean six sigma is the most well-known hybrid methodology [2]. Similarly, companies using total quality management introduced six sigma to be able to prioritize quality projects. Other examples are Imai [21], combining total quality control, and kaizen and Shirose [22], emphasizing the commonality of just in time (JIT), total quality control (TQC), and total productive maintenance (TPM).

CI is part of a family of related approaches and concepts. Therefore, the related approaches will be used to find the characteristics of a CI organization. The following approaches related to CI emerge from the literature [1][3][16][19][20][22]: balanced scorecard, business excellence, business process re-engineering, improvement methodology, JIT, kaizen, lean manufacturing, lean six sigma, lean thinking, organizational excellence, quality management systems, six sigma, theory of constraints, TPM, TQC, TQM, TPS, and world-class manufacturing.

However, this list stills lacks modern approaches that seem to be related, namely quick response manufacturing [23] and lean startup [24]. Therefore, to avoid missing relevant characteristics, these approaches were added.

3.2 Characteristics of a CI organization

A total of 40 books and papers was found and studied; see the list at the end of the paper, resulting in 736 characteristics of a CI organization. These characteristics were coded, double characteristics were removed, and similar characteristics were merged. The characteristics were iteratively combined into a model to come to an accessible overview. The first combination was about the value chain, followed by characteristics about process control. Other characteristics formed a group regarding management, and some characteristics described the role of supporting (staff) processes. Obviously, several characteristics were about improving. A large group of characteristics remained, which could be applied to all former groups. These characteristics were concerned with the people-side of a CI organization: leadership, people, and culture. To come to a useable model, finally, the characteristics were combined into 25 main characteristics, describing the eight elements of a CI organization. Table 1 shows the elements of a CI organization and their main characteristics.

Table 1. Main characteristics CI organization per element.

Element	Main characteristics
	Use standardization and visualization
Value	Customer focus
stream	Stable processes with built-in quality leading to zero defects
process	Flexible, smoothly flowing processes
	Long term cooperation with suppliers, based on mutual trust and improvement

	For a limited number of strategy-based indicators, results are visible and transparent
Process control	The organization is process-based; processes are controlled by teams using startup meetings
	External variations are actively smoothed, and countermeasures are taken to ensure a smooth-running process
	To stabilize the processes standards are clear and sustained, problems are prevented from happening
Management	Processes are clearly defined, with clear responsibilities (including improvement) for process owners and teams
	Long term focus in decision-making, partnerships, and people development
	Management is involved in the gemba and involves everyone in vision, goals, and improvement activities
Support processes	Support systems take a minimum effort and support a process-based organization
	The main focus of supporting units is on improving the process-based way of working
Improving	Everyone is involved in improvement activities in multi-disciplinary teams
	By developing people and processes, a better world is created for all the stakeholders by reducing waste and variation and adding more value
	Continuous learning of successes and failures by ongoing improvement activities, based on PDCA
	Control mechanisms, like indicators and standards, are the basis for improving
Leadership	Improvements are stepwise, or leapfrog, based on facts gathered at the gemba
	Leaders are an example; they demand the following of the standards and give autonomy to improve
People	Leaders learn, experiment, and improve, persistent and critical, challenging, encouraging and supporting their people
	People on all levels are leaders by being involved, persistent, creative, open-minded, progressive, proactive, and having self-discipline
Culture	Ongoing development of people and motivating to use standards to reach goals
	People work together in a safe working environment where they are involved, not blamed; they freely share knowledge and ideas
	People learn by continuous development, continuous reflection on their work and experimenting, mistakes are allowed, and detecting them is praised

4 Discussion

CI was defined as a never-ending, systematic, and cyclic approach that is happening all the time, striving for perfection by adding more value and eliminating waste, where everyone is involved in improving products, services, or processes in all the systems of an organization, thus coming to sustained improvements regarding effec-

tiveness and efficiency, e.g., quality, speed, flexibility, cost, and sustainability. Based on this definition, the improvement approaches were selected, leading to the characteristics of a CI organization. Combining the results of this study resulted in eight elements with 25 main characteristics, see table 1.

This paper aimed to help academics and practitioners with a clear definition of CI. Starting with the academics, an exact concept of CI helps in their empirical testing and academic discussions. Without such a concept studying and describing the implementation of CI and determining the quality of such implementations is difficult. The CI model can be used for that. More specifically, it helps academics studying the development toward the technical side and shift away from the people-orientated side of CI [20]. The CI model has three elements regarding people and can prevent this development, for instance, by distinguishing between management and leadership. Management and leadership are frequently used interchangeably; however, they are not the same [25]. In summary, management is system-oriented and aiming at control, while leadership is people-oriented and aiming at change [25] [26] [27]. They are connected, though, and dividing the two within an organization will generate problems [25]. Therefore, today's organizations need both leaders and managers [26]. Thus, the CI model supports studying the differences and similarities between management and leadership in CI organizations.

For practitioners, the model helps to know where they are heading, thus maintaining focus in their organizational transformation and creating or evaluating so-called maturity models. A clear idea of CI will help them create a dynamic assessment system, which evaluates and improves the used maturity model and its related checklists continuously [28]. Besides, the model may help practitioners to have a clear view of the meaning of CI. A question arising quite often in our work as practitioners is: Are not all organizations improving continuously? They probably are somehow, but the definition of CI makes a clear distinction between continuous (all the time) and continual (not all the time) improving.

Besides, the model helps practitioners to get a clear vision of their organization. An organization's value stream is the starting point of the CI model; all other processes are meant to support its smooth operation with minimal effort. That means minimum registration and inspections, and perhaps even the authority of value stream employees to accept or reject suggestions made by support departments. The study findings show that research on supporting processes seems to be lacking, yet in many organizations support departments seem to be planning and controlling, e.g., by writing policy documents, procedures, and work instructions. Therefore, to get a clear vision of their CI organization and have a proper implementation, the role and weight of the various processes and departments should be discussed, like the importance of support departments related to the value stream.

This study has some limitations. First, the literature on CI and related concepts is vast, and the selected literature in this study is relatively small. Though measures were taken to ensure the most relevant literature was incorporated, perhaps more characteristics exist, or characteristics need modification. For example, from our own practitioners' experience, clear customer-supplier-agreements between sub-processes

or shifts in a process lacked in the literature. Though they are part of having a smooth process, they were not mentioned. The same applies to psychological ownership, which goes beyond 'all employees are involved'.

Second, this study assumes that one model of a CI organization fits all organizations worldwide. In contrast, two different variants of the CI term 'kaizen' can be recognized, a Japanese and a Western [29]. These variants assume that contextual factors can play a role in the CI model. This requires further investigation.

In order to improve the knowledge of a CI organization, practitioners and academics must join hands. Practitioners should use the CI model in choosing their CI path and report their findings. Academics should use these findings to improve the characteristics of a CI organization and the applicability of the CI model. The joined forces will contribute to better CI organizations capable of being successful in a rapidly changing era [30].

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