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THE PRACTICE OF CONTINUOUS IMPROVEMENT BEHAVIOURS IN MANUFACTURING COMPANIES WITH ISO 9001

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Abstract

Continuous improvement gained much attention in the literature as one of the principles in total quality management and practice under methodologies such as Lean or Six Sigma. Continuous improvement in organizations represents a comprehensive process that includes involvement of all people on all organizational levels to make improvements throughout the whole organization. Therefore, building and sustaining the organizational CI capability through practicing the CI behaviours leads to achieving better efficiency, effectiveness and business results of the organization. Also applying CI behaviours leads to change in organizational culture which is, in the long run, oriented toward making every day continuous improvements. The purpose of this paper is to present which CI behaviours can be developed in organization and measured according to the Bessant's evolutionary model of continuous improvement behaviour. Also, the goal of the research is to present based on the conducted research, the state of CI practice regarding adopted CI behaviours which will be presented as the development level of CI behaviours that researched manufacturing companies in Croatia with ISO 9001 certificate, have.

Keywords: *continuous improvement behaviours, kaizen, model*

1. INTRODUCTION

Gaining competitive advantage on the market represents company's ability to achieve better position between other players in the same industry. The purpose of differentiation is in creating differences among competitors (Kotler and Armstrong, 2010), and creating customer preferences and loyalty to minimize their sensitivity to price differences between offered industrial products (Tipurić 1999). Company can build its differentiation strategy in every business activity that creates value (Tipurić, 1999) such as adding innovative characteristics, effective promotions, excellent service, building a brand name, etc. (Li & Zhou, 2010, Samuel, Siagian, & Octavia, 2017). In general, the power of differentiation is scarcity (rare) and costly to imitate is also a source of sustainable competitive advantage (ibid, 2017).

One of the possible ways to differentiate from other companies can be in applying the continuous improvement (CI) or kaizen concept which represents a set of specific CI routines or CI behaviours that may add value to company's processes which involves all people in the organization. CI has gained many attentions in researches in the field of quality since it represents the basis of Lean production and TQM. Also it is incorporated as one of the main principles of ISO 9001 Standard. CI represents a management tool for ongoing improvement (Imai, 1986) and has been noticed as significant factor in achieving firm's competitiveness (Iwao, 2017). Since developing routines represent intangible part of organizational assets they may be difficult to implement and manage since include people in the whole process. However, it is often stated as a cheap way to make improvements and often applied in times of restrictions.

The aim of this research is twofold: i) to represent the generic model for measuring CI routines in the organization and ii) to see the state of the development of CI capability in manufacturing companies in Croatia with ISO 9001 certificate.

2. LITERATURE REVIEW

2.1. The continuous improvement

The continuous improvement represents certain CI behaviours as well as their improvement and encouragement to use in order to evolve as time passes and adding new behaviours to the existing ones (Bessant, Caffyn, & Gallagher, 2001). On Japanese territory it is called kaizen and implies participation of all employees to make CI efforts through their daily tasks. Relative to the western world, kaizen is incorporated in their culture as a way things are done in their business and transferred to the west as continuous improvement it has some problems in its application and sustainability. This problem may be explained through cultural differences where Japanese society is more collectivistic while western society is more individualistic and oriented toward profit success and short-term goals.

Companies who implement CI build overall CI capability of the company. CI capability represents CI activities which have reached some level of functionality allowing repeated and reliable performance representing patterned CI behaviour. Therefore, different organisations have different levels of those CI capabilities. Representing an organizational environment that has its foundation on continuous learning (Gonzalez & Martins, 2016).

For example, lean practice underpins a CI culture by learning through different shop-floor practice and processes (Sunder, 2016) and by using the CI tools many companies create value that is seen in their products or services so companies practicing lean are examples of a good practice of CI which is evident in waste reduction and value-added creation Ferreira, Ramos, & Esteves (2019).

Also, improvement represents one of the main principles of the 9001 Standard and considers using the PDCA (Plan-Do-Check-Act) cycle methodology as one of the main initiator of continuous improvement activities in the company.

2.2. The continuous improvement and dynamic capabilities

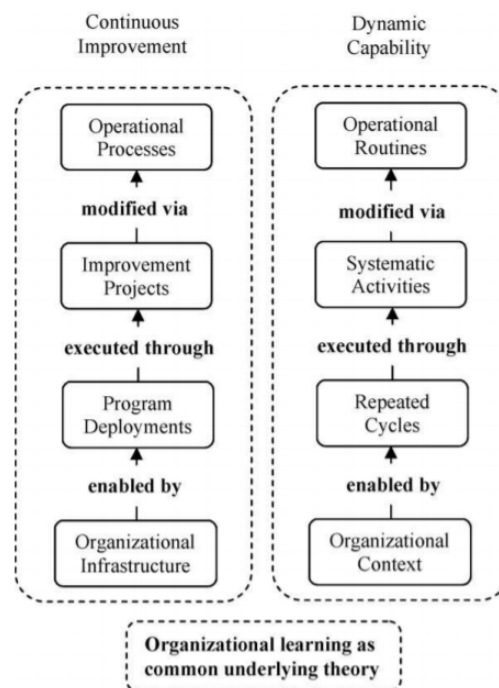
Today's companies operate in such complex conditions with high pressures to respond to external demands as quickly as possible. In order to assure the agility and fast adaptation to new conditions, companies should develop dynamic capabilities in order to stay competitive. Dynamic capabilities view argues that organizations interacting in dynamic environment continuously learn from it by acquiring knowledge which then enables managers to recombine their operational capabilities to gain better outcomes.

Company's operational capabilities (called ordinary capabilities) are drivers of company's performance. However, according to Sunder (2018) those ordinary capabilities are perceived as

static day to day activities and such cannot respond to a fast demanding environment since they have no interaction with environment. On the other hand, dynamic capabilities can represent competitive advantage for the firm, perceived as „consciously created higher-order capabilities with unique attributes to build, integrate or reconfigure the operational capabilities, while interacting with the environment (Sunder 2018, Pisano, 1994; Grant, 1996). Dynamic capabilities view is based on innovation-based competition, price–performance rivalry, increasing returns and the creative destruction of existing competencies (Teece et al., 1997, Sunder, 2018). In such context, developing continuous improvement behaviours in the company can be perceived as dynamic capability that can add value to its company.

CI capabilities suits to a dynamic capability since it shares knowledge, supports experiments therefore it evolves over a time representing its dynamics. According to Anand (2009, p. 444) „Continuous improvement can be seen as systematic effort to seek out and apply new ways of doing work i.e. actively and repeatedly making process improvements“. Since CI has been perceived in literature as a concept from which organizations benefit in excelling their efficiency, the practice has shown many failures in its application, more often its sustainability.

In order to implement and develop CI capability in companies, and more over to sustain its actions in the company some preconditions should be created. Some authors state that organizational infrastructure (Anand, 2009, Galeazzo, Furlan & Vinelli, 2017) should be aligned to foster CI activities as well as the management of CI system (Besannt, 2001). Figure 1 (Anand, 2009, p. 445) represents CI as dynamic capability and gives a parallel view of organizational infrastructure of CI and organizational context of dynamic capabilities with organizational learning theory as common underlying theory base.



Source: Anand, 2009, str. 445

Figure 1 Continuous improvement as dynamic capability

The lack of empirical evidence is evident in scientific literature regarding CI infrastructure since there are very few researches in analysing this area. The research of Anand (2009) states that CI can serve as a dynamic capability under a comprehensive organizational context which includes three areas: purpose, people and processes and may affect its sustainability. However, his research lies on theoretical basis and empirical investigation about the infrastructure seems to be

underdeveloped. Further, Galeazzo, Furlan & Vinelli, (2017) research focuses on three dimension of infrastructure that enables learning, the strategic alignment, teamwork for problem solving, and goals management systems. Those factors are perceived as important factors of organizational infrastructure that can excel CI as dynamic capability. This research gives practical implications to managers because it recognizes that organizational learning infrastructure is an important factor that assures development of CI capabilities. Kohlbacher, (2013) argues that there is a lack of research which analyse the interaction and effects of CI as dynamic capability and organizational process alignment and their effect on performance. Therefore, his contribution is in analysing the effect of CI initiatives on innovation performance in Austrian companies and argues in order to reach innovation performance improvements in the company managers have to implement management commitment toward process management, their culture has to be oriented toward processes, and have to practice continuous improvement initiatives.

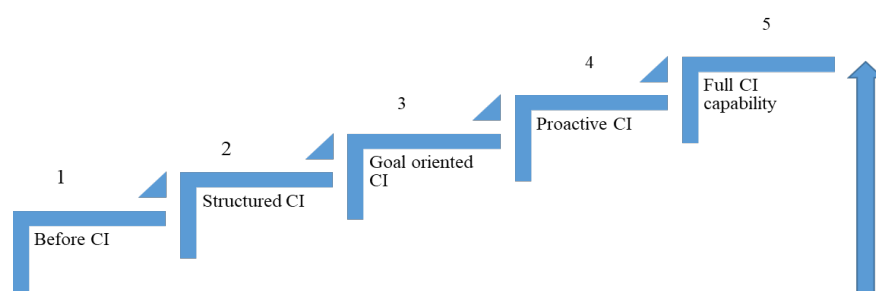
Based on the literature analysis it seems that companies gain advantage when building CI capabilities but this process is long and demands appropriate organizational infrastructure and dedication of managers and employees in developing and sustaining the culture oriented toward CI.

2.3. The model for measuring CI capabilities in organizations

This research uses the well-known generic model for measuring CI capability development known as the Bessant's evolutionary model of continuous improvement behaviour. The generic model was developed and published in 2001 in the scientific journal *Technovation* as a results of a five-year research project and is defined by a set of specific routines that help company improve what it is currently doing (Bessant et al. 2001). Since it is generic, any company which implements CI can apply it in order to measure CI development across the organization.

Based on Bessant et al (2001) the concept of continuous improvement consists of specific set of routines that can help the company improve what it is currently doing.

This model is defined through five levels (Figure 2), where level one, called 'before-CI or before continuous improvement', represents situation in company where there has been an interest for CI, but implementation hasn't begun yet.



Source: Bessant et al (2001), Jorgensen (2006), Jurburg et al (2015)

Figure 2 A generic model for measuring CI capability in organizations

The highest, fifth level is called "full capacity of continuous improvement concept", and this level corresponds to the model of "learning company" since it covers knowledge sharing across every organizational level. This level also represents a planned approach to solving problems without sudden situations coming up.

Each of these levels are defined by a certain specific skill related to continuous improvement which all employers have to learn, adopt and then practiced throughout the whole organizations. Those skills are: problem-solving skills, active participation, link between improvement activities with strategic goals and mechanisms for knowledge transformation across the company (Bessant et al 2001, p. 71).

Further authors point out that if company wants to advance its continuous improvement ability to a higher level it must go through the learning process. After that master the skills in practice and eventually "master" the characteristic behaviours associated with specific skill. This process applies to all companies, so the model is made as generic one. This means that the experience of introducing continuous improvement for each company will be specific, but Bessant et al (2001) claims that each individual company has to undergo general stages of continuous improvement development that are defined in the model in the form of levels. The creators of the model emphasize that the rise from one level to another level is possible when a company has accepted specific behaviour as a particular routine, and only when it masters those skills really good then by adding new routines to the current set of routines, it can grow and mature (Besannt, 2001) however it has been some critics to that view presenting it as a linear incremental process while findings from research of Jørgensen, Boer & Laugen (2006, p.328) suggest that some behaviours and activities underpinning this capability may take precedence over others so it can't be a linear process.

3. RESEARCH RESULTS

3.1. Company characteristics of the participating companies

An empirical study on CI practice was conducted in the Republic of Croatia on organizations that have ISO 9001 certification, of various sizes and industries. For the purpose of the research, a questionnaire was developed based on previous research in the field of continuous improvement. The survey was conducted electronically 2020, by sending questionnaires to 900 randomly selected addresses (a total of 294 questionnaires were received, 5 outliers therefore 289 was further analysed) from which 92 are manufacturing companies. It should be noted that the research was conducted during the global pandemic caused by the corona virus and at the time when Croatia declared lockdown, so the response is weaker. The Likert scale from 1 to 5 was used in the research, where grade 1 means - I do not agree at all and grade 5 means - I completely agree with the statement. These scales were derived from previous studies. To represents the results of CI application in manufacturing company's descriptive statistics was used and a radar diagram which showed the percent of effectiveness regarding the development of CI capability in manufacturing firms with ISO 9001 certificate in Croatia. In this paper from the total sample, 31% where manufacturing companies and they were further analysed.

When analysing sample size structure 30,4% where small and medium size companies, 7,6% where micro companies and 34,8% big size manufacturing companies.

Regarding the ownership structure, the largest percentage of surveyed companies are domestic-privately owned companies (60%) and 19% of the companies are in foreign ownership. Also, there are 96% of the companies that are older than 10 years and only 4% are between 5-10 years.

Regarding the formalization status of the implemented CI system, half of the companies have formally implemented CI system (51%) and 49% do not have formalized CI system in the company. Formalized CI system in the company may represent a significant factor of CI sustainability since it has to be formally implemented, planned, measured and controlled.

3.2. Research results

In this research CI capability was researched and analysed using twenty-four variables depicting continuous improvement behaviours represent certain skills that people have to adopt in order to make improvements. Also, those behaviours may be grouped according to their similar behaviours into seven groups to see, in a more meaningful way, its level of adaptation. This may be significant to managers for addressing certain CI behaviours in order to improve those areas. Therefore, questions regarding understanding the concept of continuous improvement and the way problems are resolved in the company where tested with two variables (Understandci1 and Understandci2 or Group 1). Behaviours regarding the use of improvement measurements, people participation in the CI process and clear

communication of ideas is tested with three variables (Gethab1, Gethab2, Gethab3 or Group 2). Further behaviours that include linking the CI improvements to strategic goals, then monitoring of CI improvements and integration of CI activities in work are tested with three variables (Linkci1, Linkci2 and Linkci3 or Group 3). Questions regarding behaviours that include support of CI activities and formalization of CI processes were tested with four variables (Sustainci1, Sustainci2, Sustainci3, Sustainci4 or Group 4). Also four variables were used to test people co-operation across internal divisions in CI, sharing the holistic view about CI, specific CI projects with suppliers, etc, and involvement of representatives from different organizational levels (Moveci1, Moveci2, Moveci3, Moveci4 or Group 5). Further, behaviours that include the process of monitoring the CI system, the planning process, review of the system and senior management support were tested with four variables (Stratci1, Stratci2, Stratci3, Stratci4 or Group 6). Four variables were used for testing the learning process and sharing knowledge of continuous improvement through the company (Learnorg1, Learnorg2, Learnorg3, Learnorg4 or Group 7).

Table 1 presents descriptive statistics for twenty-four variables measuring CI capability in companies. Respondents measured the perceived application of CI behaviours in their companies. It can be seen that all CI behaviours are being practiced in manufacturing companies meaning that companies with ISO 9001 do implement CI behaviours which is in accordance with the principles of the Standard. According to data results, the highest average grade has variable MOVECI_4 (4,05) representing that relevant CI activities involve representatives from different organizational levels. The lowest average grade has variable UNDERSTANDCI_2 (3,53) representing question "When something goes wrong the natural reaction of people at all levels is to look for reason, rather than to blame individual(s)" indicating that the blame culture still prevails in manufacturing firms in Croatia that hold ISO 9001 certificate which can be a limiting factor for developing more mature CI capabilities in the company.

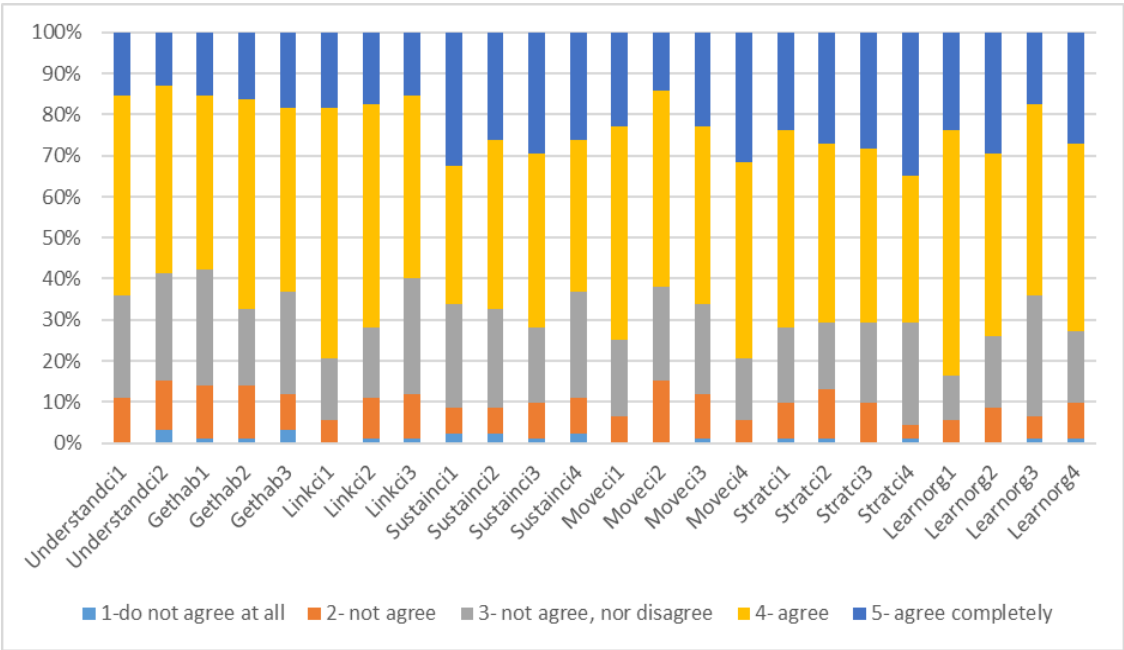
Table 1 Descriptive statistics for variables measuring CI behaviour

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
UNDERSTANDCI_1	92	2	5	3,68	0,864
UNDERSTANDCI_2	92	1	5	3,53	0,977
GETHAB_1	92	1	5	3,58	0,940
GETHAB_2	92	1	5	3,68	0,937
GETHAB_3	92	1	5	3,66	0,986
LINKCI_1	92	2	5	3,92	0,745
LINKCI_2	92	1	5	3,77	0,891
LINKCI_3	92	1	5	3,62	0,912
SUSTAINCI_1	92	1	5	3,88	1,015
SUSTAINCI_2	92	1	5	3,83	0,968
SUSTAINCI_3	92	1	5	3,90	0,961
SUSTAINCI_4	92	1	5	3,76	1,010
MOVECI_1	92	2	5	3,91	0,821
MOVECI_2	92	2	5	3,61	0,913
MOVECI_3	92	1	5	3,76	0,965
MOVECI_4	92	2	5	4,05	0,830
STRATCI_1	92	1	5	3,85	0,925
STRATCI_2	92	1	5	3,84	0,998
STRATCI_3	92	2	5	3,89	0,931
STRATCI_4	92	1	5	4,00	0,914
LEARNORG_1	92	2	5	4,02	0,756
LEARNORG_2	92	2	5	3,95	0,906
LEARNORG_3	92	1	5	3,74	0,850
LEARNORG_4	92	1	5	3,89	0,943

Source: Author's work

Figure 3 presents the structure of the responses regarding the practice of specific CI behaviours (24 behaviours) in the companies that were measured on a five point Likert scale (1-do not agree at all, 5-agree completely). The results show that all of the respondents are familiar with

CI behaviours in their companies and that 49% of respondents agrees or completely agrees (15% that “people at all levels demonstrate a shared belief in the value of small steps and that everyone can contribute, by themselves being actively involved in making and recognizing incremental improvements (variable Understandci1).” Further, 25% of respondents does not agree, nor disagrees and 11% does not agree at all with the same statement. 57% of respondents “use measurement to shape the improvement process” and 14% does not, while 28% not agrees nor disagrees (variable Gethab1). Variable Linkci3 represents “activities are an integral part of the individual or groups work, not a parallel activity” and 45% agrees and 15% completely agrees with the statement while 28% not agrees nor disagrees and 12% does not agree. Also, results indicate (variable Sustainci4) that 37% agrees and 26% completely agrees that “managers support experiment by not punishing mistakes but by encouraging learning from them.” Also, for the same question 26% nor agrees nor disagrees and 9% does not agree and 2% does not agrees at all. For the variable Learnorg1 representing “People learn from their experiences, both positive and negative”, 60% of respondents agrees with this statement and 24% completely agrees.



Source: Author’s work

Figure 3 CI capability development

Further, the question was posed how well or to what extend companies apply this CI behaviour in their companies. This can be seen in figure 4 which represents the perceived degree of development level of CI behaviours in manufacturing companies with ISO 9001 certificate. This radar diagram represents CI capability in manufacturing companies which were grouped, according to the before mentioned variables, into seven groups which represents their specific CI behaviours. Each group of CI behaviours was calculated as a mean value of variables belonging to that group.

On the radar diagram (Fig 4) the orange line represent maximum level of CI capability or a desirable condition that a company may apply regarding CI behaviours which would correspond in theory to a fully developed or matured practice of CI. Since behaviours have been measured on a 5 point Likert scale, a fully matured CI practice would be reached when all behaviours would be answered with the biggest score 5, representing 100% developed and practiced CI behaviours or so called matured CI system. While, blue line represents the achieved level of CI practice regarding adopted behaviours in surveyed manufacturing companies.

According to the results and analysing those 7 groups of behaviours we can state that manufacturing companies have developed and practiced CI capabilities around 57%, which may be explained as a middle level of CI development. It seems that surveyed manufacturing companies are on their half way to develop a full CI maturity in companies.

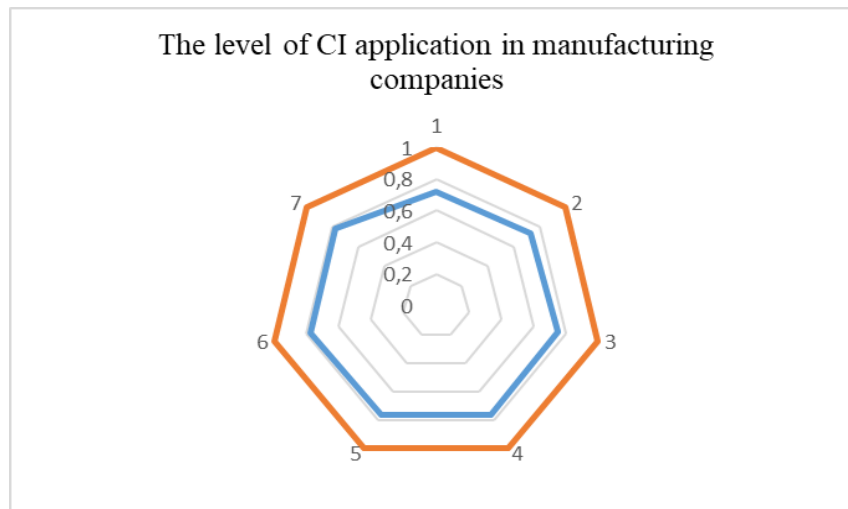


Figure 4 The level of developed CI capability in manufacturing companies with ISO 9001 certificate in Croatia

4. CONCLUSION

In this paper we presented the generic model for measuring the CI capability in the organization and presented research results about the status of CI capability development in 92 manufacturing companies in Croatia with ISO 9001 certificate.

The research results indicate that 51% of companies who are certified according to the 9001 Standard have formally implemented CI system in the company, while 49% have informal practice of CI in the company. When comparing this fact to a measured level of CI capability application or CI practice (57%) of surveyed companies it may be concluded that companies who want to practice continuous improvement and get the best results from this concept, first should formalize their CI system. With formalization, CI activities in organizations become more day to day tasks and not random activities that happen occasionally. Also, formalized CI system includes learning and training about the improvement techniques, standardisation of CI processes, process owners, defining measures and award system for CI contribution.

For future research in the field of continuous improvement it would be notable to see whether companies who have formally implement CI system achieve better business results than those who have informal CI system in the organizations since this factor may represent a significant element of sustaining a successful CI practice in companies adopting quality principles. Also this research gives practical implications for managers to measure CI capability in their organizations and address certain behaviours in organization as discovered critical in order to improve overall CI practice and encourage employee's participation in CI activities. Also, implementation of CI and practicing the CI behaviours which includes all employees may represent a significant factor that differentiates one company from another. Most often companies that implement CI or kaizen have quality principles incorporated in their business model and achieve greater productivity and quality on the market.

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