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Research article

The relationship between ISO certification and companies performance: Case of Certified Tunisian Companies

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Abstract
Many authors and researchers spoke about ISO certification and its effect on organizational performance. The choice of our theme is based on the fact that leaders are concerned with the requirements of implementation quality management system to obtain the certificate without taking into account its value. But a review of the literature revealed that continued growth in the number of certified organizations in the world show that the impacts of these certificates remain controversial. The aim of this paper is to know how certification can allow an organization to achieve performance and under what conditions. Thus, a first part is devoted to the review of academic studies that have sought to understand the link between certification and companies performance. Then a second part presents the results of an empirical study of 50 certified companies and 102 non-certified companies about sectors and sizes representative of industrial companies in Tunisia. It appears, in the comparison of theoretical and empirical results, a consistency as to the contingent character of certification and its impact on companies performance.
Keywords: ISO, Quality, Performance, Certification.

1. Introduction

A large number of companies around the world are engaged in a certification process to deepen and advance in their efforts to improve competitiveness and performance. Indeed, the certification consists to ensure that the organisation strives to develop and maintain a quality system increasing its own competitiveness and enabling it to achieve the required quality of product and service. If we retain that a main goals of companies is performance and indirectly results, ISO 9000 can meet expectations. Since one of the characteristics of ISO 9000 is to act on horizontal exchanges and thus facilitate the link with internal communication and the transversal approach process. The standards show the company like a processes vision, connected and communicating. The measurement of customer satisfaction, continuous improvement, the increased attention on available resources, the measurement process system, product and service, the data analysis collected for performance of quality management system and the involvement of senior management are also new requirements. Following this description quoted above, a conclusion worthy of note. Indeed, the results of work on performance and ISO certification are contradictory and make the link between ISO certification and performance is unclear. It therefore seemed useful and interesting to engage in research work around the theme of evaluation and performance steering in Tunisia context and in response to a main question that is refer to the object of our problematic namely: How can certification allow an organization to achieve performance and under what conditions?

Thus, our study is based on investigation sample of 50 Tunisian companies which certified ISO and 102

non-certified companies from industrial sector. So, the choice of this sector is not arbitrary. In Tunisia, 68% of certified companies are part of industrial sector and they have joined the national program of quality (INNORPI, 2009)1. This program aims to promote quality in Tunisian companies by certifying their quality management system. Moreover, faced economic changes and new competitive environment, companies certified in Tunisia are expected to improve their productivity through the adoption of modern fashion waves, more flexible and efficient to meet the challenge of competitiveness. In our opinion the ISO certification could provide that. Our work is divided into two parts. The first part, it is remains to design the research methodology to provide an answer to our question. Then a second part presents the results of an empirical study of 50 certified companies and 102 non-certified companies about sizes representative of industrial companies in Tunisia. It appears, in the comparison of theoretical and empirical results, a consistency as to the contingent character of certification and its impact on companies performance.

1. ISO certification and business performance: A literature review

1.1 Purpose of the literature review

Since several years, quality has taken an important dimension in organizations. Many companies are engaged in a quality approach in seeking to improve the quality of their products and services. This recourse to the quality is justified by the following objectives: customer satisfaction, employee satisfaction, community satisfaction, shareholder satisfaction, etc. The satisfaction of the stakeholders puts the company in a leading position compared to competitors. Moreover, the managers believe strongly in a positive correlation between certification and the economic performance of the company. However, there are many researches on evaluation and performance steering, but there are a lot less on the performance evaluation in logic of ISO certification. Still, researches addressing this issue, that is to say the investigations carried out in the management literature, could not reach a unique conclusion (observation) on the nature of the relationship. The literature shows that this relationship is unclear and that the empirical results are contradictory. A review of the literature in this area will be deployed in order to show readings to disagree views to the relation Performance-Certification.

1.2 The development of ISO certification concept

The rapid growth in the number of organizations certified ISO 9000, which grew to more than 120 000 in 2006 alone, seems a priori confirm the relevance and the positive impact of this standard (International Organization for Standardization, 2007). In fact, ISO 9000 depends first and foremost on systematic recommendations to better meet customer requirements, to implement management practices of effective quality and continuously improve performance. Developed and updated by international experts in the field to incorporate the best practices of quality management, ISO 9000 appears as an effective management system and proven. It therefore seems reasonable to assume a priori that the exponential growth in the number of certified organizations is explained, at least in part, by the positive impact of the standard on performance. It is also argued that many studies with certified companies since the early 90s (Naveh and Marcus, 2005; Gotzamani and Tsiotras, 2002; Jang and Lin, 2008; McAdam and Fulton, 2002).

However, these optimistic conclusions about the impact of ISO 9000 have been challenged by various studies. On the one hand, some items tend to minimize or deny the positive impact of ISO 9000 certification (Terziovski et al., 2003 Prahbu et al., 2002 Sun, 2000). On the other hand, other studies have highlighted the adverse effects which may result from the adoption of this standard: bureaucracy, lack of mobilization, costs, etc. (Walgenbach, 2001; Marcjanna and John, 2000; Boiral and Roy, 2007). These adverse effects seem worrying about a growing number of leaders. Thus, if the certification number is increasing rapidly in most developing countries, it tends instead to stagnate or even decline in other regions, especially in some European countries (International Organization for Standardization, 2007). This recent trend suggests an increasing number of organizations choose not to renew the certification and the benefits of adopting the standard appears often insufficient to compensate for its disadvantages (Martinez-Costa and Martinez-Larente, 2007).

Controversies studies about the impact of the adoption of ISO 9000 on performance thus partly reflect the uncertainties of the leaders themselves, who do not all develop or maintain a standard whose benefits may seem uncertain. Symmetrically, such controversies can influence the leaders, who can use some studies to justify the decision to adopt or not the norm. In this context, analyzing the likely impacts of the ISO 9000 system appears as a key issue, not only for research but also for the many leaders who question the relevance of adopting or renewing certification to this standard.

Paradoxically, despite their large numbers, the empirical studies on the ISO 9000 standard does not necessarily contribute to inform leaders and researchers on this issue. Indeed, because of their number and their diversity, all studies on the subject can hardly be taken into account. In this context, the choice of certain items over others may lead to biased conclusions and restrictive. In addition, the specific context of each study and the criteria used to measure the impacts of ISO 9000 make it difficult to have an overview over the effects of certification.

1.3 The Performance concept

The concept of performance has been the subject of many studies, research and publications, but without reaching a universal definition. In addition, taking into account the different work, several pioneers in the field such as Campbell (1991), Steers (1975), Quinn and Rohrbaugh (1981), Fessmann and Welge (1994), Peters and Waterman (1982), Kaplan and Norton (1992), Boiral and Mongour (2009) have identified several dimensions of performance (rational, human, systemic, procedural, interpretive, dynamic, cognitive, financial, strategic, objective, subjective, politics, learning, innovation, customer, internal process, etc. .), we can conclude with Lorino (2001) there is no objective or universal definition of performance as the achievement of strategic objectives.

Indeed, evaluating the performance of such a project (Quality Management, ISO certification, Just In Time, Cost Kaizen, ERP ...) uses the value systems that may not be the same. Therefore, measuring performance of the projects include a cognitive dimension. For Desreumaux (1998), the difficulty lies in the plurality possible objectives, even in the absence of consensus among stakeholders on their nature or actual content, which paves the way for the plurality of interpretations and divergent assessments. It also appears difficult to study performance measurement. We may use the contingency theory (Lawrence and Lorsh, 1973), because there is no measurement or performance evaluation that is appropriate for all projects at all stages and in all circumstances. There are a multiple works to identify performance concept. Several other attempts syntheses were initiated to clarify the concept of performance.

2. Theoretical framework and research hypotheses

2.1 ISO certification elements

Although there are always going to be debates about how to categorise elements of a holistic process and framework such as ISO certification, it is necessary to decompose it in some way to facilitate analysis. Our empirical constructs are guided by the main criteria of this quality approach, particularly the best known of them, the ISO certification practices. There are ten practices or criteria. In this section we describe the ten criteria, which we have adopted as ISO model elements. Our empirical work aims to validate these ten elements as constructs and determine the relationships between the fifteen practices elements of performance and the seven criteria of ISO certification.

Table 1: ISO practices

ISO Practices	Definition
Leadership	The Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.
Human Resources	The personnel performing work affecting conformity to product requirements shall be competent on the basis of education, training, expertise and experience.
Suppliers	Organization or person that provides a product.
Quality Procedures	Specified way to carry out an activity or process.
Policy & Strategy	Overall intentions and direction of an organization related to quality as formally expressed by leadership.
Process Improvement	Regular activity to increase the ability to meet the requirements.
Organizational Effectiveness	Level of achievement of planned activities and expected results.
Partnership and Resources	It discusses practices of management partnerships, financial resources, assets (buildings, equipment, inventory...) of the portfolio of technology and knowledge. It is summarized by the following: Management of External partnerships /Management of Financial resources / Management of Buildings, equipment and materials / Management of Technology / Management of Information and knowledge.
Operations Management	It addresses the different operational practices of the company. It is summarized by the following points: Productivity / Efficiency of Operations / Cost Reduction / Waste reduction / Document Management / Innovation and design / Inventory Management.

Source: Standard ISO 9000 V 2000 & ISO 9001V2008

2.2 The performance elements

The performance element of ISO approach focuses on quality performance, operational and business performance indicators. We have given this construct separate status in our study, as the "dependent" variable to which we fit the other categories as independent variables. Our measures

were of customer satisfaction, employee morale, productivity, quality of output and delivery performance. There are fifteen elements.

This list is far from exhaustive. No doubt there were other criteria that are not mentioned. For example, we can mention: the criteria for recognition, the performance criteria and criteria for international orders technology. In addition, all of the criteria mentioned are very heterogeneous. Indeed, a group of criteria refers to the social and human factors. A second group of criteria is directly related to the financial and economic aspects. The third category of criteria is a mix of strategy, production, environment, etc.

2.3 Research hypotheses

Our first hypothesis is concerned with the validity and reliability of the ISO construct and its elements, while the second hypothesis deals with the predictive power of these elements.

3-1- Hypothesis H1

The ISO elements individually and collectively comprise a reliable and valid instrument for measuring ISO practices and performance.

3-2- Hypothesis H2

There is a significantly positive relationship between ISO elements strength and performance.

3. Methodology

After the literature review developed in the first part, we wanted to compare the results of academic studies with the perception of employees in certified companies and non-certified companies. The central topic of the study focuses on the added value of ISO 9000 certification as perceived by the managers of 50 certified companies and to compare it to managers of 102 non-certified companies.

In this section, our goal is to provide some answers to our problems posed in the theoretical part. Indeed, we try to study the nature of the relationship may exist between some practices deemed relevant from ISO certification and the global performance of the company. In this regard, an exploratory investigation with Tunisian companies from industrial sectors was conducted. The main idea is to test a conceptual model developed through a theoretical review of the literature quite extensively on the work regarding the relationship between "ISO certification and performance". The model in question is divided into two parts. A first part traces most relevant determinants of ISO certification and the main critical practices emerged from numerous empirical studies by several specialists. The second part traces the various lines of global performance (customer focus, financial axis, internal process, innovation and organizational learning...) are developed based on the work of Kaplan and Norton (1992). Our model aims to reveal the effect of certain practices of ISO certification on the global performance of the company through the criteria.

To test hypotheses H1 and H2 the following MANOVA tests were run: a comparison of the overall means of ISO Practices and performance elements between ISO-certified and non-certified construction companies; and an analysis of which of the items of all elements were significantly different between the two groups. The dependent variables are the results from the performance elements and the independent variables are the ISO practices about the two groupings namely ISO certified and non-certified companies. One regression analysis was carried out on ISO-certified companies and one on non ISO certified companies to explore the moderating influence of ISO certification.

For the choice method of analysis, there is a calculation procedure to extract the factors from the set of variables. The choice will largely oppose: the principal component analysis (PCA) and correspondence analysis (CA). According to Evrard et al. (2009), the method most frequently used is that of principal component analysis (often designated by PCA). This method allows, firstly, to structure the initial variables and to construct a summary of the information provided by all these variables. Secondly, it allows to discover, if they exist, the latent variables underlying the original variables and to interpret them. There are two basic assumptions of this technique:

H1: The variables are metrics that are used very often ordinal data such as those collected on Likert scales considering their proximity to interval data and correlated them to be factorable (threshold of 0,5).

H2: There is no distinction between explanatory variables or explain variables.

3.1 Sample

Our empirical study was conducted 50 companies which accepted to answer our questionnaire among 350 companies, with a response rate of 14.28%. In this sample, 48% of companies are LLC (Limited Liability Company), with a workforce less than 300 employees, referring to the nomenclature of the AIP (Agency of Industrial Promotion), these are the main characteristics used to define LLC. Our portfolio of companies is composed of 68% of companies certified ISO 9001 and 12% of companies certified ISO 14001. This wave of interest related to the certification is explained by the fact that most companies are exporting or export partially (80% of companies), which makes so that certification is a passport for them to access foreign markets. Moreover, the majority of these companies are either subcontracting or co-

contractors. Indeed, at this level, the principals attach importance to this dimension when defining quality of the specifications.

For the non-ISO-certified companies a total number of 102 companies were identified. In this sample, 92.2% of companies are LLC (Limited Liability Company). There are 102 non-ISO-certified companies which accepted to answer to our questionnaire among 250 companies, with a response rate of 40.8%. Following this investigation, we produced a large quantity of information. We decrypt the information needed and above all get the most out of lessons. In what follows, we present the results of empirical research, and then we move some comments and remarks. We recall in this context the common characteristics of sample firms.

3.2 Data analysis

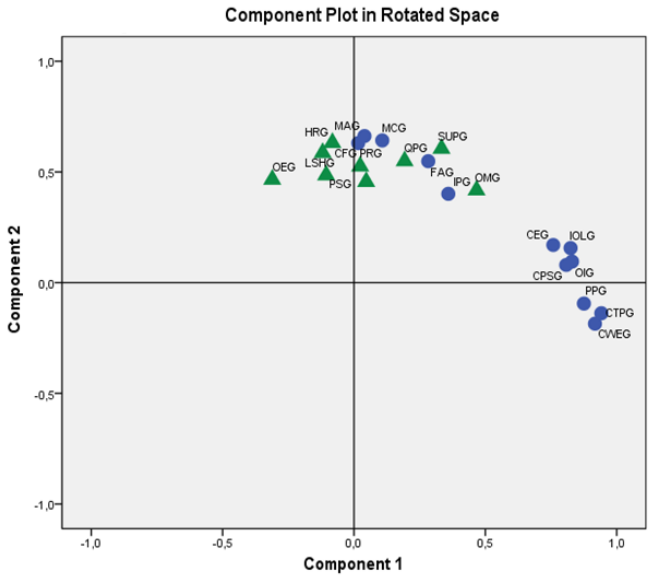
3.2.1 Reliability of ISO practices and performance elements

The reliability of the questionnaire was tested according to Cronbach's Alpha measurements, with the results as follows: ISO Practices (96.8% for ISO-certified, 85.1% for noncertified), performance elements (92.1% for ISO-certified, 85.5% for non-certified). All Alphas were above 70% which is acceptable for further analysis (Nunnally and Bernstein, 1994). The results of item-total statistics showed that there was only a small change in the Cronbach's Alphas if any items were deleted, confirming the appropriateness of further analysis of the data without any items deleted.

3.2.2 Validity test

Kline (1998) states that if the Skewness and Kurtosis indexes are within the acceptable limit [-3, 3], normality is checked. The results in Table "Testing normality" (Appendix 1) can confirm that all variables are normally distributed. We can now test the unidimensionality and validity of measurement scales that make up our measuring instrument. To test the unidimensionality, we will conduct a principal component analysis for each latent variable retention was conducted on all variable subject to an oblique rotation (Varimax) using the SPSS 16.0 for Windows. Knowing that this rotation is used to test the convergence of the observed dimensions to the factors (largely facilitated the interpretation of factors) and eliminating weakling correlated items to purify the measure. Indeed, the items retained after purification for each variable used to extract a single factor. The results obtained "Factorials contributions" (Appendix 2) show that all contributions factors are statistically significant (the contribution factor of each item varies between 0.623 and 0.978 well above the acceptability threshold 0.6). Furthermore, these results confirm the unidimensionality of the scales that make up our instrument to measure different ISO practices and performance.

Figure 1: Component Plot of all model factors



Once the calculation of Cronbach's alpha is achieved, we propose to perform a principal component analysis for each variable, or ISO practices or performance in order to bring out a factorial structure. But to achieve this goal, we must first examine whether the factors are factorable or not. Next we apply the method of principal component analysis (PCA) to determine the importance of the initial variables in the training of new factors. Finally, we will rotate in the space of factors using the varimax method in order to increase the value of the correlation coefficients of some variables with the new axes.

3.2.3 Factorization factors

One wonders here if the data is factorable, that is to say if they form a coherent enough to make it reasonable to seek the common dimensions.

For this reason, we will launch a test of the quality representation. The purpose of this test is whether the variables are dependent and connected to each other. According to the values mentioned in the "table quality of representation" (Appendix 3), the coefficient values are sufficiently inter-related and are not independent of one another. So the variables are factorable.

3.2.4 Principal Component Analysis (PCA)

In this method, the factors are expressed as linear combinations of exact variables. Conversely variables can be expressed as linear combinations of exact factors. Following this principal component analysis, we can mention that three factors were selected for analysis with an eigenvalue greater than unity. The factor structure takes into account 58.29% of "total ariance explained" (Appendix 4). According to the above, we should mention that the first factor explains 28.82% of total variance, the second factor 48.45% and the third factor 58.29%. This leads us to say that the mass of information held by the three factors is quite important and could explain the phenomenon already studied extensively.

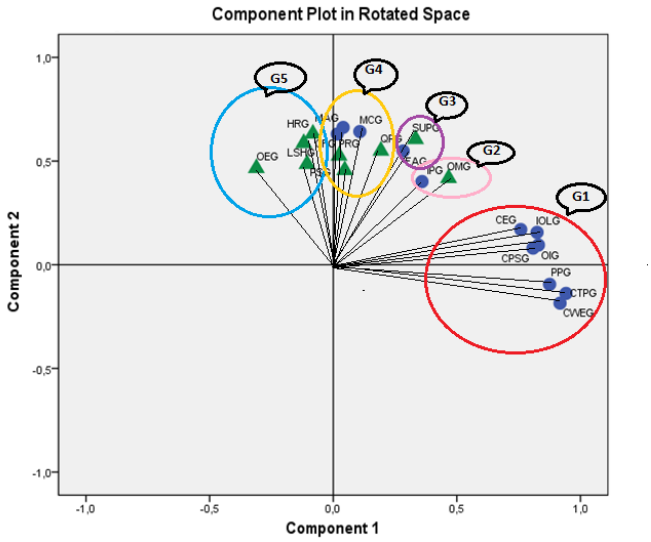
To determine whether the remaining variables are associated with these three main areas, we will calculate the correlations of these factors with the remaining variables "matrix components" (Appendix 5). While the initial variables are centered and reduced, the correlation coefficient $R(X_k, F_j)$ is a good indicator to measure the relationship of the X_k variable and F_j factor (the square of the coefficient represents the percentage of variance returned by the factor) according to Evrard (2003).

It is possible therefore, by identifying the correlation coefficients highest for a given factor, finding the initial variables that contribute most to the formation of this factor. The most usual rule is to retain the values above 0.5. We note here that all variables are well represented in the system of three axes (Higher correlation > 0.5).

However, items IPG, FAG and QPG must be excluded from the analysis because they are more than a factor axis and have a low correlation value. Indeed, an analysis of this type must necessarily be made in stages by removing each time the items that are abnormal and doing another factor analysis with rotation in the factor space. To help interpret the factors, we will rotate in the factor space in order to increase the value of the correlation coefficients of some items with new areas of representation. After rotation and removal of abnormal items (IPG, FAG and QPG), we found that only two factors were retained, forming the ISO practices and global performance of the company with a degree explanation of 93.7% of the total variance.

In addition, all remaining items are highly correlated with the axes chosen. Each item is correlated with one principal axis. The quality of representation of the axes is improving: MSA value for each large component. This value is in order of 0.993 very close to unity. After this purification data, we can now present the final composition of our model evaluation and performance management in logic of quality management through ISO certification in terms of latent variables and items. The table (Appendix 6) summarizes the architecture of the model.

Figure 2: Component Diagram (SPSS 16.0)



The diagram of the components is a graphical representation of the matrix components. The factor loadings become the coordinates in 2-dimensional space thus created. The coordinates of the variable CTPG on the horizontal axis (X axis) is 0.937 and on the ordinate (Y axis) is 0.163. All information is available for SPSS construct diagrams of components. We note that there are 5 groups strongly correlated as follows:

Table 2: List of groups

Groups	Variables*
G1	CEG ; IOLG ; CPSG ; OIG ; PPG ; CTPG; CWEG
G2	IPG ; OMG
G3	FAG ; SUPG
G4	MAG ; CFG ; PRG ; PIG ; QPG ; MCG
G5	CFG, HRG ; LSHG ; PSG ; OEG

* The letter G is used to refer to Global because after scoring operation with each criteria, we resume all items in one variable and add G to be the label result.

According to the groups selected from the components diagram, we find that the relationship between the variables will be realized only from a causality test. That is why we chose the causality test with Granger causality test to test the relationship between variables in our study. Given this analysis, our model will consist of eighteen latent variables and fifty six items. We propose the following test causal relationships may exist between the ISO practices and performance in order to confirm or refuse our initial hypotheses. This will be achieved by using the Granger causality test (Eviews 5.0).

3.2.5 Study of causality between selected variables of groups

After the validity of the measurement model, we propose in what follows to test a set of proposals (tests of causality between the ISO practices and performance) that can be considered as assumptions, that is to say what are the results of a special literature review. To do this, we had the idea to test the significance of cause and effect between the different latent variables via the approach of the analysis of causal pathways, as has been used

by Swamidass and Newell (1987), Anderson and al. (1995) and Flynn and al. (1995) via the Eviews software (version 5.0) by using the test of Granger causality.

Table 3: Direct and Indirect effect between Different Latent Variables

Dependent Variable	Independent variable	Direct Effect	Indirect Effect
CFG	PSG	NO	YES
	HRG	NO	YES
	LSHG	NO	YES
	OEG	YES	NO
MCG	IPG	NO	YES
	QPG	YES	NO
	PRG	NO	YES
CFG	IPG	NO	YES
	QPG	YES	NO
	PRG	NO	YES
MAG	IPG	NO	YES
	QPG	NO	YES
	PRG	YES	NO
FAG	SUPG	NO	YES
IPG	OMG	YES	NO

To give more meaning to our study, we had the idea to test some relationships that may exist in a direct and indirect between ISO few practices on the one hand and performance on the other hand. Based on the results obtained and shown in the above tables, we can now confirm or refuse predefined hypotheses. Will test the hypotheses which are the result of a literature review dealing fairly comprehensive ISO practices and global performance.

Table 4: Validation of Assumptions

Hypotheses		Results
H1	The leadership has an indirect effect on the different axes of the global performance.	Confirmed
H2	Human Resources has an indirect positive effect on the various lines of global performance.	Confirmed
H3	Policy and strategy have a positive indirect effect on the various lines of global performance.	Confirmed
H4	Partnership and resources have an indirect effect on the various lines of global performance.	Invalid
H5	The process has a direct effect on the various lines of global performance.	Confirmed
H6	Organizational effectiveness has a direct effect on the various lines of global performance.	Confirmed
H7	Quality has a direct effect on the different axes of the global performance.	Confirmed
H8	Operations management has a direct effect on the different axes of the global performance.	Confirmed

Indeed, the causality analysis gave us the opportunity to test several relationships (direct and indirect) between few critical ISO practices and performance involving several managerial contributions. Among the managerial implications those listed in the table below (Table 5).

Table 5: Validation of Proposals

Proposals		Results
P1	ISO has a positive effect on global performance	Confirmed
P2	ISO certified companies are more favored in success of a TQM	Partial Confirmed

In general, the results show the existence of a positive relationship between ISO practices and global performance. This brings us to confirm widely the first and second proposal (P1 and P2).

Moreover, the results showed that all practices have notionally developed marked their presence in the companies surveyed, that is to say, no practice is eliminated from the study during the purification step through factor analysis. Indeed, it is desirable to remember that this investigation has touched certified companies. These results clearly show that the standard has a positive impact on the main types of variables measured. Thus, for most trust relationships between different variables-certification performances explain the reasons why many leaders are looking to adopt ISO certification. And that, to improve quality management, productivity, image of the organization, internal communication, competitiveness, etc.

3.2.6 MANOVA-tests

The results of the MANOVA tests are as follows: H1. Impact of ISO practices in organizations with ISO 9000 certification will perceive a higher influence on performance companies than organizations with non-ISO-9000 certified. The F test yields a p-value of 0.000, which is lower than the previously selected alpha of 0.05 (see Table 6). Therefore H1 is accepted. One may conclude that there is a significant difference in effect of ISO Practices on performance between the ISO-certified and noncertified construction companies. As shown in Table 5, MANOVA results reveal that all factors of performance are significantly different at pb 0.05 between the two groups. H2. The performance in organizations with ISO 9000 certification has a higher level than those without ISO-9000 certified. The F test yielded a p-value of 0.000 (Table 6). With an alpha of 0.05, H2 is accepted. There is significant difference in carrying out ISO Practices between the ISO-certified and non-certified construction companies. MANOVA results reveal that all factors, namely Operations Management (p=0.000), Quality Procedures (p=0.000), Suppliers (p=0.000), Organizational Effectiveness (p=0.000), Leadership (p=0.000), Policy and strategy (0.000), Human Resources (0.000) and Partnership and Resources (0.000) are shown to be significantly different at pb 0.05 between the two groups. No one factor is shown to be not significantly different (Table 6).

Table 6: Summary of MANOVA test on individual factors

	Non-certified (N=102)		ISO-certified (N=50)		Tests of between-subjects effects
	Mean	SD	Mean	SD	Sig.
ISO Practices					
Operations Management	8,567	3,011	23,560	3,786	< 0,0001
Quality Procedures	12,298	4,344	20,640	2,701	< 0,0001
Process Improvement	32,212	8,734	20,300	3,118	< 0,0001
Suppliers	14,952	4,030	8,040	1,414	< 0,0001
Organizational Effectiveness	11,231	3,166	7,880	1,239	< 0,0001
Leadership	12,894	4,670	8,380	1,067	< 0,0001
Policy & Strategy	30,596	8,686	16,120	2,584	< 0,0001
Human Resources	28,519	5,930	20,060	2,637	< 0,0001
Partnership and Resources	13,433	3,826	19,400	3,003	< 0,0001
Performance Dimensions					
Marketing Axis	17,029	4,011	8,000	0,881	< 0,0001
Market Competitiveness	50,971	7,790	7,860	1,512	< 0,0001
Opertional Indicator	22,144	5,818	6,320	2,630	< 0,0001
Control of the Pollution Source	15,827	8,183	6,940	2,519	< 0,0001
Control of Transmission Process	16,288	5,452	6,260	2,656	< 0,0001
Control of Work Environment	27,192	9,206	6,260	2,813	< 0,0001
Protection Person	11,885	4,749	6,620	2,633	< 0,0001
Control and Evaluation	9,625	2,966	6,540	2,476	< 0,0001
Financial Axis	10,913	4,358	32,480	7,640	< 0,0001
Internal Process	23,654	9,805	7,300	2,033	< 0,0001
Customer Focus	24,192	5,878	26,040	3,143	< 0,0001
Innovation and organizational learning	16,048	4,668	9,62	3,596	< 0,0001

Furthermore, Table 6 shows there is a significant difference in effect of ISO practices on performance between the ISO-certified and non-certified construction companies and the MANOVA results reveal that all factors of ISO practices are significantly different, at pb0.05, between the two groups (Table 6).

4. Discussion

The survey results, which overall found ISO Practices and performance enhanced by ISO 9000 certification, are consistent with the majority of prior studies, detailed in many results, reporting a positive relationship between ISO 9000 certification and elements of organizational performance. The results

provide evidence of the synergies that exist between a QMS and a commitment of Leadership. For companies, where the certification project is the basic form of organization for its operation, ISO Practices are part of an ongoing and repetitive operation to which most of the elements of a QMS would apply (Orwig and Brennan, 2000).

They are key business processes and many organizations strive to make such processes part of their business-as-normal activities. In this respect the ISO Practices are equitable with the standardised and repetitive processes from manufacturing that are regarded as particularly applicable to the ISO 9000 certification treatment (Kazaz and Birgonul, 2005). They equate to the internal process-oriented measures which studies of ISO 9000 use to measure organization performance. In this respect they are akin to ensuring the quality of the production method, rather than the actual product itself, which is the traditional focus of a QMS. Some of the stated benefits of a QMS, such as ensuring consistency in the level of quality (Pinar et al., 2003) can easily be translated to elements of performance, where undertaking some processes in a standardized and uniform fashion is desirable. As such, a QMS, properly developed and operated, can provide a valuable insight to a project-oriented firm in how to apply appropriate certification processes (Orwig and Brennan, 2000). Specifically ISO 9000 enhances quality management processes in the areas of leadership, Human Resources, policy and strategy, quality procedures, operations management, Suppliers, process improvement and organizational effectiveness.

The findings also provide confirmatory evidence that enhanced outcomes as measured using multi-dimensional constructs of quality project Success (Bryde, 2008), such as meeting client needs on construction quality projects (Chan and Tam, 2000) can be delivered through having a certified QMS. So having ISO 9000, indirectly through its impact on the establishment of quality project processes, enhances performance in the areas of: internal process, customer focus and quality specifications; efficiency of management effort; fitness for purpose; usability; and delivering user and client benefit. In this respect the research findings extend the early work of Serpell (1999), which suggested desirable outcomes could be achieved on companies performance by having a QMS in place, by emphasising the important role of the ISO 9000 certification process, which ensures the QMS conforms to internationally recognised standards. It is worth noting that the research measured perceptions of quality project Success and prior work suggest QMS perceptions are influenced by numerous factors, some of which relate to the essence of the quality approach that is the inherent risk involved and some of which are more manageable that is the choice of contract type (Sadeh et al., 2000).

For performance, having a well-managed quality project with a high degree of process control, a focus on quality assurance, good governance and a clear audit trail all of which will be achieved by adhering to the requirements of ISO 9000, are likely to be important. It is likely that, in the case of quality approach, the existence of such a quality management system, which is set up to meet the requirements of ISO 9000, gives confidence that they are “doing things right” and, hence, leads to an enhanced perception of performance.

Significantly, the empirical study shows that the contribution of certification earned by managers depend on the logic of commitment, voluntary or forced, in the certification process. While most often the certification prevents degradation of the performance of the company over time, ISO 9000 certification is not as such a guarantee for a better performance. There are conditions to maximize the positive impact of certification on business performance. It appears in the comparison of theoretical and empirical consistency on the contingent nature of certification and its impact on business performance: the best conclusion shared by our study which verified empirically that the ground certification appears to be the best variable to predict the level of performance caused by the ISO 9000 certification.

Now it seems that a significant number of companies were entering in the certification process under duress or simply mimetic behavior resulting like a membership to ISO 9000 certification (Boiral, 2003). This finding should motivate leaders to be more responsive to complaints and employee suggestions in relation to ISO 9000 in order to adapt the implementation of this system to the needs of the organization. This attitude of listening is relatively rare because the employees are actually very reluctant to share information that compromise policy or management practices adopted by the leaders. This "silence organizational "(Morrison and Milliken, 2000) severely limits the diverging expression from the dominant discourse in organizations and limited therefore opportunities challenged habits. These latter are not necessarily desired by leaders more concerned about conferred to the image of ISO 9000 certificate by its intrinsic efficiency. In this context, the assessment of successful implementation of the certification and attitudes about it should perhaps define themselves in relation to the objectives of the company.

5. Limitations of research and areas for future study

Firstly, in terms of limitations of the research reported in this paper, it is recognised that the overall positive relationship between ISO 9000 certification and performance could be due to other factors besides having an accredited QMS. For example, the experience of the quality project, performance of sub-

contractors, and the level of skills and experience of quality project team members could all be contributory factors. The survey results were derived from companies representing the Tunisian industry and generalisations beyond this population cannot be made. Future research could collect data from other geographical regions, e.g. US, Europe the Far East, Australasia and South America to see if the findings are replicated and to explore the influence of national culture on any variations in performance (which was outside the scope of this study). Further, to test the external validity of the ISO practices, additional studies would be needed with increased sample sizes and geographical. Thirdly, the findings are based on the use of self-reported survey data, where respondents were asked to recall the practices and outcomes of their most recent completed quality project for ISO certification. To assess whether the data were affected by response bias future research could collect data from other project stakeholders, such as clients or end-users.

6. Conclusion

As part of this empirical investigation, a study of relations which existed between ISO practices and the global performance was conducted. Evans (1997) mentions that this kind of study is essential for a better understanding of the relationships between ISO practices and their effects on the performance dimensions. To do this, we launched an exploratory survey among 50 companies operating in several sectors. The choice of these sectors as a field of study is not arbitrary, given their important role in the Tunisian economy as strategic sectors. A technique of collecting data through questionnaire. Indeed, and to clean the data, a two-step analysis was performed using the SPSS (version 16.0 for Windows). A first iteration is devoted to the study of reliability and validity according to the Cronbach's alpha. Then a second step of factor analysis was initiated to determine the importance of the initial variables in the training of new factors. Finally, we performed rotations in the factor space using the varimax method in order to increase the value of the correlation coefficients of some variables with the new axes. Following this principal component analysis, we can mention that three factors were selected for analysis with an eigenvalue greater than unity. The factor structure takes into account 58.29% of the total variance. Moreover, the results of this analysis has eliminated twenty four items and three latent variables related to performance (financial axis, organizational learning and innovation and the Focus consumer). The last step of the analysis gave us the opportunity to test the effect of these ISO practices on the global performance of companies. To do this, a model was launched via the causality test of Granger by the Eviews software (Version 5.0) with latent variables. Indeed, by analyzing the causal relationships sixteen variables (direct and indirect) were tested.

In general, the results showed the existence of a positive relationship between the following ISO practices: Organizational Effectiveness, quality procedures, partnership and resource, management operations and global performance determinants. By cons, the lack of a statistically positive relationship between the practices "policy and strategy, human resources, leadership, processes and suppliers" on global performance. Therefore, the choice to be certified or not may depend on various internal or external motivations to company. In each case, the result of certification on the performance differs. The two dimensions of quality approach (customer-oriented and optimization of internal processes) are not two sides of one coin. These two steps are separate and do not affect the company by the same way. The mixed approach carries a deteriorating financial performance in yields action and the result represents the market's leaders towards that lack clarity in their strategy and demonstrates through the adoption of mixed approach their risk aversion. Buttle (1997) reached the same conclusion showing that the more reasons to be certified are the motivations for marketing and sales (gain market share, increase customer satisfaction and differentiate itself from its competitors ...), more the impact of ISO 9000 certification on performance is important. Synthesis of academic research and our empirical study, ISO 9000 certification seems to increase the performance of the company especially since the processes voluntary and not forced and is focused on external profits rather than internal benefits.

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Endnotes

INNORPI: National Institute for Standardization and Industrial Property in Tunisia.

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Appendix

Appendix 1 : Normality Test

Items	Skewness (the asymmetry coefficient)	Kurtosis (concentration)
OM1	0.550	0.964
OM2	-1.825	8.591
OM3	-1.126	2.504
OM4	-1.009	2.039
OM6	-1.117	1.521
OM7	-1.447	2.336
QP1	-0.160	-0.461
QP2	-1.208	1.833
QP3	-1.05	2.118
QP4	-0.344	-0.712
QP5	-1.088	2.177
PI1	0.046	0.756
PI2	-0.108	-0.858
PI3	-0.460	-0.252
PI4	-0.829	1.194
PI5	-0.962	2.095
IP2	-0.727	0.554
IP3	-0.884	0.802
CF1	-0.420	-0.727
CF2	-0.273	-0.770
CF3	-0.275	-0.570
CF4	-1.331	2.831
CF5	-0.420	-0.727
CF6	-1.304	2.867
SUP2	-1.696	7.564
SUP3	-1.530	4.078
OE 2	0.032	-0.419
OE 3	0.089	-0.652
LSH2	0.049	0.007
LSH3	0.167	0.085
PS2	0.000	-0.675
PS3	-0.108	-0.858
PS4	-0.02	-0.554
PS5	-0.025	-0.783
IOL 1	-0.236	0.244
IOL 2	-0.358	0.059
IOL 3	-0.607	0.578
HR1	-0.726	0.945
HR2	-0.795	1.305
HR3	-1.184	2.681
HR4	-0.728	1.476
HR5	0.171	0.670
PR1	-0.160	-1.095
PR2	0.004	-0.557
PR3	0.209	-0.782

PR4	-0.222	-0.257
PR5	-0.134	-0.062
MA1	-0.213	1.782
MA2	0.108	1.039
MC1	-1.117	2.930
MC2	-0.998	2.878
OI2	-0.727	-0.282
OI3	-0.933	0.079
MI	-0.798	-0.412
EI	-0.837	-0.345
EVI	-0.723	-0.505
CPS 1	-0.993	-0.972
CPS 2	-0.972	0.305
CTP 1	-0.777	-0.362
CTP 2	-0.879	-0.091
CWE 1	-0.728	-0.519
CWE 3	-0.646	-0.606
PP1	-0.879	-0.156
PP2	-0.685	-0.593
CE 1	-0.341	-0.860
CE 2	-1.075	0.507
FA4	-0.384	1.891
FA5	-0.252	1.322
FA6	-0.137	1.473
FA8	-0.443	1.889
FA9	-0.162	1.386
FA10	-0.261	1.656
FA11	-0.309	2.422
FA12	-0.241	2.199
FA13	0.044	1.541
FA14	-0.316	1.784

Appendix 2 : Factorials contributions

Variables	Items	Factorial contribution
Leadership	LSH2	0.975
	LSH3	0.975
Human Resources	HR1	0.797
	HR2	0.722
	HR3	0.700
	HR4	0.850
	HR5	0.716
Suppliers	SUP2	0.957
	SUP3	0.957
Policy & Strategy	PS2	0.943
	PS3	0.947
	PS4	0.965
	PS5	0.968
Quality Procedures	QP1	0.709
	QP2	0.913
	QP3	0.875
	QP4	0.907
	QP5	0.779
Process Improvement	PI1	0.823
	PI2	0.851
	PI3	0.846
	PI4	0.855
	PI5	0.824
Partnership and Resources	PR1	0.744
	PR2	0.852
	PR3	0.868
	PR4	0.865
	PR5	0.806
Organizational Effectiveness	OE2	0.951
	OE3	0.951
Operations Management	OM1	0.702
	OM2	0.833
	OM3	0.813
	OM4	0.807
	OM6	0.785
	OM7	0.655
Customer Focus	CF1	0.917
	CF2	0.885
	CF3	0.812
	CF4	0.922
	CF5	0.623*
	CF6	0.887
Internal Process	IP2	0.953
	IP3	0.953
Innovation and organizational learning	IOL1	0.921
	IOL2	0.877

	IOL3	0.923
Financial Axis	FA4	0.908
	FA5	0.927
	FA6	0.909
	FA8	0.917
	FA9	0.926
	FA10	0.959
	FA11	0.934
	FA12	0.913
	FA13	0.951
	FA14	0.941
Opertional Indicator	OI2	0.978*
	OI3	0.978
Management Indicator	MI	-
Economic Indicator	EI	-
Environment Indicator	EVI	-
Control of the Pollution Source	CPS1	0.939
	CPS2	0.939
Control of Transmission Process	CTP1	0.977
	CTP2	0.977
Control of Work Environment	CWE1	0.992
	CWE3	0.992
Protection Person	PP1	0.929
	PP2	0.929
Control and Evaluation	CE1	0.888
	CE2	0.888
Marketing Axis	MA1	0.897
	MA2	0.897
Market Competitiveness	MC1	0.963
	MC2	0.963

Appendix 3 : Quality of representation

Items	Initial	Extraction
LSH2	1.000	0.950
LSH3	1.000	0.950
HR1	1.000	0.636
HR2	1.000	0.521
HR3	1.000	0.491
HR4	1.000	0.722
HR5	1.000	0.513
SUP2	1.000	0.915
SUP3	1.000	0.915
PS2	1.000	0.888
PS3	1.000	0.897
PS4	1.000	0.932
PS5	1.000	0.937
QP1	1.000	0.521
QP2	1.000	0.852
QP3	1.000	0.827
QP4	1.000	0.852
QP5	1.000	0.648
PI1	1.000	0.677
PI2	1.000	0.723
PI3	1.000	0.716
PI4	1.000	0.731
PI5	1.000	0.679
PR1	1.000	0.554
PR2	1.000	0.727
PR3	1.000	0.753
PR4	1.000	0.749
PR5	1.000	0.650
OE2	1.000	0.905
OE3	1.000	0.905
OM1	1.000	0.493
OM2	1.000	0.693
OM3	1.000	0.662
OM4	1.000	0.652
OM6	1.000	0.617
OM7	1.000	0.427
CF1	1.000	0.850
CF2	1.000	0.859
CF3	1.000	0.738
CF4	1.000	0.867
CF5	1.000	0.712
CF6	1.000	0.841
IP2	1.000	0.908
IP3	1.000	0.908
IOL1	1.000	0.849

IOL2	1.000	0.770
IOL3	1.000	0.852
FA4	1.000	0.824
FA5	1.000	0.859
FA6	1.000	0.826
FA8	1.000	0.841
FA9	1.000	0.857
FA10	1.000	0.919
FA11	1.000	0.873
FA12	1.000	0.834
FA13	1.000	0.904
FA14	1.000	0.885
OI2	1.000	0.956
OI3	1.000	0.956
MI	1.000	-
EI	1.000	-
EVI	1.000	-
CPS1	1.000	0.881
CPS2	1.000	0.881
CTP1	1.000	0.954
CTP2	1.000	0.954
CWE1	1.000	0.984
CWE3	1.000	0.984
PP1	1.000	0.863
PP2	1.000	0.863
CE1	1.000	0.789
CE2	1.000	0.789
MA1	1.000	0.805
MA2	1.000	0.805
MC1	1.000	0.927
MC2	1.000	0.927

Appendix 4 : Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.053	28.822	28.822	6.053	28.822	28.822
2	4.122	19.629	48.451	4.122	19.629	48.451
3	2.066	9.839	58.290	2.066	9.839	58.290
4	1.609	7.662	65.952			
5	1.126	5.363	71.315			
6	1.009	4.806	76.120			
7	.821	3.907	80.028			
8	.725	3.451	83.478			
9	.568	2.704	86.183			
10	.543	2.587	88.770			
11	.492	2.344	91.114			
12	.440	2.096	93.210			
13	.393	1.870	95.079			
14	.302	1.439	96.519			
15	.189	.901	97.420			
16	.160	.763	98.183			
17	.153	.729	98.912			
18	.104	.494	99.406			
19	.066	.313	99.719			
20	.043	.204	99.923			
21	.016	.077	100.000			

Extraction Method: Principal Component Analysis.

Appendix 5 : Components Matrix [a]

	Component		
	1	2	3
CTPG	.831	-.463-	
IOLG	.826	-.147-	.117
AIOG	.810	-.206-	.127
CWEG	.792	-.499-	
PPG	.785	-.399-	
CPSG	.784	-.212-	-.258-
CEG	.769	-.110-	-.152-
OMG	.584	.225	
SUPG	.526	.448	-.148-
IPG	.478	.248	.299
HRG	.147	.620	-.302-
MAG	.272	.605	-.255-
LSHG		.591	-.388-
CFG	.239	.584	.256
MCG	.329	.562	
OEG	-.126-	.546	-.287-
QPG	.375	.446	
PIG	.205	.410	.666
PRG	.208	.483	.582
PSG		.491	.568
FAG	.459	.412	-.513-

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Appendix 6: List of Variables and Items Retained in the Model

Latent variable of ISO certification	Items Retained
OMG	OM1 ; OM2 ; OM3 ; OM4 ; OM6 ;OM7
HRG	HR1 ; HR2 ; HR3 ; HR4 ; HR5
PRG	PR1 ; PR2 ; PR3 ; PR4 ; PR5
LSHG	LSH1 ; LSH3
SUPG	SUP2 ; SUP3
PSG	PS2 ; PS3 ; PS4 ; PS5
OEG	OE2 ; OE3
Latent variable of Performance	Items Retained
CTPG	CTP1 ; CTP2
CWEG	CWE1 ; CWE3
PPG	PP1 ; PP2
OIG	OI2 ; OI3
IOLG	IOL1 ; IOL2 ; IOL3
CPSG	CPS1 ; CPS2
CEG	CE1 ; CE2
MCG	MC1 ; MC2
MAG	MA1 ; MA2
CFG	CF1 ; CF2 ; CF3 ; CF4 ; CF5 ; CF6
IPG	IP1 ; IP2 ; IP3 ; IP4 ; IP5