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HOW DO TQM PRACTICES AFFECT EMPLOYEE EFFECTIVENESS IN TUNISIAN SMES?

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A B S T R A C T

Total Quality Management (TQM) is a key strategy used by human resources to maintain a competitive advantage. Indeed, TQM is essentially based on the strategy and culture of the company as well as on the maturity and awareness of the managers. Therefore, TQM has a strong relationship with Employee Effectivenessto ensure the improvement of all company performance.Thus, the purpose of this study is to show the nature of the relationship between TQM and employee effectiveness and to judge whether TQM affects employee effectiveness or not.In this context, we have used the survey method to study the behavior of Tunisian companies. 206 responses were collected and analyzed using the software "SPSS". Then, structural equation modeling was used to validate the work's hypotheses.The obtained results show that TQM has a positive impact on employee effectiveness and that all TQM practices affect positively employee effectiveness.

1. INTRODUCTION

Total Quality Management (TQM) is a management philosophy that focuses on the continuous improvement of products, services, and processes to meet or exceed customer expectations (Banuro et al., 2017; Marchiori & Mendes, 2020). It encourages employees to take ownership of their work and to participate in continuous improvement efforts. This can lead to increased job satisfaction, motivation, and engagement, which in turn can lead to higher levels of productivity and performance.

TQM also emphasizes the importance of training and development, which can help employees acquire new skills and knowledge and improve their effectiveness on the job. By investing in employee development, organizations can create a culture of continuous learning and improvement.

Another key aspect of TQM is teamwork and collaboration. By working together to identify and solve problems, employees can build stronger relationships and improve communication and coordination. This can lead to a more efficient and effective workplace, as well as higher levels of job satisfaction and engagement.

In this context, TQM start to be adopted in Tunisia, especially in manufacturing companies, as a means of enhancing efficiency and competitiveness. However, there can be a problem between employee effectiveness and TQM implementation in Tunisia. This is because some employees may resist the changes that come with TQM implementation. They may feel threatened by the changes or may not understand the need for them, leading to a lack of commitment to TQM initiatives. Another issue is the lack of effective communication and training on TQM principles and methods, which can make it difficult for employees to understand their role in the implementation process. In addition, there may be cultural barriers that need to be addressed to

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successfully implement TQM in Tunisia, such as a reluctance to question authority or challenge established ways of doing things.

Companies that seek to enhance their chances of survival have implemented TQM practices, which prioritize quality and continuous improvement as part of their strategic objectives. These practices involve utilizing management concepts and tools to engage both managers and employees in the pursuit of ongoing performance enhancement. Success factors and TQM practices have been identified by numerous authors (Alawag et al., 2023; Hchaichi, 2023). Lehyani et al. (2018) have identified the six most crucial TQM practices in scientific literature which are: leadership, customer focus, Human Resources Management (HRM), process management, information analysis, and continuous improvement.

In this framework, Lehyani et al. (2022) have studied the application of TQM practices in Tunisia. The results indicate that over 90% of SMEs in the "Petrochemical," "Manufacturing," "Agri-food," and "Textile" sectors apply TQM, while only SMEs in the "Construction" sector apply TQM at a rate between 80 and 90%. Furthermore, between 70 and 80% of SMEs in the "Electric & Electronic," "Telecommunication," "Automotive," and "Service" sectors responded positively to the application of TQM. SMEs in the "Transportation & Distribution" and "Materials" fields responded equally with 66.7%, while those in the "Training" and "Healthcare" sectors had an equal rate of 50%. Furthermore, in the first category, all TQMP practices, except "Information analysis", are frequently applied in more than 70% of cases in the "Materials" and "Agri-food" sectors. In the "Training" field, only "Leadership" has a 66.67% application rate. Similarly, in the "Textile" sector, only "Customer focus" and "HRM" have a 66.67% application rate. Among the industrial domains, the "Telecommunication" sector had the highest rate of TQMP application, with three practices applied commonly in more than 70% of cases, and two practices, "Customer focus" and "Process management," applied in 62.5% of cases.

Based on related works such as (Israfilov et al., 2020; Rombaut & Guerry, 2020; Enenifa & Akintokunbo, 2020). The employee effectiveness practices are: employee expertise, continuous employee learning, employee involvement & commitment, integration/ interaction with employees, employee performance, use of technological resources.

The impact of TQM on employee effectiveness has been widely studied in many countries. In this vein, Khan et al. (2019) have found that TQM practices positively influenced employee job satisfaction, which in turn positively influenced employee creativity and proactive behaviors. In addition, Ali et al. (2020) have claimed that TQM practices positively influenced employee job satisfaction, organizational commitment, and employee performance. Moreover, Ababneh (2021) has affirmed that TQM practices positively influenced employee job satisfaction and employee engagement, which in turn positively influenced employee performance. Also, Galeazzo et al. (2021) have argued that TQM practices positively influenced employee job satisfaction, employee commitment, and employee performance, and that employee involvement in TQM activities was a significant mediator in these relationships. Regarding healthcare field, Dagasan et al.(2023)pointed out that TQM principles produce different performance outcomes like the job performance of employees. Furthermore, Lehyani et al.(2023) studied the impact of knowledge management and TQM impact on employee effectiveness in Emerging Industries in the case of Tunisian Small and Medium enterprises(SMEs) and they confirmed that there is a positive and significant relation between TQM practices application and employee effectiveness determinents.

In summary, it is remarkable that TQM and staff effectiveness have mutual relationships based on the intersection of their practices. Hence, the aim of this research is to answer the following question: is there an impact between TQM and employee effectiveness in Tunisian companies?

In this circumstance, the aim of this study is to investigate the feasibility of implementing TQM practices in small and medium-sized Tunisian enterprises, and to determine their impact on the effectiveness of employees. To achieve this objective, the survey method was employed and the data gathered were analyzed using SPSS software. Then, the Principal Component Analysis (PCA) method was used and the hypotheses of the model were validated by applying the SEM method.Thus, the significance of this research lies in its examination of the relevance of TQM practices in the context of Tunisian SMEs and their potential effects on employee effectiveness.

2. RESEARCH METHODOLOGY

2.1 Data collection method and Measurement instrument

This work is based on a survey designed to study TQM's impact on staff effectiveness in Tunisian SMEs. The survey was divided into two sections. Section 1 contains questions related to the descriptive details of enterprises. Section 2 consists of open-ended questions that respondents can answer using a Likert scale ranging from 1 to 5, from very low impact to very high impact.

The survey was distributed in two ways: direct contact with 125 companies and sending emails to approximately 3000 companies from several fields. With this strategy, the percentage of responses obtained by direct contact is around 80%, and by sending emails is about 3.5%. Hence, the total number of obtained responses was 206. However, questionnaire validation was carried out by academic and non-academic experts who checked the nature of the questions, their understanding, consistency, etc. The instrument had a Cronbach’s Alpha of 0.986, which is considered reliable

(Azizi et al., 2016). Indeed, survey questions were coded to be processed by "SPSS" software version 24.

2.2 Reliability

For Gandhare et al. (2018), reliability analysis is a correlation-based procedure estimated using the Chronbach Alpha "α" reliability coefficient. This coefficient varies between 0.00 and 1.00 and its generally acceptable minimum value is 0.7. Similarly, Katiyar et al. (2018) assert that the acceptable reliability of the indicators must exceed the recommended threshold of 0.70. However, Zaied et al. (2012) states that if the test shows that the α value is equal to or greater than 0.80, this means that the collected data are consistent.

2.3 Validity

Convergent Validity is assessed using Item Loading, Composite Reliability (CR), and Average Variance Extracted (AVE). To accept convergent validity, the values of all these measurements must be greater than 0.5. In contrast, Lu et al. (2019) argue that the CR and AVE are adopted to measure convergent validity and that the CR must be greater than 0.7 and the AVE must be greater than 0.5. However, the discriminant validity specifies to what extent a given construction is different from all other constructions of the same measurement model. It can be examined by comparing values with the diagonal square root of the AVE with correlations between reflective constructions (Katiyar et al., 2018).

2.4 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) is performed using the maximum probability of rotation "Varimax" to verify that validity and reliability criteria of variables are satisfactory and correlated (Singh et al., 2018). According to Qasrawi et al. (2017), for the AFE to be carried out, the data must satisfy the following conditions: 1) Kaiser-Meyer-Olkin (KMO) measurement must be greater than 0.5. 2) the eigenvalue of each factor must be at least 1. 3) a minimum load factor of 0.40 for the preservation of each element must be achieved. For our empirical study, we chose the PCA method to verify the validity of the factor adjustment test since it provides the correlation between the factors with the unique variance of the elements.

2.5 Confirmatory Factor Analysis

For the model to be accepted and sampling to be adequate, KMO must be greater than 0.6 (Singh et al., 2018). However, Bartlett's sphericity test is significant if p=0.00 (i.e. the null hypothesis of the correlation matrix being an identity matrix must be rejected). In this case, the sample can reduce the factors and is suitable for factor analysis (Qasrawi et al., 2017).

After the exploratory analyses are performed, Confirmatory Factor Analyses (CFA) are used to define and represent one or more hypothetical models of factor structure. Each suggests a set of unobserved variables to account for covariance in a set of observed variables (Zhang & Min, 2022). Depending on Dissanayake and Cross (2018), Structural Equation Modeling (SEM) follows certain hypotheses of statistical distribution, since it is assumed that the observations are independent of each other and that the exogenous variables have a multivariate normal distribution. Indeed, several adjustment indices are considered to judge the adequacy of the model. In our case, our model was assessed by examining the goodness-of-fit statistics indices: ratio of $\chi 2$ to degree of freedom, Root Mean Square Error of Approximation (RMSEA), Parsimony Goodness of Fit Index (PGFI), Akaike's Information Criterion (CAIC), Parsimony Normed Fit Index (PNFI), and Comparative Fit Index (CFI).

2.6 Structural Equation Modeling

In order to test the causal links between KM elements, TQM factors, personnel effectiveness practices and SCP dimensions, we applied the SEM. This method is a methodological approach that tests complex causality models incorporating latent variables. The set of causal relationships between latent, dependent and independent variables of our model compose our study hypotheses. The method application will be developed by the software AMOS 24 and the method that will be used for the data estimation is the Maximum Likelihood (ML) method.

3. RESULTS AND DISCUSSIONS

3.1 Sample demographics

A summary of the participating companies and respondents is presented in Table 1.

Table 1. Summary of participated companies and respondents

Relevant Dimension	Profiles in percentages	Relevant Dimension	Profiles in percentages
Localisation	37.4% Sfax	**Activity field**	18.9% Service
	17% Tunis		5.8% Petro-chemical industry
	7.3% Nabeul		6.8% Electric & Electronic
	4.4% Ariana		2.9% Training
	4.9% Ben arous		1.9% Health
	4.9% Sousse		7.8% Construction
	4.4% Mahdia		5.8% Transport & distribution
	3.4% Bizerte		17% Agri-Food

	3.4% Monastir		5.3% Automotive
	2.9% Gabes		13.6% Manufacturing
	2.4% Medenine		5.8% Textile
	2.4% Zaghouan		4.4% Materials
	1% Beja		3.9% Telecommunication
	1% Jendouba	**Number of employees**	15.5% less than 9
	0.5% Gafsa		25.7% between 10 and 49
	0.5% Kairouan		26.7% between 50 and 249
	1.5% Manouba		32% More than 250
	0.5% Sidi bouzid	**Respondent function**	24.8% Quality Manager
	0.5% Tataouine		17.5% Human Resources Manager
Certification	51.5% QMS		16% Logistics Manager
	16.8% EMS		6.8% Production Responsible
	9.9% OHSMS		4.4% Purchasing & Supply Manager
	5% FSMS		6.8% Sales & Marketing Manager
	3% SMS		7.3% Technical Manager
	2% Others		2.9% Financial Officer
	9.9% Not certified		3.4% Administrative Officer
	2% In progress		10.2% General Manager

3.2 Exploratory Factor Analysis results

The measurement of KMO and Bartlett sphericity results show that they are well accepted in our analysis, see table 2. Therefore, it can be concluded that the data show a suitability and homogeneity conducive to PCA application.

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	1443.009
	df	66
	Sig.	.000

Based on the results presented in table 3, two factors have been selected, with an eigenvalue greater than 1. These factors provide a cumulative percent variance of 64.78%. The 1st factor provides 51.93% of the total variance and the 2nd factor brings 12.84%. This allowed us to conclude that the mass of information retained by these two factors is quite significant. Then, we calculated the correlations between these factors, the retained measurement variables, the corresponding standardized factor loadings, and t values resulting from testing the items' coefficients in CFA, see table 3.

3.3 Tests for reliability and validity of the constructs

Cronbach's alpha was used to measure the reliability of the multi-item scale to assess internal consistency. Also, it was used to ensure that the scale items are free of measurement errors and that they quantify the corresponding latent variables (Masa'deh et al., 2019). However, structural reliability will not increase significantly if elements are removed from the analysis.

Table 5 exposes descriptive statistics, Cronbach's alpha values, and variables Pearson correlations in our research model. In this regard, it is noted that the reliability analysis of TQM practices was 0.884 and the reliability analysis of employee efficiency practices was 0.896. According to Wang et al. (2019), if the alpha values of all variables exceed the threshold of 0.70, we can conclude that this is an excellent reliability, which is the case for our work.

3.4 Test results of the structural model

The results for the adjustment of the structural model are shown in Table 3. Based on these results, we can conclude that the index values are acceptable and satisfactory and that our structural model shows a good quality of adjustment.

Table 3. Results of structural model

Goodness-of fit statistics	Structural model	Recommended values
χ^2/df	2.798	<3
Root mean square error of approximation (RMSEA)	0.094	<0.08
Parsimony goodness-of-fit index (PGFI)	0.612	>0.5
Parsimony normed fit index (PNFI)	0.722	>0.5
Comparative fit index (CFI)	0.933	>0.9
Goodness of Fit Index (GFI)	0.900	>0,8
Adjusted Goodness of Fit Index (AGFI)	0.853	>0,8
Root-mean-square residual (RMR)	0.034	≤0.05

According to Zhang & Min (2022), to support a tested hypothesis, it is necessary to examine the Coefficient Ratio (CR) which should be greater than 1.96. Also, the probability of release of H0 must be less than 0.05 ($p \leq 0.05$). Table 4 presents the path models estimating, direct and indirect effects of TQM practices on employee effectiveness from the structural model. It shows that the model not needs modification to be used for the further analysis and that all the relationships have significant regression weight.

Table 4. Rotated factor matrix of the TQM practices and employee effectiveness

	Measure/construct	Factor loadings		Eigenvalue	Percentage variance explained by factor	Percentage total variance explained	t-value
		Component 1	Component 2				
Employee Effectiveness	Employee expertise	-	.793	6.23	51.93	51.93	62.558
	Continuous employee learning	-	.792				58.303
	Employee involvement & commitment	-	.786				61.213
	Integration/ interaction with employees	-	.779				56.017
	Employee performance	-	.775				61.847
	Use of technological resources	-	.678				60.484
TQM practices	Leadership	.795	-	1.54	12.84	64.78	61.133
	Customer focus	.785	-				57.299
	HRM	.782	-				57.111
	Process management	.755	-				57.278
	Information management	.741	-				57.729
	Continuous improvement	.661	-				60.719

Table 5. Descriptive statistics, Cronbach's alpha, and bivariate correlations for the variables in the research model*

Measure/ construct	1	2	3	4	5	6	7	8	9	10	11	12	Mean	S.D	Alpha value
EE1	1.000												3.68	.845	0.896
EE2	.657	1.000											3.51	.865	
EE3	.575	.630	1.000										3.58	.839	
EE4	.545	.601	.636	1.000									3.58	.917	
EE5	.418	.639	.600	.639	1.000								3.57	.828	
EE6	.484	.556	.609	.577	.667	1.000							3.52	.836	
TQM1	.377	.378	.428	.351	.399	.360	1.000						3.84	.903	0.884
TQM2	.286	.367	.307	.281	.333	.308	.517	1.000					3.73	.934	
TQM3	.407	.379	.430	.416	.433	.321	.590	.525	1.000				3.74	.941	
TQM4	.394	.462	.411	.404	.419	.363	.471	.520	.637	1.000			3.74	.937	
TQM5	.444	.428	.522	.461	.394	.327	.563	.369	.641	.620	1.000		3.77	.938	
TQM6	.424	.439	.445	.367	.393	.380	.604	.392	.557	.698	.677	1.000	3.95	.933	

***** N =206. all correlations are significant at the P<0.001

Table 6. Results of the structural model

			Estimate	S.E	C.R	P	Direct effects	Indirect effects
TQM	<---	EE	.863	.110	7.868	***	.863	-
EE	<---	TQM1	.856	.079	10.872	***	.856	.739
EE	<---	TQM2	.728	.085	8.597	***	.728	.628
EE	<---	TQM3	.975	.080	12.178	***	.975	.842
EE	<---	TQM4	.996	.079	12.579	***	.996	.860
EE	<---	TQM5	.994	.079	12.524	***	.994	.858
EE	<---	TQM6	1.000	-	-	***	1.000	.863

Note. * $p < 0.01$; ** $p < 0.001$

Results of the structural model is presented on Figure 6.

4. DISCUSSION AND STUDY IMPLICATIONS

4.1 **Managerial implications**

The proposed model can serve as a valuable tool and strategic plan for managers, allowing them to understand the connections between TQM practices and staff effectiveness. However, the model is not set in stone and can be customized to suit the specific needs of the organization. By utilizing the results obtained from our study, managers can accurately gauge the impact of TQM practices on staff effectiveness and make informed decisions to enhance employee productivity. Furthermore, establishing positive relationships between staff effectiveness and TQM practices can motivate leaders to prioritize the well-being of their employees by fostering a positive work environment and encouraging their active participation in decision-making processes. Ultimately, the commitment of managers to implementing TQM practices and promoting employee effectiveness can directly influence overall employee performance.

4.2 **Research limitations**

Although our study produced noteworthy results, it is important to acknowledge the limitations that need to be addressed in future research. One of the limitations is the difficulty in obtaining cooperation from industrial managers, which may have influenced the sample size. Furthermore, the number of companies that participated in the study was limited. Additionally, although we collected data from various industrial sectors, we did not perform a sector-specific analysis as the sample size was not representative of most industries. Addressing these limitations could help provide a more comprehensive understanding of the relationship between TQM practices and staff effectiveness in different industries.

4.3 **Implications for future research**

We have identified several potential research directions based on the findings of our study. First, we suggest the use of alternative data collection methods such as direct access to company data to overcome the challenges of confidentiality and to enable the identification and analysis of barriers to TQM implementation in Tunisian companies. This would also allow for an investigation of the reasons behind the application of some TQM elements and staff effectiveness practices while neglecting others. Additionally, we propose conducting a comparative study by disseminating the survey to companies in other developed and/or developing countries. This could provide valuable insights into how TQM practices and staff effectiveness differ across countries and industries. Overall, these research directions could contribute to a deeper understanding of how TQM practices can be effectively implemented and the factors that contribute to staff effectiveness.

5. CONCLUSION

In this study, the primary objective was to examine the impact of TQM practices on staff effectiveness in Tunisian companies. The results indicate that TQM practices have a positive effect on staff effectiveness, particularly in the areas of leadership, customer focus, human resources management, process management, information analysis, and continuous improvement. The findings suggest that companies that prioritize effective management approaches are more likely to attain higher levels of employee effectiveness. This can be achieved through evidence-based decision-making, quality programs, and training, as well as creating a motivating and balanced work environment, among other strategies. Based on the findings, it is recommended that managers in Tunisian companies lead by example by sharing their knowledge and experiences with their employees and by adhering to all quality procedures and guidelines established by the company. It is also important for managers to not only focus on what they are paying their employees, but also on what benefits they can provide to them.

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