Available online at http://sanad.iau.ir/journal/ijim/
Int. J. Industrial Mathematics (ISSN 2008-5621)
Vol.15, No.1, 2023 Article ID IJIM-1629, 23 pages
Research Article

Structural Equation Modeling to Explore the Critical Success Factors of Benchmarking Implementation within Industrial Clusters

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Submission Date: 2021/08/14, Revised Date:2022/01/10, Date of Acceptance: 2022/05/15

Abstract

Due to the unique features, small and medium-sized enterprises (SMEs) located in industrial clusters can implement benchmarking more easily and effectively than individual companies. Nevertheless, there is not a benchmarking model that has been specially developed to consider the clustered SMEs characteristics. This research aims to identify and model the critical success factors (CSFs) affecting the implementation of benchmarking in the clusters of SMEs. Through literature review and interviews with industry experts and companies' owners, the needs of industrial clusters for benchmarking implementation were identified, and the initial success factors were recognized. The research framework was developed, and a questionnaire was designed and validated. After a pilot study, 412 questionnaires were distributed among SMEs in four well-developed industrial clusters involved in the metal sectors. By receiving 151 filled questionnaires from companies, a one-way independent analysis of variance (ANOVA) was performed to ensure that SMEs located in different clusters could be considered a single sample. Exploratory factor analysis (EFA), confirmatory factor analysis (CFA) followed by structural equation modelling (SEM) resulted in the construction of the "CSFs model". The standardized path coefficients of the model were calculated, which were positively associated with benchmarking. This study is a pioneering attempt to investigate the CSFs of benchmarking implementation regarding the particular characteristics of clustered SMEs. It does not apply to individual organizations unless they act in a network with similar infrastructure such as benchmarking clubs or create an extended network enterprise. It is conducted from the perspective of SMEs; thus, some of the identified factors might not be relevant to large organizations. The detailed CSFs model provides ideas on what needs to be focused on to achieve continuous improvement. It could be applied in SME clusters in similar developing and newly industrialized countries with minor modifications.

Keywords: Industry, Successful Benchmarking, Clusters, Small and medium-sized enterprises (SMEs), Modell

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1. Introduction

These days, SMEs represent the vast majority of firms in most countries and employ a large percentage of the workforce [1]. SMEs are regarded as stimulating private ownership and entrepreneurial skills [2,3]. However, the individual SMEs have typical issues that obstruct them from effectively competing. The most important issues in this regard entail a lack of skilled human resources, limited financial funds, inadequate training, limited ICT infrastructure, imperfect contacts with suppliers and customers, a need for consultants' assistance, relying on government support, and partial export opportunities [4]. Furthermore, SMEs often face difficulties capturing market opportunities, gaining economies of scale while purchasing inputs, and introducing innovative processes and products [5].

Nevertheless, regardless of their obstacles, the SMEs would still survive and compete with large organizations in the market if they accept joining clusters and implementing benchmarking [6]. Benchmarking is a method to improve performance and competitiveness. Large companies have commonly practised this method, which has recently been extended to SMEs [7].

In this case, the involved SMEs can greatly benefit from several amenities offered by clusters, including co-production and having access to a skilled workforce and having access to financial institutions and resource sharing and collective actions. Also, they benefit from lower production costs, specialized training institutions, communal ICT infrastructure, easy access to suppliers and consultation agencies, and government support [8]. Other facilities for clustered SMEs include an appropriate business environment for exporting purposes, sharing markets and technology, knowledge sharing and collaboration, and close relationships that can foster innovation and speedy diffusion of new knowledge. The clustered SMEs are expected to harmonize their business strategies and cooperation in the form of inter-firm linkages that manifest the social capital of clusters [9].

However, the most difficult process in creating a cluster is developing sustained collaboration to connect the SMEs, the ICTs must be developed to fulfil such an objective. In this context, for a cluster of SMEs, the role of ICT as a powerful instrument for information flow and promotion of joint actions should be particularly determined. Consequently, knowledge sharing will enhance the cluster's organizational learning and collective efficiency [10].

In addition, SMEs need to implement benchmarking as a quality management technique if organizational learning of the best practices and continuous improvement is desired. To this date, it has been admitted that implementing benchmarking yields several benefits for SMEs. Such benefits include a better understanding of one's strengths and weaknesses, improving customer satisfaction and supply management, reducing production costs, promoting creativity and innovation, and finally increasing competitive advantages and profitability [11].

As mentioned above, SMEs encounter some challenges for competitiveness and growth. Paradoxically, despite the growing interest in benchmarking as an efficient quality improvement technique in developed countries, fewer SMEs still trust and utilize it in the transition countries. Presumably, this is because implementing benchmarking is costly and time-consuming. Correspondingly, individual SMEs face other benchmarking issues such as a low level of willingness to share knowledge and concern about confidentiality. Moreover, implementation of benchmarking needs supporting resources such as the firm's infrastructure, long-term planning, human resource management, and open interdepartmental communications. In this regard, although the individual SMEs encounter various challenges in implementing benchmarking, they can access most requirements by adopting a cluster approach and entering into cluster-based relations. Clusters and business networks have become keywords in the policy debate in industrialized and developing countries. They are regarded as tools to promote poverty reduction and the development of competitive industries [12]. The needs of industrial clusters for benchmarking implementation include cooperative competition, joint development and collaboration, shared resources and ICTs, trust and knowledge sharing, training institutions, expert consultants, financial institutions, and local and national government support.

Due to these unique features of industrial clusters, clustered SMEs can implement benchmarking more easily and effectively than individual companies. As such, the clustered SMEs need a benchmarking model that has been specially developed to consider their characteristics. There is no single existing model for benchmarking that solely and completely addresses the SMEs' particular issues in clusters. Nevertheless, only one study conducted by Carpinetti and Oiko (2008) has been reported to elaborate on benchmarking implementation amongst the clustered SMEs, although they reportedly play significant roles in developing an economy. That study did not introduce a benchmarking model for implementation; instead, it attempted to present a benchmarking information system designed for collaborative use within a cluster. Indeed, it was a database including benchmarks and a web application for remote access to the database [13].

In benchmarking implementation within SMEs, Ahmad et al. (2017) aimed to determine whether QuickView, a web-based benchmarking tool, could be usable in the UAE and test whether SMEs in the UAE could be evaluated against the 4000 US SMEs on the QuickView database. They intended to help SMEs in the UAE improve bottom-line performance by transforming their practices for competitive advantage [14]. Mishra and Pal (2017) intended to benchmark Indian SMEs through data envelopment analysis (DEA) to predict the performance of SMEs for effective decision making. Forty-one Indian SMEs who are producing auto components were chosen for benchmarking purposes. The peer group and peer weights for the inefficient SMEs were identified. That was useful for benchmarking for the inefficient DMUs. They concluded that the SMEs could identify the parameters they lack and take necessary steps for improvement [15].

Hungund and Mani (2019) studied the benchmarking of factors influencing innovation adoption in software product SMEs. First, they identified the variables relevant to adopting innovation in SMEs. Subsequently, primary data were gathered from decision-makers of 213 SMEs, and a multinomial logistic regression analysis was performed. The results indicate that the firm-level factors could help the firms in their business strategy [16].

Wulandari et al. (2020) studied the benchmarking method and the AHP approach to SMEs, especially in determining benchmark partners in the fashion sector. They concluded that AHP helps SMEs determine which benchmark partners have the best marketing communication performance [7]. Benchmarking fuzzy logic and ANFIS approaches for leanness evaluation in Indian SMEs were made by Agrawal et al. (2017). They computed the leanness index using a fuzzy logic approach, and that of the ANFIS approach was found to be 5.84 to facilitate benchmarking of leanness evaluation [17].

Since many benchmarking implementations have not delivered the promised functionality and resulted in some costly failures, it is principally essential to identify the factors that lead to a successful implementation of benchmarking. By accentuating that the CSFs of benchmarking implementation within clustered SMEs substantially differ from the others, it can be concluded that developing a comprehensive benchmarking model for them is required. Few studies have explored what factors contribute to the success of benchmarking implementation within SME clusters. To this end, this issue remains a major concern for both academicians and practitioners urging further development of a holistic model which can thoroughly consider all the characteristics of industrial clusters. In this regard, the current research aims to determine the CSFs of benchmarking implementation within the clustered SMEs [18].

The first part of this study explores the study topics, goals, and contributions. Second, the theoretical basis underlying this study is mainly related to benchmarking in the performance improvement of SME clusters. Third, this study describes the research method used. Fourth is the discussion of research results, and fifth is concluded remarks and future works.

2. Literature review

2.1. SME Clusters

Porter defines SME Clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and finally the associated institutions in a particular field that compete while also cooperating” [19]. Clusters are agglomerations of interconnected companies and associated institutions. Firms in a cluster produce similar or related goods or services. They are supported by a range of dedicated institutions located in spatial proximity, such as business associations or training and technical assistance providers. Vibrant clusters are home to innovation-oriented firms that benefit from an integrated support system and dynamic business networks [12]. It is affirmed that clusters can enable the members to benefit when they appear in places where specific infrastructure exists, including specialized training foundations and common infrastructures such as ICT and telecommunications [20]. SMEs can develop their cooperation in a cluster by strengthening inter-firm connections to improve their performance [9].

As a prerequisite to forming a cluster, a suitable business environment can be the foundation for the critical mass of SMEs to emerge [21]. It is highlighted that one of the most indispensable features for more developed clusters is, in fact, the firms' interaction in cooperative actions for strategic gains. Illustrations of such gains include collective actions, resource sharing, joint development or experimentation, co-production, economies of scale and scope [6]. Besides, if it is intended to establish a competent cluster, trust-building and fruitful negotiation should be among the cluster actors and information exchange and determining common strategic purposes. There should also be some agreement on joint development strategy and implementing such a strategy systematically and coherently [22].

The other important contributing factor is the existence of enterprise culture within the clusters of SMEs, affording a knowledge-sharing environment that can enable the formation of the SMEs' alliances; consequently, these alliances can use emerging business opportunities for their value-creating potential [23].

The reviewed literature suggests that clustering helps SMEs promote their competitiveness while providing them with such advantages as closer working relationships for innovations, having access to a skilled workforce, and decreased transportation and transaction expenses [24]. Also, other benefits of clustering for SMEs include sharing communal essentials, like a common end product market, Laboure force, technology, and natural resources. Also, clustering results in competition urging the firms to remain inventive and advance or generate new technology. Furthermore, clustering leads to cooperation between the firms. Finally, knowledge and technology transfer can be enabled through the social infrastructure within the cluster.

It is also highlighted that formal establishments such as companies, Laboure unions, and specialized institutes can play a vital role in reinforcing the cooperation between the cluster organizations [20]. The social interactions and interpersonal relationships forged between people, organizations, and sectors foster innovation. Such professional interaction yields profits for the small firms while allowing them to enter evolving niche markets once there is a change in demand and the technology [25].

To be concise, clustered SMEs are said to have unique characteristics; the existence of supportive local institutions, availability of specialized suppliers and service providers, access to a skilled workforce, and incentive to compete are but a few of such characteristics.

2.2. The CSFs of benchmarking implementation

Very few studies have directly addressed CSFs, specifically those related to benchmarking implementations. Most of the previous success factors of benchmarking implementation align with the more general CSFs for TQM and quality-related areas. Moreover, the literature review reveals no consensus on benchmarking implementation's critical success factors. Because success criteria vary from one person to another, every organization differs in culture, environment, mission, and technological tools available [26]. Besides, most studies on CSFs in benchmarking implementations consider only large organizations. However, only a few limited studies consider the enterprises' size and its relation to benchmarking implementation factors. Zeinalnezhad et al. (2014) believed that the success of benchmarking depended on many factors, including the management roles, teamwork, partners, benchmarking data, implementation and some general issues such as the scope of the study [4]. However, Deros et al. (2006) classified CSFs of benchmarking implementation amongst SMEs into nine groups, including top management leadership, policy and strategic planning, systems and processes, human resource management, creativity and innovation management, customer satisfaction management, resources management and business results, employee satisfaction management, as well as organizational culture and work environment [18].

In addition to the commitment of top management and employee involvement, Majd (2008) suggested other influential factors of an effective benchmarking project; this entailed operative dialogue and applying the discoveries associated with benchmarking and elucidating the objects related to benchmarking [27]. Singh et al. (2019) believed that lack of awareness about benchmarking and management vision is the most critical barrier in Indian SMEs [28]. Likewise, other contributing factors include following systematic steps in implementing benchmarking and mounting the benchmarking culture. The emphasis will be on an organizational inclination to alter the procedures and search for better practices [27].

Looking for ways to improve the chances for the success of benchmarking implementations, Bhote (2011) suggested many CSFs in benchmarking implementation. The proposed factors include a close tie-in with the corporate strategies and the management's support and involvement, organizational infrastructure, long-range planning, and accurate definition of the problem. He also enumerated other factors such as justifying and explaining the reasons for benchmarking implementation and objectives, linking what to benchmark with key business outcomes, linking the internal customer (sponsor) to the benchmarking project, an efficient benchmarking team, and the staff's involvement and support. Other success factors include training, internal benchmarking as a preface, practising the pilot run, choosing the right partners, developing a questionnaire, early data collection via telephone interview or blind survey, and on-site visits. Subsequently, it is suggested to run a precise data analysis alongside communicating the results of the benchmarking effort, having the spirit of renewal, networking, "out of the box" thinking or "beyond benchmarking", and finally nurturing the corporate [29].

In manufacturing process factors, complexity refers to the number of levels and types of interactions existing in the system. Compatibility is the extent to which an innovation is considered by the present adopters' values, requirements, and experiences. Flexibility is described as the ability of the manufacturing system to handle the uncertainties within the companies.

In line with many researchers, Asrofah et al. (2010) confirmed that top management commitment is unquestionably imperative for benchmarking practice in the context of organizational factors. Customer satisfaction orientation is the amount of attention a company has granted to achieve customer's satisfaction. Employees' innovativeness is about improving the ability to generate ideas, services, and work processes in the production and terms of the manufacturing process. Effective employees' innovativeness would result in the workers' satisfaction, improve the quality, and enhance the products in the manufacturing organizations. Additionally, environmental factors include government intervention and the customer's feedback. Government intervention refers to the government reforms to facilitate overseeing and controlling the efficiency and quality while emphasizing the internal and external shareholders. Furthermore, for the organizations to better perceive and respond to the customer's needs, a customer feedback system can be established alongside regular meetings. It is the way for manufacturing companies to retain their customers' loyalty and as a way to indicate their companies' performance [26].

2.3. Research gap

Essentially, factors influencing the clustered SMEs' adoption of benchmarking are substantially different from those of large organizations. Then, the SMEs in the clusters need a model especially devoted to their particular environments. Based on the identified gap, further development of a holistic model considering all the aspects of the target organizations is also needed. To bridge this gap and provide organizations with practical assistance when dealing with benchmarking, this study aimed at determining the CSFs of benchmarking implementation within SME clusters.

3. Methodology

3.1. Research assumptions and population

The main assumption of this study is that clustered SMEs require a benchmarking tool specifically designed and tailored to their characteristics and requirements. It is assumed that there are well-developed business networks involving SMEs and large enterprises, suppliers, financial institutions, training institutions, expert consultants, and government support. Moreover, it is assumed that competition and cooperation, joint development and collaboration, trust-building and constructive dialogue, knowledge sharing, resources, and innovative capabilities are all in their place in the cluster.

The data is collected from organizations responsible for manufacturing metal parts and mostly engaged in producing automobile spare parts. The sampling frame for this research was drawn from the ISIPO data bank, accessible from the agency's website (www.sme.ir). As listed in the ISIPO data bank, out of 832 SMEs producing metal parts in Mashhad, the second most populated city in Iran, only 412 were active and had an accurate postal address at the time of the study. These target companies were located in four well organized industrial estates (SME clusters), namely Toos, Kaviyan, Mashinsazi and Kalat. Indeed, Industrial Estates can be considered latent or potential clusters [25].

A one-way independent analysis of variance (ANOVA) was performed to ensure that SMEs located in different clusters could be considered a single sample. The location was not statistically significant on the lead performance indicators' score between the groups concerning F-ratio, degrees of freedom and p-value ($F(4,144) = 1.783$, $p = 0.135$). Accordingly, it concluded that all the SMEs located in the four different Industrial clusters (Toos, Kaviyan, Mashinsazi, and Kalat) might be considered a single sample.

In this research, the minimum requirements for structural equation modelling (SEM) of the data were considered in determining the sample size. A sample size of 200 satisfies the SEM data analysis technique [30]. Sending the questionnaires to all the members when the population is small (less than 500) is recommended. Therefore, the questionnaires were sent to all the existing 412 SMEs to get more possible responses. Since our survey covers the total population, it is called census sampling. We received back the filled questionnaires from 151 companies. The characteristics of the surveyed clusters are summarized in Table 1.

Table 1. The characteristics of the surveyed industrial clusters

No	**Industrial clusters' Name**	**Year Approved**	**Total Area (Km^2)**	**Transferred Area (Km^2)**	**Number of production Units**	**Estimated Total Investment (Billion Dollars)**	**Estimated Employment of Units**
1	Toos	1989	396.4	264.26	637	8157	24597
2	Kayan	1992	200	201.38	99	5101	3378
3	Mashinsazi	1999	192.22	106.31	142	22580	4430
4	Kalat	2000	113.3	70.22	247	1171	5504

Table 1 shows that the Toos cluster is more than 32 years old and has the largest number of approved production units, 637. The Mashinsazi cluster, with a history of more than 22 years, has the largest amount of investment, i.e., 22580 billion dollars. In total, the total area allocated to the surveyed clusters is 901.92 square kilometers, of which 642.17 square kilometers have been exploited and an estimated 37,909 people are employed there.

3.2. Research framework

This research study was conducted through several steps to address the research questions and achieve the objectives, as shown in Figure 1.

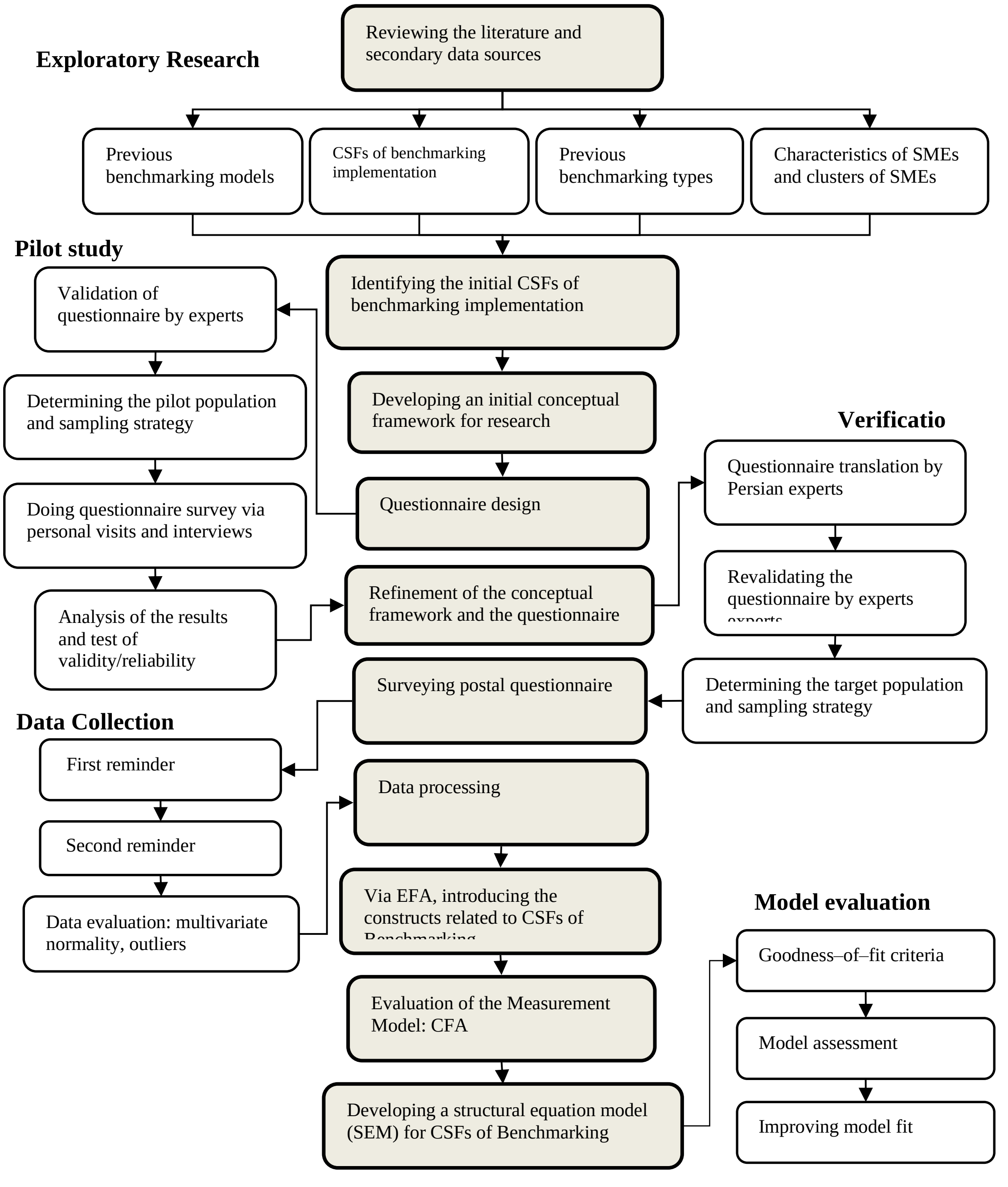

Figure 1. The Research Design

Several data sources were reviewed through the theoretical study, including different databases such as Emerald, Elsevier, Science Direct, EBSCO Publishing, and ProQuest Dissertations and Theses. Also, some governmental studies and reports, census reports on demographics, and related academic books were studied. The literature survey of the published theories and past empirical studies helped identify the gap, formulate the problem, and define the research objectives.

The empirical study's second phase entailed designing and validating the survey questionnaire to test the earlier research hypotheses. Next, this phase encompassed running the pilot study and refining the conceptual research framework and the questionnaire based on the analysis of the obtained results. Furthermore, other steps of this phase included translation of the questionnaire and then verification and performing the postal survey questionnaire and data collection. Using SPSS software through EFA and analysis of the obtained data in this phase resulted in defining the constructs (latent variables) related to the CSFs of benchmarking.

The third phase is related to the model construction, which was undertaken by constructing an initial model for the CSFs of benchmarking. Subsequently, the Measurement Model was validated via confirmatory factor analysis (CFA) using the AMOS software. Further, in this phase, a structural equation model (SEM) was developed for the CSFs of benchmarking was then assessed based on the goodness-of-fit criteria.

3.3. The identified CSFs and the research hypothesis

Based on the results of the exploratory research, the elements that might assist the SMEs in clusters to implement benchmarking more successfully were identified as (1) Management; (2) Benchmarking Team Members; (3) Employees; (4) Customers; (5) Partners; (6) Government; (7) Consultants; (8) Benchmarking Processes; (9) Benchmarking data; and (10) Communications/ICTs.

These factors, derived from the literature review, were potentially applicable to benchmarking implementation amongst the clustered SMEs. However, based on the results of the pilot study, the final CSFs of benchmarking was classified from five dimensions, namely “communications”, “employees”, “management”, “processes”, and the “government”. Table 2 presents the item code and item description related to the CSFs of the benchmarking.

Table 2. Item Codes and Item Descriptions Related to CSFs of LCB

No.	Item Code (Variables)	Item Description
Factor 1 – Communications		
1	com1	Skilled consultants should assist firms in all phases of the benchmarking process (i.e., introducing partners, providing guidance through data collection and implementing better practices, and providing continuity to the process).
2	com2	There must be willing to share information among benchmarking partners based on mutual trust.
3	com3	Partners should avoid pure competition, rather cooperate and compete through following ethical and legal guidelines.
4	com4	Customer satisfaction must be highly considered, particularly considering the future changes in their needs.
5	com5	ICT must be developed as a strategic tool for creating collective learning and enhancing communications and experience exchange.
Factor 2 – Employees		
6	emp1	Team members should be drawn from key areas likely to be impacted by the project and require training and facilities.

7	emp2	A benchmarking team must be ensured that the organization understands its processes well before comparing them against others (doing self-assessment).
8	emp3	Team members must develop a persuasive benchmarking proposal including the scope of the study, business reason for the study, project objectives, required resources (time, human, financial), and introducing potential partners.
9	emp4	Employees' empowerment must be highly considered (i.e., training and rewards).
Factor 3 – Management		
10	man1	Benchmarking must be actively promoted and supported by the management.
11	man2	Management must develop a benchmarking policy and appoint key benchmarking roles such as benchmarking steering committee.
12	man3	Management must provide adequate resources (workforce and financial) for the benchmarking activities.
13	man4	Management must ensure that the organizational culture supports benchmarking (i.e., dealing with resistance to change).
Factor 4 – Processes		
14	pro1	The benchmarking processes should analyze forward-looking, predictive and future performance comparisons.
15	pro2	The benchmarking processes should assist in effective organizational learning and the development of learning organizations.
16	pro3	The benchmarking processes must measure and benchmark organizations' upstream, intangible, innovative, agile, and developmental aspects.
17	pro4	By eEstablishing a systematic data gathering system, collecting, validating, and analyzing data must be done carefully.
Factor 5 – Government		
18	gov1	Government should encourage firms' linkage to the SMEs concentrations (preferably clusters) by providing some resources and infrastructures.
19	gov2	As facilitators, the government must develop and support the clusters through initiate helps.
20	gov3	Government must support SMEs in various ways such as financial support, government policy or import and export promotion.

Hence, the research hypotheses were re-phrased as follows:

H1. The "Communications" (including ICTs, Customers, Partners, and Consultants) positively affect the successful implementation of benchmarking within clustered SMEs.

H2. The "Employees" (including Benchmarking Team Members and Employees (staffs)) has a positive effect on the successful implementation of benchmarking within clustered SMEs.

H3. The "Government" positively affects the successful implementation of benchmarking within clustered SMEs.

H4. The "Management" positively affects the successful implementation of benchmarking within clustered SMEs.

H5. The "Processes" (including Benchmarking Processes and Benchmarking Data) positively affect the successful benchmarking implementation within clustered SMEs.

4. Results

4.1. Demographics of the Surveyed SMEs

In this study, firms that have employed fewer than 50 people have been considered small businesses, and the ones that recruit fewer than 250 have been regarded as medium firms. Based on this, 48.3% (71) of the surveyed firms were small firms, and a total of 51.7% (76) were categorized as medium ones. Amongst them, 28.6 per cent (42) had below two years of work experience, 44.9 per cent (66) had between 2 and 10 years, and 26.5 per cent (39) had above ten years of work experience. The detailed characteristics of the 151 surveyed companies participating in the study are presented in Table 3.

Table 3. The demographics of the surveyed SMEs

No.	Description	Yes Frequency (percentage)	No Frequency (percentage)
1	Do the companies have any ISO certifications?	122 (83%)	25 (17%)
2	Do the companies export some parts of their products?	66 (44.3%)	83 (55.7%)
3	Are there any organizational charts in the companies?	137 (94.5%)	8 (5.5%)
4	Do the companies have formal strategic planning?	125 (83.9%)	24 (16.1%)
5	Are the companies joined to any advanced industrial clusters?	31 (21.7%)	112 (78.3%)
6	Are any training opportunities provided on benchmarking for employees?	69 (46.3%)	76 (52.4%)
7	Is informal benchmarking practised by learning from colleagues' consultants and networking with other people via online databases?	115 (78%)	33 (22.3%)

4.2. Evaluation of Data Quality and Data Preparation

Before conducting the EFA using the SPSS software and initiating the steps related to the SEM analyses utilizing the AMOS software, the raw data was evaluated for quality. The data screening included examining the data set for the probable missing values and outliers and the data normality.

In this regard, the data set was checked for missing data. As observed, there were few instances (8.1%) of missing data probably because our sample size was not large and the number of cases to be dropped was not small (8.1%); in this occasion, the data imputation (Regression Imputation) was applied.

First, the univariate normality was tested to check the multivariate normality of data. The calculated $\beta 2$ values were less than seven, indicating that no item was substantially kurtosis. As well, reviewing the skew values revealed no item to be substantially skewed. Therefore, skewness and kurtosis indices for each variable indicated the existence of univariate normality.

Although univariate normality is a prerequisite while assessing the multivariate normality, regardless of whether the distribution of the observed variables is univariate normal, the multivariate distribution can still be multivariate non-normal. The calculated value of the multivariate kurtosis' critical ratio (C.R.) suggested the presence of non-normality at the multivariate level (C.R. = 10.742). At this point, a bootstrapping methodology was employed in order to handle the presence of multivariate non-normal data [30].

In order to assess the multivariate outliers, the computed values of Mahalanobis d-squared (D2) were reviewed, which revealed that there was minimal evidence of serious multivariate outliers.

4.2.1. Correlation

The 20 variables, introduced in Table 2, were included in the correlation analysis, all together. The Inter-Item Correlation Matrix of all the 20 variables was produced. Once the correlation matrix was scanned, it was found that none of the items had lots of correlations below 0.33 [31]. Thus, the variables' linearity was established because the correlation was significantly different from zero [32]. In addition, we also looked out for very high correlations. There was no case of a very high correlation between the items with more than 0.9. Therefore, examining the Pearson correlation values revealed fairly high correlations between all the 20 indicator variables written to identify the CSFs of benchmarking implementation within the SME clusters.

Although the determinant of the correlation matrix (R–Matrix) was not significantly different from zero (|R| = 8.48E-010), the Haitovsky test of singularity (Field, 2009) was not significant, either:

$$Haitovsky's\ H = \left[1 + \frac{(2p+5)}{6} - N\right] \ln(1 - |R|) \qquad (1)$$

p : The number of variables in the correlation matrix

N: The total sample sizes

$|R|$: The determinant of the correlation matrix

ln : The natural logarithm

Haitovsky’s significance test provides a way for determining whether the determinant of the matrix is zero. It was calculated as 1.208E-7. This test static has p(p-1)/2 degrees of freedom, equal to 190. Regarding the DF = 190, the critical values were 124.34 (DF = 100) and 233.99 (DF = 200), and in both cases, the observed chi-square was much smaller than those indicating non–significance. Therefore, we have contradictory evidence about whether or not multi-collinearity is a problem for these data. However, we need not worry about the multi-collinearity because we perform the principal component analysis [31].

4.2.2. Reliability

According to the SPSS analysis results, Cronbach's α value of the overall model was excellent (α = 0.945). Hence, the items were all reliable, meaning that the real test was consistent internally [33]. Furthermore, if an item was deleted, the Cronbach's Alpha indicated that none of the items here would increase the reliability if they were deleted. Therefore all 20 items describing the CSFs of the LCB should be retained. Later, there was a need to run separate reliability analyses for all the subscales of the CSFs.

4.2.3. Validity

A preliminary factor analysis was conducted to identify the relevant subscales, and the point to notice is that five factors were extracted. These factors can be enlisted as "communications" (com1, com2, com3, com4, com5), "employees" (emp1, emp2, emp3, emp4), "management" (man1, man2, man3, man4), "processes" (pro1, pro2, pro3, pro4), and "government" (gov1, gov2, gov3). Since the entire factor loadings were more than 0.774, the convergent validity is claimed to be supported accordingly.

4.3. Exploratory Factor Analysis (EFA)

Before conducting the EFA, the requirements were all assessed. Our variables for the factor analysis were measured at an ordinal level on a five-point Likert scale. The factor analysis was executed through three steps, including (1) Measuring the data appropriateness by computing the correlation matrix for every variable; (2) Factor extraction and (3) Rotation of the extracted factors to a terminal solution [33,34].

4.3.1. Factor extraction

The factor analysis was run to understand the 20 variables' structure better. Then, exploring the descriptive statistics for each variable revealed that the mean scores were higher than 3, implying that all proposed CSFs were important. Furthermore, fairly small standard deviations, relative to the values of the means, indicated that the data points were close to the mean.

The calculated value of KMO was 0.895, confirming the adequacy of the sample size. Moreover, all KMO values for individual items were more than 0.824, indicating that they were properly above the acceptable limit of 0.5 [31].

The results of Bartlett's test of Sphericity (χ^2_{231}= 2976.59, DF = 190, $p = 0.000$) indicated that correlations between the items were sufficiently large for the principal component analysis (PCA). Thus, the correlation matrix was not an identity matrix.

Next, the factor analysis was conducted using the principal component analysis on the 20 items with orthogonal rotation, the Varimax method. Table 4 contains the number of common factors which were computed. It also presents the eigenvalues concomitant with the mentioned factors; furthermore, Table 4 exhibits the total variance percentage that has been gotten for each factor and presents the cumulative percentage of total variance accounted for by the factors. A total of five components had eigenvalues over 1 and, in combination, explained 83.702% of the variance [31,33,34].

Table 4. Total Variance Explained

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	9.794	48.969	48.969	9.794	48.969	48.969	4.180	20.901	20.901
2	2.439	12.197	61.166	2.439	12.197	61.166	3.481	17.403	38.304
3	1.954	9.772	70.938	1.954	9.772	70.938	3.285	16.424	54.728

4	1.42 4	7.122	78.060	1.42 4	7.122	78.060	3.19 2	15.958	70.686
5	1.12 8	5.642	83.702	1.12 8	5.642	83.702	2.60 3	13.016	83.702
6	.466	2.332	86.033						
7	.365	1.823	87.856						
8	.359	1.796	89.652						
9	.312	1.560	91.212						
10	.262	1.312	92.524						
11	.232	1.160	93.684						
12	.222	1.110	94.794						
13	.205	1.026	95.820						
14	.183	.915	96.735						
15	.163	.814	97.549						
16	.142	.712	98.262						
17	.119	.593	98.854						
18	.090	.449	99.304						
19	.081	.403	99.707						
20	.059	.293	100.000						
Extraction Method: Principal Component Analysis.									

Furthermore, by graphing the eigenvalues, Figure 2, the relative importance of each factor becomes more apparent. As shown in Figure 6.7, the inflexion point occurred at the sixth data point, confirming that five factors could be extracted.

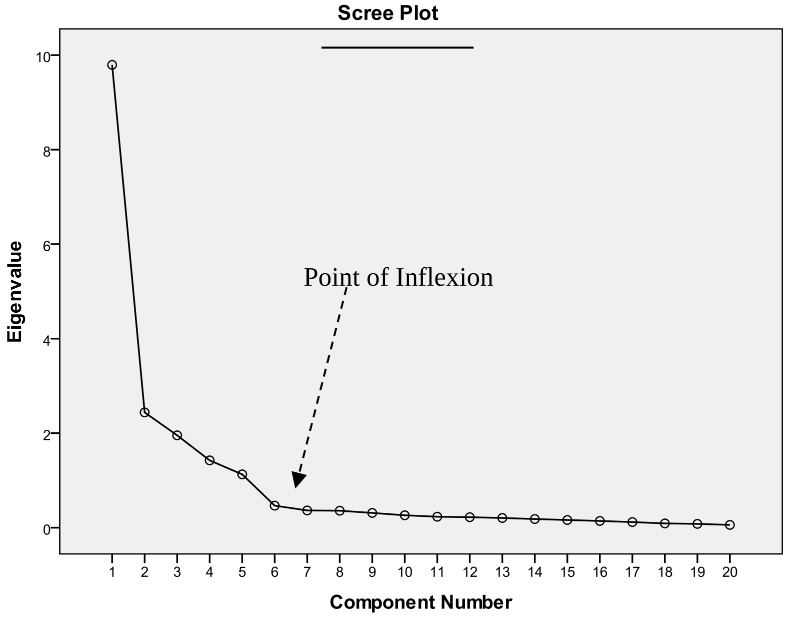

Figure 2. The Scree Plot – CSFs of benchmarking

Therefore, according to eigenvalues and the scree plot, a total of five factors were extracted. Conducting separate reliability analyses for every factor indicated that “communications”, “employees”, “management”, “processes”, and the “government” all had high reliabilities (respectively, the Cronbach’s α = 0.942, 0.926, 0.954, 0.907, and 0.931).

The Component Matrix revealed the un-rotated component analysis factor matrix. The table illuminates the correlations linking the intended variables to the five extracted factors. Still, most of the variables loaded highly onto the first factor while significant cross-loadings were also obtained because the factors were un-rotated. For instance, variable "com5" was highly loaded on Factors 1 and 2. The rotation must improve factors' interpretability and attain a simpler but theoretically more meaningful factor pattern.

4.3.2. Rotation

The five factors obtained after Varimax rotation are displayed by the Rotated Component Matrix, as in Table 5. Interpretability of the factors was improved through rotation. Table 5 displays that all 20 variables were loaded highly onto only one factor out of the five factors representing the CSFs of benchmarking.

Table 5. Rotated Component Matrix

	Component				
	1	2	3	4	5
com1	.808				
com2	.854				
com3	.883				
com4	.857				
com5	.876				
emp1			.831		
emp2			.854		
emp3			.781		
emp4			.815		
man1		.806			
man2		.882			
man3		.809			
man4		.869			
pro1				.809	
pro2				.792	
pro3				.841	
pro4				.774	
gov1					.857
gov2					.820
gov3		.334			.846

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.

Reviewing Table 5 revealed that one variable (gov3) was cross-loaded across Factor 2 and Factor 5. However, the factor loading value for variable "gov3" across Factor 5 was much greater than that across Factor 2 (0.846 versus 0.334). The cross-loaded variable of "gov3" was observed to be conceptually related more to Factor 5 (the "Government") than being related to Factor 2 (the "Employees"). Consequently, this variable was retained to represent Factor 5 [33].

In a nutshell, the conclusion drawn is that factor analysis recognized five factors including “communications” (com1, com2, com3, com4, com5), “employees” (emp1, emp2, emp3, emp4), “management” (man1, man2, man3, man4), “processes” (pro1, pro2, pro3, pro4), and “government” (gov1, gov2, gov3). Generally speaking, the mentioned factors were denoted by specific statements inscribed to indicate the CSFs of LCB implementation within the clustered SMEs.

4.4. STRUCTURAL EQUATION MODELLING (SEM)

The SEM process involves two main steps: while the first step is to validate the measurement model, the second one deals with fitting the structural model [35]. In this context, the first step can be principally fulfilled via the confirmatory factor analysis; on the other hand, the second step can be executed via the path analysis with latent variables.

4.4.1. Measurement Model: The 1st Order CFA for CSFs

The measurement model for CSFs is schematically portrayed in Figure 3. The model was proved to be fit acceptably with the value of CMIN/DF = 1.727 (X2 = 276.266 with DF = 160, and p = 0.000) which was less than 2. Likewise, values of TLI = 0.953, CFI = 0.960, RMR = 0.034, and RMSEA = 0.070 are within the recommended fit values. The fit indices greatly resemble the indices attained under the original model.

Factor loadings which varied from 0.81 to 0.97, did remain significant statistically once the Critical Ratio test was done ($p < 0.001$). The Confidence Level was assumed at .05.

Therefore, it can be concluded that convergent validity was achieved for this measurement model. Besides, the correlation between the CSFs varied from the lowermost value of r = 0.414 (between "Communications" and "Government") to the highest value of r = 0.622 (between "Employees" and "Processes"). Hence, the CSFs' constructs were discriminant between one another.

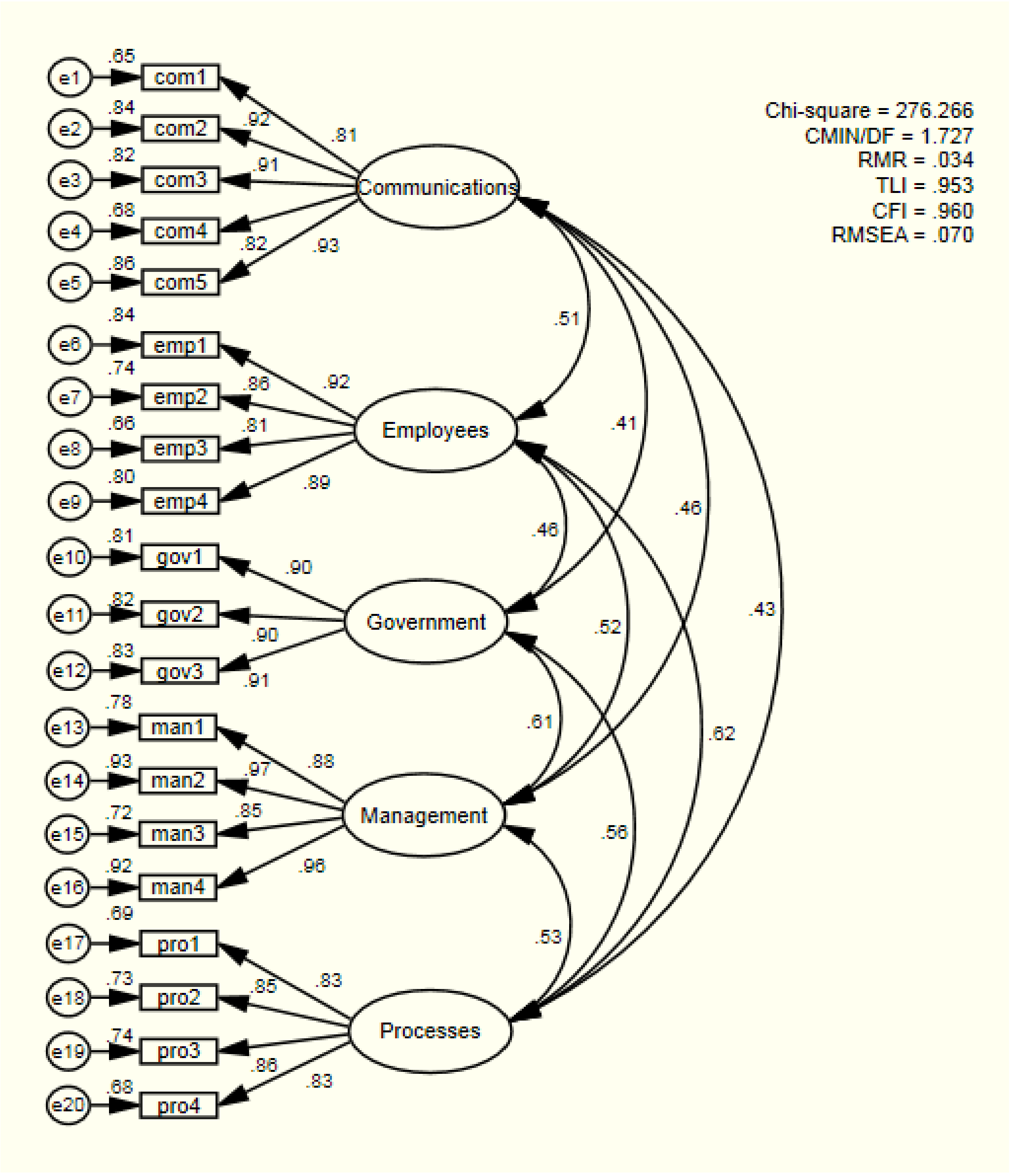

Figure 3. The 1st Order CFA for CSFs

Examination of the Modification Indices revealed that the fit of the measurement model could be significantly enhanced by allowing some error terms to correlate. Goodness-of-fit statistics related to the Modified Measurement Model revealed a statistically significant improvement in the model fit ($\chi2 = 573.843$ with DF = 354, and $p < 0.001$; $\Delta\chi2 = 121.933$), and substantial differences in the CMIN/DF (1.621 versus 1.938), TLI (0.945 versus 0.917), CFI (0.952 versus 0.926), RMR (0.036 versus 0.037), and RMSEA (0.064 versus 0.079) values.

Compared to the original model, the Parsimony Normed Fit Index (PNFI) proved that the modified model indicated a significantly better fit to the data.

4.4.2. The Structural Model Analysis

Analysis of the results indicated that the structural model for the CSFs of benchmarking was a reasonably good-fitting model with fitness values of TLI = 0.947 CFI = 0.954, which exceeded 0.9. Moreover, the value of RMR was 0.036 and RMSEA = 0.063, which indicated an acceptable fit. Furthermore, the value of CMIN/DF was 1.596 (X2 = 563.238 with DF = 353, and p = 0.000) which was less than the suggested value of 2.0. In light of the excellent fit of this model, together with these nonthreatening MIs, it can be claimed that no rational need is sensed for incorporating additional parameters into the model.

Table 6 includes the Standardized Regression Weights (Estimate) along with the Standard Errors (S.E.) and the multivariate kurtosis' critical ratio (C.R.) and the p-values. Therefore, just 11 per cent of the variation in the model was left baffling for the hypothesized model; on the other hand, the joint influence of the CSFs accounted for 89% of the variance.

Table 6. The Standardized Regression Weights (Estimate), the Standard Errors (S.E.), the multivariate kurtosis' critical ratio (C.R.)

			Estimate	**S.E.**	**C.R.**	**p-value**
Communications	→	Benchmarking	.235	.069	3.584	***
Employees	→	Benchmarking	.206	.069	2.697	.007
Government	→	Benchmarking	.236	.063	3.191	.001
Management	→	Benchmarking	.250	.062	3.363	***
Processes	→	Benchmarking	.284	.077	3.486	***

Since the standardized paths should be at least 0.20 to be considered meaningful for discussion. we also looked at paths among the variables [36]. In this hypothesized model, the path coefficients could be interpreted as comparably as the regression coefficients, explaining the linear relationship between two latent variables [37]. All the five coefficients were significant once the critical ratio test was > ±1.96, p-values < .05.

The standardized path coefficient of 0.235 indicated that the item of "Communication" was positively associated with benchmarking (H1). Also, the standardized path coefficient of 0.206 suggested that the item of "Employees" was also positively associated with benchmarking (H2). Besides, the standardized path coefficient of 0.236 indicated that the item of "Management" was positively associated with benchmarking (H3). The standardized path coefficient of 0.250 implied that the item "Processes" was also positively associated with benchmarking (H4). Moreover, the standardized path coefficient of 0.284 demonstrated that "Government" was positively associated with benchmarking (H5).

4.3. Bootstrapping Analysis

By applying the bootstrap procedure, we requested the AMOS perform a bootstrap on 140 samples using the ML estimator and provide "bias-corrected confidence intervals" for each parameter bootstrap estimate; it needs to be done noted that the default is 90% level. Referring to the p-values, all were less than 0.1; we would reject the hypothesis that the estimates were zero in the population, using a two-sided test with a significance level of 0.1. Therefore, based on the bootstrapping results, it can be concluded that although the data was multivariate non-normal, all the estimated values were still significant at a 90% confidence interval.

5. Conclusion

The urge to strengthen the SMEs' effectiveness and efficiency has led to developing a practical model for their sustained improvement. This study of benchmarking methodology is motivated by its increased practitioner use as a continuous improvement tool. The study attempts to increase the knowledge of the quality management theory, particularly on benchmarking methodology in industrial clusters. It aims at determining the critical factors influencing the success of benchmarking implementation, particularly within SME clusters. It is hoped that the study results will also yield significant contributions towards developing benchmarking theory, its methodology and applications.

By thoroughly regarding the findings through the relevant literature review, no such study and survey to date have been conducted regarding Iranian industrial clusters. Thus, this study provides a direction for research in benchmarking in clustered SMEs in Iran.

In essence, the major contribution of this study is that it is a pioneering attempt to investigate the CSFs of benchmarking implementation within clustered SMEs. In order to better understand the reasons why some organizations utilize benchmarking to learn best practices and improve their performance and efficiency, it is essential to analyze various factors which can influence the success of benchmarking and identify how they can do so. It has been mentioned earlier that while most of the existing studies on benchmarking have ignored the theoretical perspective, they have been more inclined to underline the methodological aspects and development of the tools. Regarding the characteristics of clustered SMEs in developing countries, the current study focuses on developing benchmarking CSFs. Such a perspective is consistent with the vision of the Sixth Socio-Economic Development Plan of the Islamic Republic of Iran (2017-2022), which aims to develop SMEs and promote clusters for long-term sustainable growth. This study provides a document and guideline on benchmarking for the policymakers and administrators, especially in Iran and similar developing and newly industrialized countries. The detailed CSFs will provide ideas on what needs to be focused on to achieve continuous improvement.

The current research is conducted for industrial metal parts manufacturers, mostly engaged in producing automobile spare parts. The results could be generalized to the other industrial sectors, but this should be done only after considering the size of the member organizations, the characteristics of the supply chain issues, management procedures, and relevant required infrastructure. The results could also be generalized for other developing and newly industrialized countries after studying the extent and characteristics of the similarities that exist between the government policies, economic policies, social status, goals, business cycles, and cultural aspects. This study does not apply to individual organizations unless they act in a network with similar infrastructure such as benchmarking clubs or create an extended network enterprise. This study is conducted from the perspective of SMEs. Thus, some of the identified factors might not be relevant to large organizations.

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