Volume 12 Issue 2 (2024) 9-12 ISSN 2347 - 3258
International Journal of Advance Research and Innovation

Organizational Innovation's Impact on Overall Quality Management

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Article Info
Article history:
Received 15 December 2023
Received in revised form
20 February 2024
Accepted 5 March 2024
Available online 15 March 2024

Keywords Total quality management, Innovation, DEMATEL method, Continual improvement.

Abstract: The competitive priority is greatly impacted by Total Quality Management (TQM) strategies in terms of cost, quality, time, and innovation. The speed at which technology is changing presents issues for many firms in the competitive market. More creativity and innovation in product lines, management techniques, and manufacturing methods have been advocated by management theorists and practitioners alike. On the one hand, TQM, or total quality management, has long been a prominent management technique. Globally, TQM is becoming widely recognized as a competitive advantage, and few businesses can afford to ignore it. A large aspect of TQM is continuous process improvement. Continual improvement drives an organization to be both analytical and creativity. Thus, this paper's goal is to discover and extract the characteristics of TQM and innovation. Four TQM dimensions and two innovation dimensions have been identified in the first section of the study. The four TQM dimensions are leadership, employee relations, customer focus, and continuous improvement, while the two innovation dimensions are process and product innovation. Furthermore, this study examined the causal relationships between these parameters using the DEMATEL Method.

1. Introduction

The development of modern management methods has been significantly influenced by the advent of total quality management, or TQM. One of the most important strategic elements in attaining commercial success is quality. To strengthen the position's competitiveness and Organizations of all sizes, in the manufacturing and service sectors, have implemented the concepts of overall quality to enhance corporate performance [1]. Additionally, throughout the past 20 years, one of the most common sources of competitive advantage has been recognized as total quality management, or TQM. There is a positive correlation between TQM and organizational performance, as demonstrated by numerous research [2]. The best practices or methods by which "firms and their employees undertake business activities in all key processes: leadership, planning, customers, suppliers, and community" can be characterized as the critical elements of Total Quality Management relationships, the creation and provision of goods and services, and the application of benchmarking [3]. All corporate systems, processes, and functional areas—including design, development, production, distribution, and customer support—are covered and supported by Total Quality Management (TQM). This all-encompassing strategy seeks to optimize client pleasure through constant innovation and progress [4]. On the one hand, innovation is a vital organizational renewal process and a key component of competitive strategy. It can refer to the creation and use of a new technology, product, organizational structure, or method of organization. [5] Innovation is essential for long-term success, growth, sustainable performance, and the firm's industry survival. It is also a primary strategic tool for gaining a competitive edge in such complicated situations. Because of this, businesses acknowledge that innovation is a strategic must rather than a strategic option, and they typically present innovation as the primary driver of competition across a range of markets [6].

As a result, this study extracts the aspects of TQM and Innovation and then looks at the causal relationship between TQM and Innovation and DEMATEL (Decision Making Trial) and Assessment Laboratory) approach.

2. Literature Review

2.1. Entire management of quality

TQM is an umbrella term for a collection of concepts and methods for raising the caliber of processes and goods in order to increase competitive performance. TQM is an overall company-wide approach to quality enhancement. According to this idea, the company's main objective is to better satisfy consumer needs by raising the caliber of its processes and goods [7]. In addition, TQM is a coordinated set of disciplines and a management process that make sure the company continuously meets and surpasses customer expectations. Every department, division, and level of the company is involved in TQM. Senior management creates a culture that encourages strong employee participation and bases all of its decisions and plans on the needs of the customer. TQM-aware businesses prioritize systematic data management across all procedures and activities to pursue constant development and get rid of waste [8]. Additionally, it has been used in numerous nations throughout the world to enhance organizational performance in areas including raising market share, profits, and productivity [9].

2.1.1. Methods of TQM

The following list includes 11 TQM practices: supplier collaboration, staff involvement, training and education, management commitment, quality department role, product/service design, quality policies, and quality [10]. TQM practices in this study include employee interactions, leadership, customer focus, and continuous improvement.

1. Leadership: Top management's direction with a clear and workable vision determines how employees' performance is enhanced. The leadership qualities of top management enhance other organizational activities in addition to TQM implementation [4].

2. Employee relations: Employees must receive proper training and an explanation of the advantages of TQM in order to engage in quality management. A program for organization-wide training needs to be ensured by management. Together with improved teamwork, employee fulfilment and satisfaction with benefits and pay could result in enhanced output [11].

3. Customer focus: The most crucial aspect of manufacturing is meeting the requirements and expectations of the customer by creating and providing goods and services that meet their demands both now and in the future. In order to secure the long-term survival and prosperity of a firm, customer attention also refers to going above and beyond what customers anticipate [12].

4-Continuous improvement: The idea behind improvement projects that aims to minimize failure and boost success is known as continuous improvement. According to Das et al. [13], continuous improvement is an ongoing, targeted process of incremental innovation carried out by the entire organization. Evaluation of present procedures and quality control methods is required for ongoing improvement. The term continuous improvement describes the pursuit of constant advancements and the creation of procedures to identify more effective ways to transform inputs into outputs. By enhancing connected processes, a company can more effectively meet the demands and expectations of clients [12].

2.1.2. Creativity

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According to Samat et al. [10], innovation is the acceptance and use of new information and methods, including an organization's capacity to take on and develop fresh concepts and use them to produce new and enhanced goods, services, and operational procedures. Therefore, it is believed that innovation is an intangible resource that is exceedingly hard to replicate. These assets make up organizational capital and provide a competitive edge. Gunday et al. [14] in the OECD introduce four distinct categories of innovation. They are organizational innovation, marketing innovation, process innovation, and product innovation. Technological improvements are intimately associated with innovations in products and processes. Product and process innovations are among the sorts of innovations included in this study.

Product innovation is the creation and launch of a new product onto the market or the alteration of an already-existing product in terms of its functionality, consistency in quality, or appearance. 2. Process innovation: This entails developing and refining the production technique as well as incorporating new components (such as equipment, task specifications, input materials, and information flow) into the company's production process [15].

3. The link between TQM and innovation

Numerous academics have asserted during the last 20 years that there is a beneficial correlation between TQM and innovation. The TQM dimensions can help a business foster a culture that is more inventive. Because new and improved methods can be employed to achieve more efficient and effective enterprises, TQM does not prevent innovation in the provision of new products, services, and processes [16]. Moreover, TQM and innovation share a lot of similarities. Both of them came into being as a partial response to the fierce competition that firms in the industrial industry are up against. There are several similarities between innovation and TQM. For instance, innovation and TQM both heavily rely on continual improvement [17]. Thus, in light of the critical roles that TQM and Innovation play in the success of the Firm, this study first looks at how Total Quality Management affects Innovation. employs the DEMATEL approach to investigate the causal relationships between the TQM and Innovation aspects.

4. Method of research

The stages involved in performing the work are described in this section (Figure 1). Following the identification and extraction of TQM and Innovation dimensions, a questionnaire was designed to ascertain the degree of dependency among the variables. Consequently, the DEMATEL technique is used to evaluate the causal relationship and the impacts of many elements on one another.

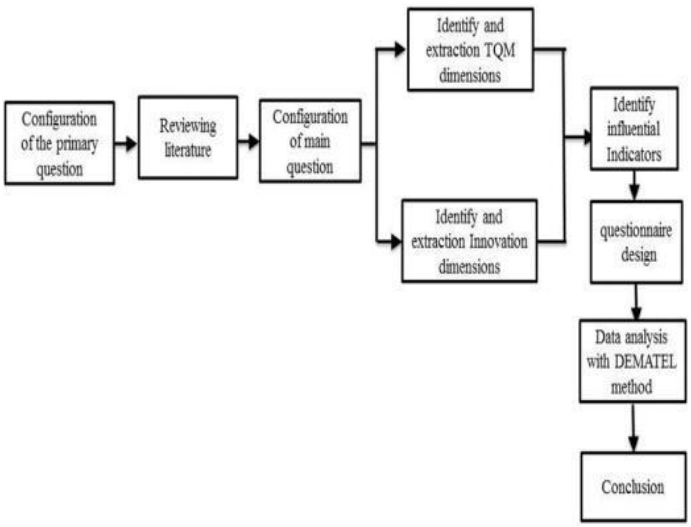

Fig. 1:. Research Method

5. Techniques

The relationship between the causes and effects of criteria can be transformed into an understandable structural model of the system using the DEMATEL approach, which was created between 1972 and 1976 by the Geneva-based Battelle Memorial Institute's Science and Human Affairs Program.

Many contexts, including marketing strategies, R&D projects, e-learning evaluation, managers' competences, control systems, and aircraft safety issues, have effectively employed the DEMATEL to investigate and resolve complex and interwoven challenges [18].

5.1 DEMATEL procedures

Making the direct-relation matrix is the first step. Four scales are employed to assess the correlation between various criteria: One means little influence, two means great influence, and so forth and 3 (very strong impact). Subsequently, sets of pairwise comparisons pertaining to the direction and impacts between criteria are prepared by decision makers. Next, the original data can be represented as the n n× matrix A, where each element of a_{ij} a represents the degree to which criterion i influences criterion j.

Step 2: The direct-relation matrix is normalized. To perform normalization, use the following:

X = K. .A (1)

K = 1 , i, j =1,2, ...,n

Max1≤i≤nΣnj=1 aij (2)

Reaching the total-relation matrix is the third step. Equation (3) can be used to obtain the total relation matrix T once the normalized direct-relation matrix X has been obtained. Here, I stand for the identity matrix.

T=X(1-X)-1 (3)

Creating a causal diagram is step four. Using equations (4-6), the sum of rows and the total of columns are expressed independently as vectors D and R. Next, by adding D to R, the horizontal axis vector)

R D+ called Prominence is created, revealing the relative significance of every requirement. In a similar manner, D is subtracted from R to create the vertical axis (R D) called "Relation," which can separate criteria into groups based on causes and effects.

Generally speaking, the criterion indicates the impact group when it is negative and the cause group when it is positive in) (R D−. As a result, by mapping the dataset of the), (R D R D − +, the causal diagram can be constructed, offering some guidance for decision-making.

T = | tij|n*n , i, j = 1,2, ……,n (4)

$$D = \begin{pmatrix} \sum_{j=1}^{n} t_{ij} \end{pmatrix}_{1xn} = \begin{pmatrix} t_i \end{pmatrix}_{nx1} \quad (5)$$

$$D = \begin{pmatrix} \sum_{j=1}^{n} t_{ij} \end{pmatrix}_{1xn} = \begin{pmatrix} t_i \end{pmatrix}_{1xn} \quad (6)$$

Where, vectors D and R stand for the total rows and total columns, respectively, of the total relation matrix

T = [tii] nxn

Getting the inner dependence matrix is the fifth step. In this phase, the inner dependency matrix can be obtained once the normalization approach sets the sum of each column in the total-relation matrix to 1 [19].

6. Proposed model

Proposed model is given by figure 2, Table 1 shows the geometric average of questionnaire's elements. Table 2 shows the normalized direct-relation matrix, Table 3 shows the direct and indirect (total) - relationship matrix. The sum of influences given and received on criteria given by Table 4.

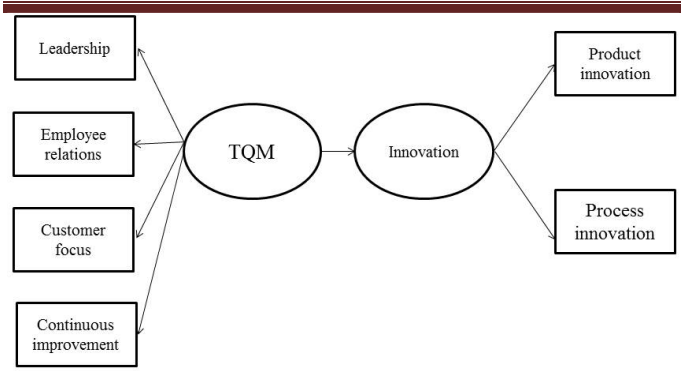

Fig. 2: Proposed Model

Table 1. Geometric average of Questionnaire's elements

	Leadership	Employee relations	Customer focus	Continuous Improvement	Product Innovation	Process Innovation
Leadership	0.00	3.1	1.5	3.9	2.5	1.9
Employee relations	2.4	0.00	2.6	3.8	2.5	2.1
Customer focus	2.1	2.9	0.00	1.9	3.8	3.1
Continuous Improvement	1.9	2.5	2.7	0.00	3.1	3.6
Product Innovation	2.7	2.1	3.8	1.7	0.00	3.8
Process Innovation	2.1	1.8	3.1	2.1	3.7	0.00

Table 2. The normalized direct-relation matrix

	Leadership	Employee relations	Customer focus	Continuous improvement	Product innovation	Process innovation
Leadership	0.00	0.22	0.10	0.27	0.17	0.13
Employee relations	0.17	0.00	0.18	0.27	0.17	0.15
Customer focus	0.15	0.20	0.00	0.13	0.27	0.25
Continuous improvement	0.13	0.17	0.19	0.00	0.22	0.25
Product innovation	0.19	0.15	0.27	0.12	0.00	0.27
Process innovation	0.15	0.13	0.22	0.15	0.26	0.00

Table 3. Direct and Indirect (total) - Relationship Matrix

	Leadership	Employee relations	Customer focus	Continuous improvement	Product innovation	Process innovation
Leadership	2.54	2.91	3.17	3.10	3.54	3.42
Employee relations	2.81	2.87	3.39	3.23	3.72	3.60
Customer focus	2.95	3.19	3.41	3.29	3.97	3.87
Continuous improvement	2.84	3.07	3.46	3.06	3.81	3.75
Product innovation	2.97	3.15	3.62	3.28	3.76	3.87
Process innovation	2.74	2.92	3.34	3.07	3.70	3.40

Figure 3 shows **t**he priority of the factors on the basis of effective severity and relative severity of direct and indirect relations algorithms given by figure 4. Thus, TQM encompassed customer attention, employee relations, leadership, continuous improvement, and innovation, which included both process and product innovation.

Table 4. The sum of influences given and received on criteria

	R		D		D+R		D-R
Product innovation	22.50	Customer focus	20.69	Product innovation	43.13	Leadership	1.84
Process innovation	21.92	Product innovation	20.64	Process innovation	41.08	Employee relations	1.51
Customer focus	20.39	Continuous improvement	19.99	Customer focus	41.08	Continuous improvement	0.97
Continuous improvement	19.02	Employee relations	19.62	Continuous improvement	39.01	Customer focus	0.30
Employee relations	18.11	Process innovation	19.16	Employee relations	37.73	Product innovation	-1.86
Leadership	16.85	Leadership	18.68	Leadership	35.53	Process innovation	-2.75

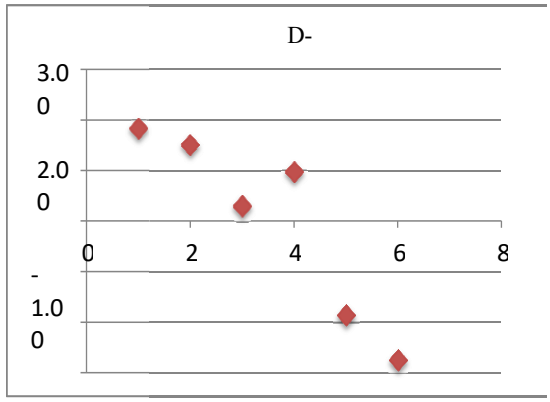

Fig. 3: The priority of the factors on the basis of effective severity

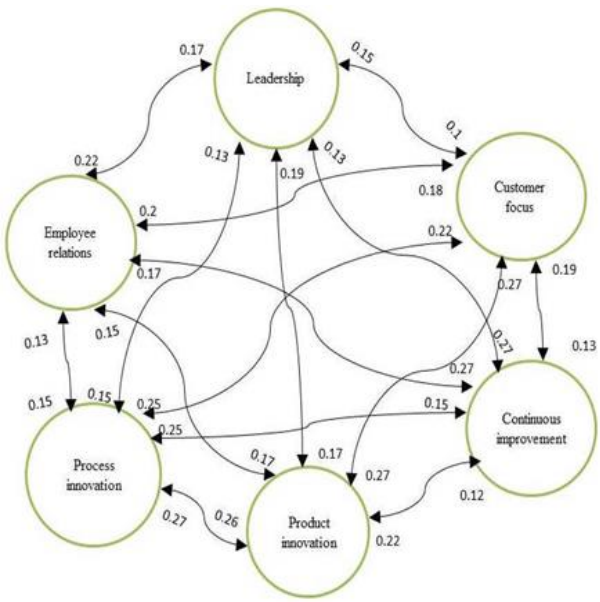

Fig. 4: Relative severity of direct and indirect relations algorithms

7. Conclusions

Total quality management, or TQM, is a company management approach that aims to raise organizational management standards. As a result, it can raise customer value and competitiveness. TQM gives businesses a competitive advantage. Furthermore, the present

while there is evidence of a relationship between TQM practices and innovation performance in companies, there hasn't been much in-depth research on the relationship between TQM procedures and product innovation performance. A questionnaire for this study was created using the TQM and innovation dimensions as a basis. Lastly, the DEMATEL approach was used to analyze the questionnaire results. TQM encompassed customer attention, employee relations, leadership, continuous improvement, and innovation, which included both process and product innovation. The findings show that, among the four TQM criteria, leadership is the most important immediate activity. Additionally, process innovation is the most impacted aspect out of the two innovation criteria.

Acknowledgment

I'd like to express my gratitude to Dr. Manish Deshmukh, my esteemed advisor, for all the guidance, support, and instruction he provided me throughout my research journey.

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