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The Innovation of Quality Control Circles: A Clear Disuse in the Last 15 Years in the Mexican Industry

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ABSTRACT

Purpose– The aim of this work is to present a concise analysis of Quality control circles (QCC's) disuse in the Mexican Industry.

Design/methodology/approach – A comparative descriptive analysis was carried out on the year of 2000 and 2015, considering a sample of Mexican Industries that implemented the quality control circles, which belong to the Mexican Association of Work in Team A.C. (AMTE). First, in the methodology was realized a classification of the sample studied, later it was divided into two stages: 1) Quantitative variables and 2) Qualitative variables.

Findings – Two important factors can be considered to explain the QCC's disuse. (1) The different cultural context. (2) The new and better methodologies currently recommended for the solution of opportunity areas in Mexican Industry. Finally, the few Mexican Industries that uses Quality Control Circles suggest consider a high percentage of employees to guarantee adequate results.

Discussion – A first possibility to consider a clear tendency to disappear the QCC in Mexican Industry is due to a different cultural context. A second possibility could be to better methodologies are currently recommended for the solution of areas of opportunity. However, the fact that, apart from the automotive sector and its derivative components, the participation of another industries turnaround has been drastically reduced to almost disappear, as well as for the service companies.

1. Introduction

To get better results in the global competitive industry, is crucial to adequate the actual management practices to current needs. As well as, to improve it quality and the innovativeness to gain competitive advantages (Nuchjarin***et al.,*** 2018).Also, Food companies are considering the concept of Happiness Management, which is one of the primary emotions. Several successful enterprises in the world stand as examples of how businesses can be reorganized in order to sustain happiness while increasing profits at the same time (Conley, 2017; Şahin, 2018).A well-known quality management practice for continuous improvement and problem solving to achieve customer satisfaction is the Quality control circle (QCC). It was developed in 1960s, and it began to be put into practice as participatory systems in Japanese industries(Izumi, 1993). Basically, the QCC is considered an effective practice for stronger problem-solving (Zetie, 2002).

QCC consists in the resolution of a problem with the application of simple methods of analysis within the so-called seven tools for continuous improvement (Salaheldin and Zain, 2007). Improving the internal communication of the company in different levels, the work climate and interpersonal relationships are favored, the motivation of the worker is stimulated and there is a greater involvement of the employee. The QCC consists in a team of up to 12 people who usually work together and who meet voluntarily on a regular basis to solve their work-related problems (Yohan, 2015).

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Principally, the cost reduction is encouraged and improves the quality of the service and final product (Hirata and Castellanos, 2005). In fact, there is a tendency to create a novel part of QCC, which is related to people's creativity expression (Faria and Guimarães, 2007).

Also, a considerable amount of literature related to QCCs has presented over the past decades since the first time the program was used in Japan in 1962, in the Matsuyama Carrier Equipment Circle of Japan Telephone and Telegraph (Strang and Young-Mi, 2009). The QCC were disseminated from Japan around the world in several ways.

Recently in Austria, this practice develop a new tendency, called as quality circles for pharmacotherapy (QCPs), and it was taken as a special approach to increase the use of generics (Spiegel ***et al.,*** 2011).Also, the QCC approach has become a popular quality management tool within Taiwan's health care industry (I-Chi and Min-Hsun, 2011).

It has been successfully carried out for several decades and gradually extended to hospital management in recent years (Wang ***et al.,*** 2013). In the UK by Rolls-Royce (1978) (Salaheldin and Zain, 2007), in this same year, it was claimed that there were more than one million quality circles involving some 10 million Japanese workers (Wang ***et al.,*** 2013).

In the USA was employed by Lockheed in 1974. An interesting case occurs in this country, the QCC practice applied in the Hewlett-Packard's quality program was based on the experience of its Japanese subsidiary. This methodology was implemented in the opposite direction, from national subsidiaries to headquarters (Strang and Young-Mi, 2009). Meanwhile, one of the early activities using QCC were developed by Brazilians in Volkswagen (1971), forming the first Japanese-Latin American team. Meanwhile, in Mexico, QCC were established until 1976.

Subsequently, in 1982, there were already 362 Quality Circles within 21 companies in the country (Hirata and Castellanos, 2005). Although, a clear tendency towards to disappear arises at the end of the decade of the 80's.

Trying to revert the previous, in 1991 the first National Contest of Quality Control Circles is organized, administered by the Mexican Association of Work in Team A.C. (AMTE), who classifies the different work groups (AMTE, 2000).

Also, is observed an absence ofliterature related to this topic in literature regarding to QCC in the Mexican Industry (Chinen and Enomoto, 2004).

The aim of this work is to present an analysis of disuse of QCC management in the Mexican Industry. This analysis focuses on a sample of 80 Mexican Industries in the year of 2000 and 2015, comparing the growth of industries and its evolution in the last fifteen years.

Although, there are some cases when the QCC implementation has not been produced positive results. For example, the case of Land-Rover (UK), where after 9 years of operations, Land-Rover's QCC program was terminated in 1997. The researchers argue that the program was a failure because the industry executives did not want to experiment further with a participative approach to management. Also, it was considered due to the setting of inappropriate objectives and faulty implementation (Salaheldin and Zain, 2007).

2. Materials and Methods

A comparative descriptive analysis was carried out on the year of 2000 and 2015, and was considered a sample of 80 Mexican Industries that implemented quality control circles, which belong to the Mexican Association of Work in Team A.C. (AMTE).

Also, was considered the seniority and number of workers and members. As well as the number of cases resolved, time it takes to solve them and data of the team studied were contemplated.

First, was realized a classification of the sample studied, later it was divided into two stages: 1) Quantitative variables, a comparison through hypothesis tests centered on annual references (2000-2015) is presented. 2) Qualitative variables, it will be treated as a comparative summary by means of descriptive statistics.

3. Results and Discussions

The sample was considering industries from the Mexican Association of Work in Team A.C. forum in the year of 2000 and 2015. Table 3.1-A shows approximately a half reduction on number of companies that uses the QCC. However, the average of teams almost was the same (Table 3.1-B). Also, an increasing in the different methodologies applied by companies was observed (Table 3.1-C), in the 2000 year only QCC methodology was employed, and in the 2015 year were employed five different methodologies.

Table 3.1 Company's distribution

YEAR	(A) NUMBER OF MEXICAN COMPANIES	(B) AVERAGE OF TEAMS PER COMPANY	(C) METHODOLOGIES USED BY TEAM	(D) ANTIQUE AVERAGE OF THE COMPANIES	(E) STANDARD DEVIATION (ANTIQUITY)	(F) SECTOR
2000	50	30.2	QCC (25) *	28.58	21.15	Industrial
2015	30	28	CCC (9), GT (3), 6 Sigma (3), Kaizen (7), EMET (8) ***	31.12	16.5	Industrial
	n=80	29.1 ± 1.5				Industrial

* Quality Control Circles, ** Work groups and *** Strategic teamwork methodologies.

T-Student hypothesis test indicates that there is no significant statistical evidence to assume that companies that have implemented a QCC methodology increase the number of workers (Fig. 3.1).

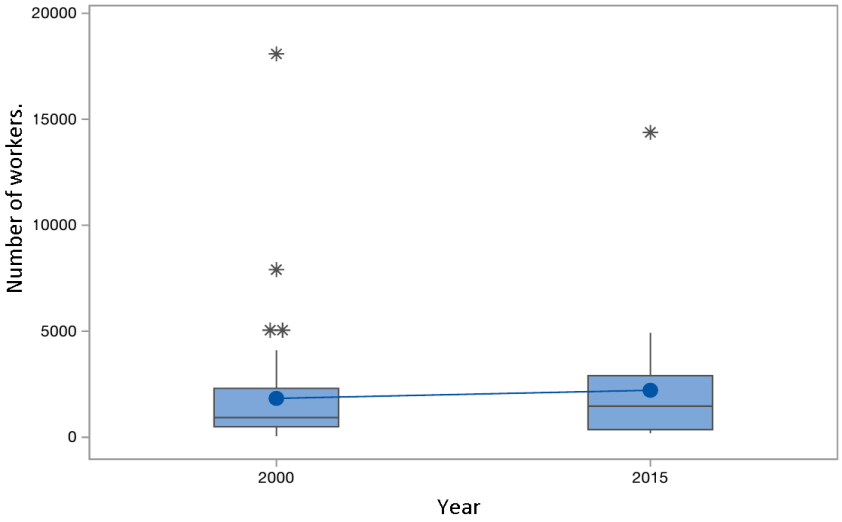

Figure 3.1 Number of workers in companies, have implemented QCC methodology

Fig. 3.2 shows a decrement in the number of teams that uses a QCC methodology in the Mexican industry.

Statistics

Variable	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
2000	30.200	2.719	19.229	4.000	16.000	28.000	38.500	80.000
2015	38.474	5.053	22.026	2.000	20.000	39.000	50.000	76.000

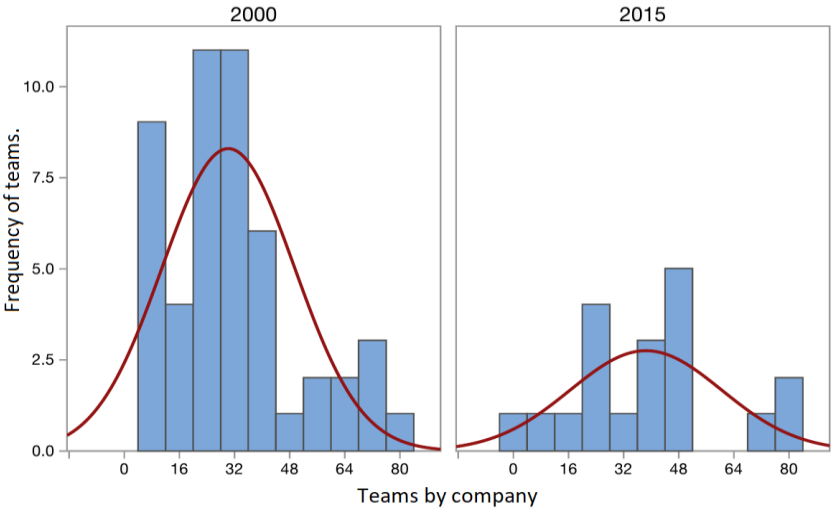

Figure 3.2 Number of teams by company and year

Through these last fifteen years, the companies analyzed and their teamwork systems have accumulated experience in problem solving methods. In 2000, they only solved one problem by year. Meanwhile, in 2015, they solved three problems annually (Fig. 3.3).

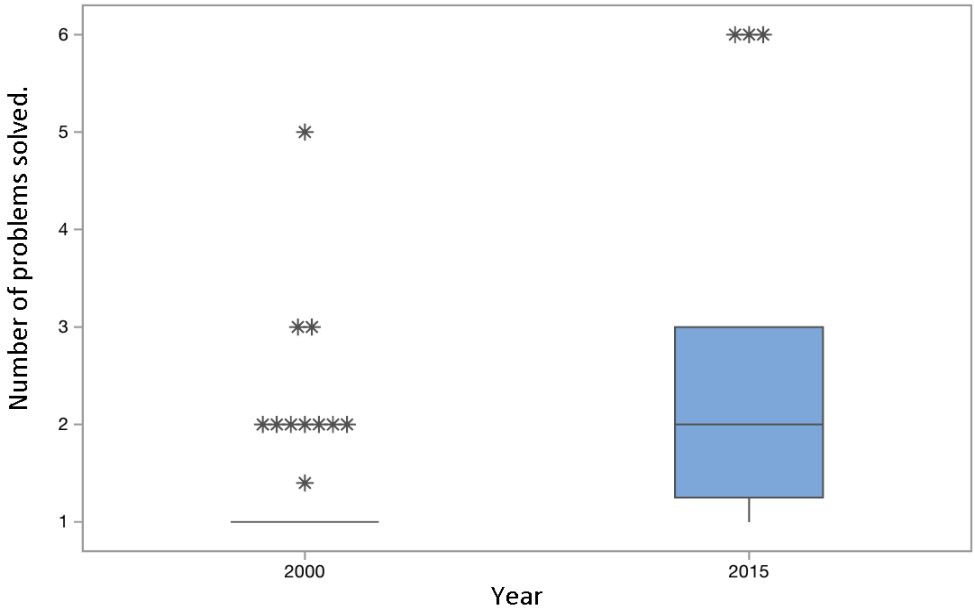

Figure 3.3 Analysis of number of problems solved by company and year

In 2000, different teamwork used an average of 7.5 (std. dev. = 2.1) improvement tools (mainly the Ishikawa diagram and the Pareto chart). In 2015, they used an average of 8 (std. dev. = 2.6), so there is no significant difference to claim that more tools are mastered. Finally, as an additional result of this work, in 2000, there was the participation of breweries, malt, medical equipment, mechanical metal, cars, harnesses and cables, among others. However, in 2015, the automotive sector and its components, such as cables, harnesses and other related parts, basically dominate.

5. Conclusions

A first possibility to consider a clear tendency to disappear the QCC in the Mexican Industry is due to a different cultural context. A second possibility could be to better methodologies are currently recommended for the solution of areas of opportunity, for example, is the Kaizen concept.

This new procedures and techniques respond to required standards of the industry, and follow a continuous improvement in all its production processes and support to the operation.

These fifteen years have served so that participating companies with a track record of several inclusions in the AMTE competition (most of the industrial companies in the automotive sector have repeated for several consecutive years) strengthen their teamwork systems, even with innovation of methodologies.

However, the fact that, apart from the automotive sector and its derivative components, the participation of another industries turnaround has been drastically reduced to almost disappear, as well as for the service companies, whose participation is null, except in the case of some dependencies of municipal governments.

Finally, as a reflection, it is important to ask whether these methodologies are currently recommended for the solution of areas of opportunity in Mexican industries, or, if these last fifteen years have shown that retaking methodologies from other countries has been a limiting factor due to the cultural context itself.

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