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Success Factors of a Quality Model Award

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Abstract

TQM theory has been developed since earlier 70´s and the overall model has been configured to include some key aspect such like: Leadership, costumer focus, strategically planning, human capital, new product development, operation management among others. One of the main questions is what elements are the most important of need to be considered as key element in order that a beginner company in this journey starts focus and aligning its strategy to the core elements that will rapidly cause a positive effect on its financial performance? Researchers have not got to a common agreement on what could be the key elements. This empirical paper make further research on some winners of the national quality award and what do they consider to be the main key elements of a TQM generalized model.

Key words: Total quality management, leadership, customer focus, operation management, business results.

Resumen

La teoría de la gestión de la calidad total se ha desarrollado desde principios de los años 70´s y el modelo general incluye diferentes aspectos que engloban: Liderazgo, enfoque al cliente, planeación estratégica, capital humano, desarrollo de nuevos productos, gestión de operaciones entre otros; Una de las preguntas clave en esta relación integral de la gestión de la calidad total es ¿cuál es el elemento(s) principal(es) que una compañía en estado inicial deberá seguir con un mayor enfoque a fin de lograr un impacto positivo en el desempeño financiero? Los investigadores no han resuelto tal cuestionamiento respecto a cuál o cuáles son los elementos principales. La presente artículo realiza una investigación empírica de los ganadores del premio nacional de calidad y sus aportes respecto a cuál o cuáles son los elementos clave dentro del enfoque integral de gestión de calidad total.

Palabras claves: Calidad total, liderazgo, enfoque al cliente, gestión de operaciones, resultados financieros.

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Theoretical background and hypothesis

Quality drives financial results

The aim of this research paper is to study the relationship between the elements of a quality award model and financial business results. This empirical research is taking into account different previous studies that deeply analyze the theoretical and empirical correlation between such factors; some studies found to have either positive or not conclusive linkage between constructs. Quality award model might be noticed as a practical extension of the overall TQM theory. Even though, that TQM is an integrated model the expectation is that should be some factors that might be considered as key drivers to financial business results.

The TQM theory based on quality award model is typically integrating eight factors: 1) leadership, 2) Strategic planning, 3) Customer focus, 4) Human capital, 5) New product, process, and service development, 6) Operation management, 7) Supplier development and 8) Social responsibility; however what factors are the ones considered as a key drivers to financial business results? This question is further analyzed from two perspectives theory and practice, in order to try to determine the key drivers in this equation.

Leadership

H_1: Leadership has no positive impact on financial results.

The relative importance of leadership for company´s vision and strategy is well documented in different empirical studies lead by Lakshman, C. (2006), Zehira, C. et. al. (2012). Some other studies have linked leadership and TQM success Choi, T., Eboch, K. (1998), Davis T. (1997), Douglas, T.J. & Judge, W.Q. (2001). The literature has documented that leadership practices and business performance are related as described by Hackman, J., Wageman, R. (1995), Samson, D., Terziovski, M. (1999) and found to have positive relationship.

Organizational leadership is the basement of driving companies to maximize their core competences towards achieving the ultimate goals set in the strategy. Key performance indicators can rely on social responsibility, customer and financial results consistent to the findings documented by Sila, I. (1997).

Strategic planning

H_2: Strategic planning has no positive impact on financial results.

The most orthodox literature strongly suggests that strategic planning and financial results are positive correlated as described by Gicia, O. N. (2011), Rudd, J. et. al. (2008), even though there are different

studies that are not conclusive in regards of this theoretical and empirical link as documented in previous research made by Pearce, JAI. et. al. (1987).

The common knowledge will base the good key performance indicators trending on strategic planning and how those strategies are wide spread developed throughout the company Rhyne, LC. (1986), Miller, C.C. et. al. (1994).

Customer focus

H_3: Customer focus has no positive impact on financial results.

Customer focus and its linkage to business financial performance have been documented in previous empirical research by Zakuana, N.M. et. al. (2010) and Han, S.M. (2007). The documented studies in large manufacturing firms revealed statistical evidence of a positive correlation between financial performance and customer as a key driver. Customer focus theoretical framework indicates key quality tools such as VOC (voice of the customer), house of quality, QFD (quality function deployment) and Kano´s Model as the basement of business alignment to customer expectations, desires and needs as indicated by CQM. (1993), Kathawala, Y., and Motwani, J. (1994).

Prakash, O.M. et. al. (2008) and Hauser, J.R. et. al. (1988) analyzes customer focus strategy and highlight it as driver in the competitive market to gain customer preference.

Human capital

H_4: Human capital has no positive impact on financial results.

It is assumed that employee satisfaction, organizational development, knowledge management in general terms: the human capital has positive impact on financial results as indicated by Chi, C. G. (2009), Bernhardt, K.L. et. al. (2000), and Harter, J.K. et. al. (2002). There is almost no literature that describes a different relationship.

The main concept of human capital is based on employee satisfaction and organizational development that drives the employees to get involved and empowered to be proactive, focus on continuous improvement of day to day activities towards business results as presented by Koys, D. (2003).

New product, process, and service development

H5: New product, process and service development has no positive impact on financial results.

New product development should be considered as a powerful strategy to gain customer achieving their preference thru customer focus product. QFD (Quality Function Deployment) is a customer driven approach that transforms customer expectations into engineering requirement and manufacturing process parameters. According to Pang, J., et. al. (2011); QFD is extremely important during product design

stage. Working papers and empirical research has proven the effectiveness of QFD application during product design gate by Govindalruri, S.M, Cho, B.R. (2007), Freiesleben, J. (2010) and Sharma, J.R., Rawani, A.M. (2007).

New product development requires the input of the customers, and this knowledge can be extracted and analyzed using some variety of marketing and customer driven tools such as: QFD (voice of customer and house of quality) and customer profile studies.

There are some theoretical studies that describe the relationship and business synergy of a well design customer oriented products can be found in Kano, N. et. al. (1984), Su, C. et. al. (2006), Fornell, C. et. al. (1987), Cristiano, J., et. al. (2000). The web base technology can also be used as a powerful tool to get closer to customers and know their perceptions (pros and cons) of a product. Initial web based technology focus on the voice of the customer was develop by Park, Y. et. al. (2011).

Operation management

H6: Operation management has no positive impact on financial results.

Operation management is emergent fields that focus on tactical level of business strategy as studied by Schroeder, R.G. (2005). OM (operation management) main goal is to increase productivity thru the design or re-design of current manufacturing footprint to optimize the process variables, reduce process variation and get product and/or services according to customer expectations ruled by specifications.

OM has been linked to business performance in general terms; however there is not a consensus of such correlation. Another perspective of OM is that is an umbrella of different productivity tools such as: TPM (total productive maintenance), LM (lean manufacturing), SS (six sigma), VA/VE (value added and value engineering) among others, and some of those are the key ones that are linked with positive correlation to business financial performance and not the overall OM theoretical framework indicated in previous empirical research by Arawatu, A. (2008) and Dinesh, S. (2006).

Supplier development

H_7: Supplier development has no positive impact on financial results.

The literature empathizes that supplier development has a positive impact on financial results throughout the supply chain as proposed by Deming, E. (1986). Supplier development effort focus on quality assurance, sourcing and economy of scale strategy, less suppliers, long term agreements based on product, process control reliability rather than only price per piece and shipping performance as studied by Kaynak, H. H. (2008), Saraph, J.V. et. al. (1989). Supply development has a strong correlation to the competitive capabilities of any company as documented by Garvin, D.A. (1987).

Social responsibility

H_8: Social responsibility has no positive impact on financial results.

Current customer/market order qualifiers identify the company social responsibility as one of the different factors to be considered by the customer while making a purchase decision or intent. The literature is widespread in different areas of social responsibility factors and its financial implications for instance Becchetti, L.E. (2011), Moskowitz, M.R. (1972), Creyer, E. et. al. (1997).

There are studies that support that social responsibility impacts the company financial results while other are not conclusive to support this relation as proposed by Doh, JP. et. al. (2010), and McWilliams, A. et. al. (2000). Some other studies only evidence that social responsibility is an order qualifier to enter to the business rather than order winner factor.

Critical success factors in the quality model

H_{02}: X1, X2, X3, X5, and X6 have no positive impact on financial results.

Business results and the theoretical background in regards of the key activities that drives financial results identifies TQM, lean manufacturing, quality awards/models, six sigma among others as overall strategies that influence any organization to get positive results on its key performance indicators Corredor, P.G. (2011), Ghobadian, A. et. al. (1996), Curkovic, S. et. al. (2000); however such strategies are extremely correlated to specific activities such like: leadership, strategic planning, customer focus, new product development and operation management as the key ones Yong, J. et. al. (2001), Lee, S.M. et. al. (2003).

There are some studies empirical research that proposes that the figure of TQM is captured by quality awards/models such like MBQA, EFQM (or in this case the Nuevo Leon Quality State Award) CCM. (2012), EFQM. (2012), NIST. (2012).

Table No. 1. Quality award model cross referenced to theoretical framework.

Constructs	Description of constructs	Theoretical background	International quality awards		
			NLQSA	MBQA	EFQM
X_1: Leadership	Organizational leadership drives financial results.	Lakshman, C. (2006), Zehira, C. et. al. (2012), Choi, T., Eboch, K. (1998), Davis T. (1997), Douglas, T.J. & Judge, W.Q. (2001), Hackman, J., Wageman, R. (1995), Samson, D., Terziovski, M. (1999), Sila, I. (1997).	X	X	X
X_2: Strategic	Strategic planning	Gicia, O. N. (2011),	X	X	X

Constructs	Description of constructs	Theoretical background	International quality awards		
planning	conceptualization and wide spread development drives financial results.	Rudd, J. et. al. (2008), Rhyne, LC. (1986), Miller, C.C. et. al. (1994), Pearce, JAI. et. al. (1987).			
X_3: Customer focus	Customer focus is the based for companies success.	Prakash, O.M. et. al. (2008). Han, S.B. et. al. (2007). Zakuana, N.M. et. al. (2010). Hauser, J.R. et. al. (1988). CQM. (1993). Kathawala, Y., & Motwani, J. (1994).	X	X	X
X_4: Human capital	Human capital (empowerment and employee satisfaction) drives company´s results.	Chi, C. G. (2009), Bernhardt, K.L. et. al. (2000), Harter, J.K. et. al. (2002), Koys, D. (2003).	X	X	X
X_5: New product, process and service development	New product development plays a high level role in company strategy in order to get competitive advantages in the market.	Kano, N. et. al. (1984), Su, C. et. al. (2006), Fornell, C. et. al. (1987), Cristiano, J.J. et. al. (2000), Park, Y. et. al. (2011), Pang, J. et. al. (2011), Govindaluri, S.M. et. al. (2007), Freiesleben, J. (2010), Sharma, J.R. et. al. (2007).	X	X	X
X_6: Operation management	Operation management seeks productivity and effectiveness in manufacturing or services. It is the tactical level strategy that deploys productivity and management tools to reduce and eliminate the waste (non value activities) and increase the efficiency.	Arawatu, A. (2008). Schroeder, R.G. (2005). Dinesh, S. (2006).	X	X	X
X_7: Supplier development		Kaynak, H. H. (2008), Saraph, J.V. et. al. (1989), Deming, E. (1986), Garvin, D.A. (1987).	X	X	X
X_8: Social	Ethic and business	Becchetti, L.E. (2011),	X	X	X

Constructs	Description of constructs	Theoretical background	International quality awards		
responsibility	sustainability are the social responsibility framework for today's company in the market.	Moskowitz, M.R. (1972), Creyer, E. et. al. (1997), Doh, JP. et. al. (2010), McWilliams, A. et. al. (2000).			
Y: Business results	There are key activities that drives financial business results such like: leadership, strategic planning, customer focus, new product development and operation management.	Corredor, P.G. (2011), Ghobadian, A. et. al. (1996), Curkovic, S. et. al. (2000), Yong, J. et. al. (2001), Lee, S.M. et. al. (2003), CCM. (2012), EFQM. (2012), NIST. (2012).	X	X	X

Figure No. 1. The hypothesized theoretical model for Nuevo Leon State Quality Award.

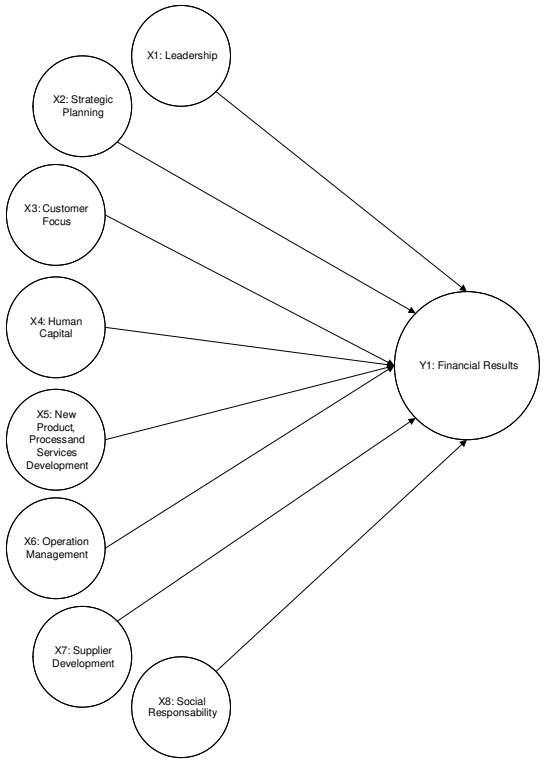
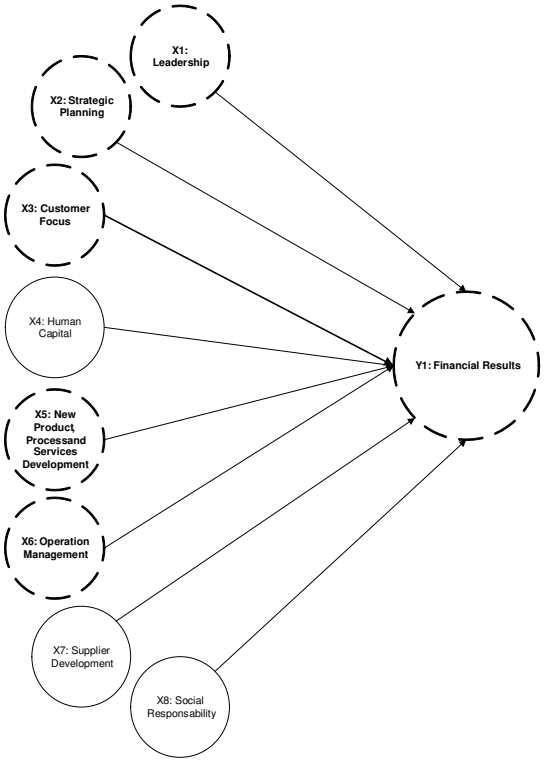


Table No. 2. Hypothesis concept model framework.

Hypothesis (H_o / H_i)	
H_{o1}: X_1, X_2, X_3, X_4, X_5 X_6 X_7, X_8 have no positive impact to financial results	H_i: other case.
H_{o2}: X_1, X_2, X_3, X_5, X_6 have no positive impact to financial results	H_i: other case.

Figure No. 2. The hypothesized theoretical model for critical success factors in the quality model.



Research Method

Sample

The city of Monterrey is one of the major research environments in order to conduct this type of research due to the amount of industrial activity that triggers economic activity. Monterrey is a city of Nuevo Leon state and it is situated to be the third top contributor in gross domestic product. Nuevo Leon developed a local state quality model and award back in 1996, in 2009 opens the score and coverage to be national wide. In now days after 15 years of history more than 2000 companies had participated into the evaluation process and only few had accomplished the priceless award. This research focuses on the winners of the last two decades, the people that participated in this web based open survey were employees either middle staff or top managers of their organization (see Fig. No. 3).

Figure No. 3. Nuevo Leon State Quality Award´s winners trend.

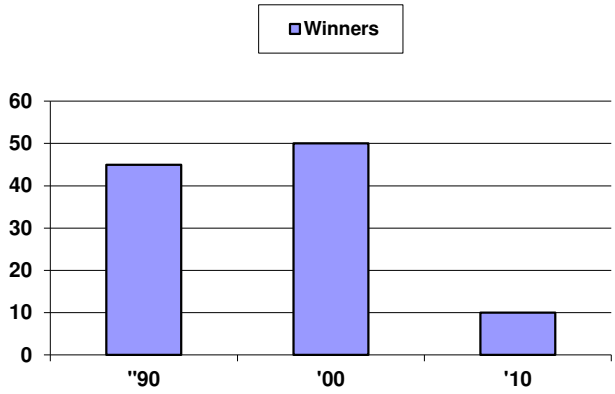
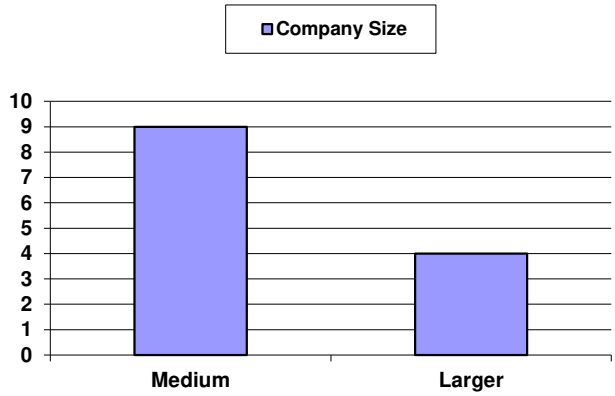


Figure No. 4. 2000 to 2011 Industry winners.



A stratified and random sampling was designed to take into account only respondents coming out of the industry category. This selected cluster compiles 13 large organizations. The questionnaire invitation was distributed using internet services and the respondents used the web system to fulfill the different aspects of the research. A total of 33 fully completed and usable questionnaires were returned in a timeframe of 2 months. 100 % of the 13 large organization participated into the research and more than one person answered the questionnaire. Sample size and correction factor is shown in fig. No. 5.

Figure No. 5. Sample size and sample correction factor.

$$n = \frac{z^2 pq}{B^2} = \frac{1.96^2 (0.85 * 0.15)}{0.05^2} = 195 \approx 196.$$

$$n' = \frac{1}{n} + \frac{1}{N} = \frac{1}{196} + \frac{1}{13} = 12.5 \approx 13.$$

Measurement

The only survey used a five-point lickert scale that varies from 1 (strongly disagree) to 5 (strongly agree), the demographic characteristics of the respondents is shown in the following table.

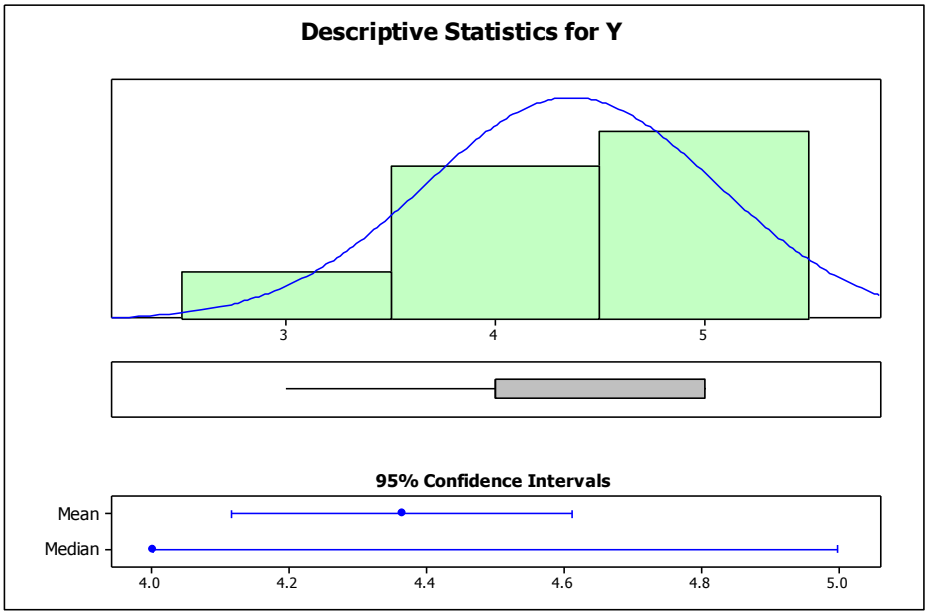
Table No. 3. Sample composition.

Variable	Composition
Sample	33
Gender	Men 77 %, Women 23 %
Age	30 – 45 Years
Education	Bachelor degree or above

Results

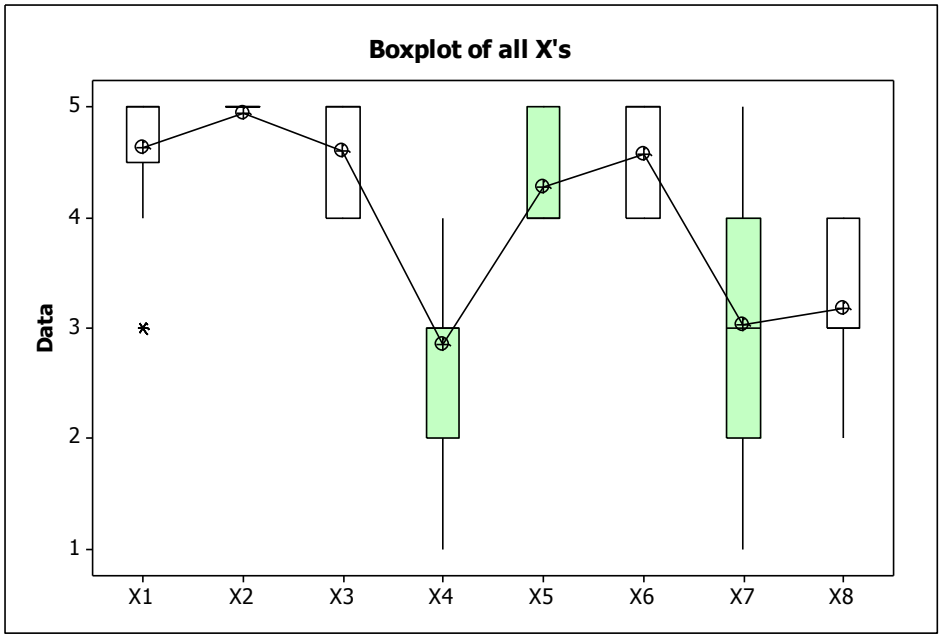
The preliminary analysis shows that Y factor (Impact to business results) is moving from 4 to 5 in the last third of Licker 5 point scale; the result leads to believe that respondents identify some of the factors as the cause of a high business results (see Fig. No. 6).

Figure No. 6. Descriptive statistics for Y (Business results).



In the following analysis of variance between all factors (X_1, X_2, X_3, X_4, X_5, X_6, X_7 and X_8) identify some of the factors that are different, in this case: X_1, X_2, X_3, X_5, X_6. The key finding is that there is difference between factor, then there are some that are impacting more to Y (see Fig. No. 7).

Figure No. 7. ANOVA for all factors.



The ANOVA analysis shows a p-value of 0.000 that is considered to be significant and R-Sq of 60.84% although is less than a typical expected value of 75% is sufficient evidence to affirm that there is a different in factors that could contribute more to the overall analysis of Y.

One-way ANOVA: X_1, X_2, X_3, X_4, X_5, X_6, X_7, and X_8.

Source	DF	SS	MS	F	P
Factor	7	164.845	23.549	56.81	0.000
Error	256	106.121	0.415		
Total	263	270.966			

S = 0.6438 R-Sq = 60.84% R-Sq(adj) = 59.77%

```
Individual 95% CIs For Mean Based on
Pooled StDev
Level   N    Mean   StDev  --+---------+---------+---------+-------
X1     33  4.6364  0.6990                          (--*--)
X2     33  4.9394  0.2423                              (---*--)
X3     33  4.6061  0.4962                          (--*--)
X4     33  2.8485  0.7550  (--*--)
X5     33  4.2727  0.4523                    (--*--)
X6     33  4.5758  0.5019                        (--*---)
X7     33  3.0303  0.9838    (--*--)
X8     33  3.1818  0.7269      (--*---)
                           --+---------+---------+---------+-------
                           2.80      3.50      4.20      4.90
```

Pooled StDev = 0.6438

The next step of analysis is to make a stepwise regression analysis for all X_i vs Y; The final model identifies X_1, X_3, X_6 and X_8 as the key variables that explains a total of 71.74% of overall variation.

Stepwise Regression: Y versus X1, X2, X3, X4, X5, X6, X7, X8

```
Alpha-to-Enter: 0.15  Alpha-to-Remove: 0.15
Response is Y on 8 predictors, with N = 33


Step              1        2         3         4
Constant    0.69767  0.04390  -1.15185  -2.81028

X1            0.791    0.773     0.757     0.729
T-Value        7.19     7.50      7.71      7.60
P-Value       0.000    0.000     0.000     0.000

X8                     0.231     0.223     0.215
T-Value                 2.33      2.37      2.37
P-Value                0.027     0.025     0.025

X6                                0.28      0.41
T-Value                           2.07      2.75
P-Value                          0.047     0.010

X3                                          0.27
T-Value                                     1.82
```

P-Value				0.080
S	0.435	0.407	0.386	0.372
R-Sq	62.52	68.26	72.35	75.27
R-Sq(adj)	**61.31**	**66.14**	**69.49**	**71.74**
Mallows C-p	**12.6**	**8.3**	**5.7**	**4.5**

This previous analysis is confirmed thru descriptive analysis that shows all key variables are situated in the high end of the scale either 4 or 5, except for X_8 that has a large mode identified in 3.0 of the scale (see Figs. No. 8, 9, 10 and 11).

Figure No. 8. Descriptive statistics for key variable X_1.

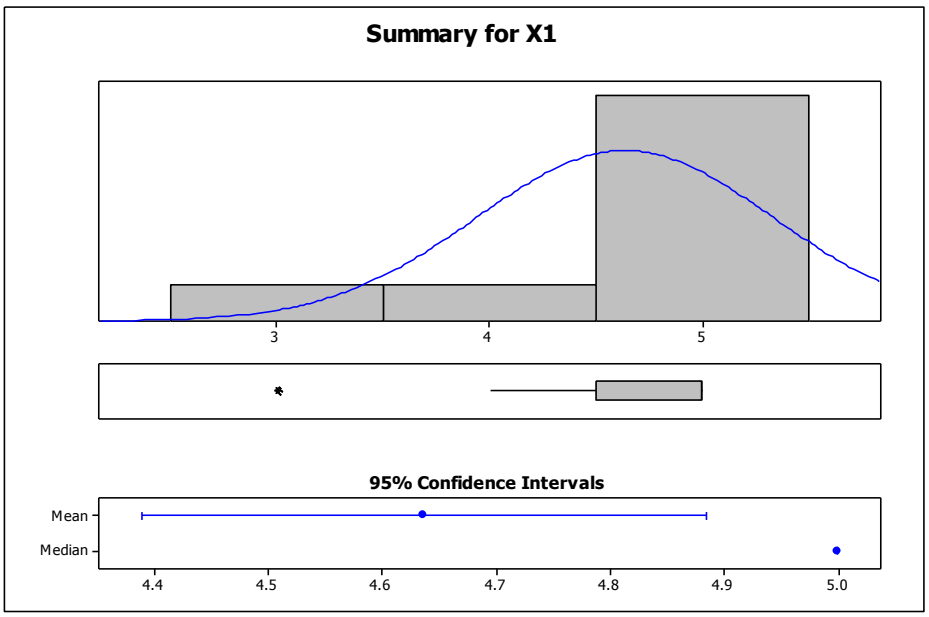


Figure No. 9. Descriptive statistics for key variable X_3.

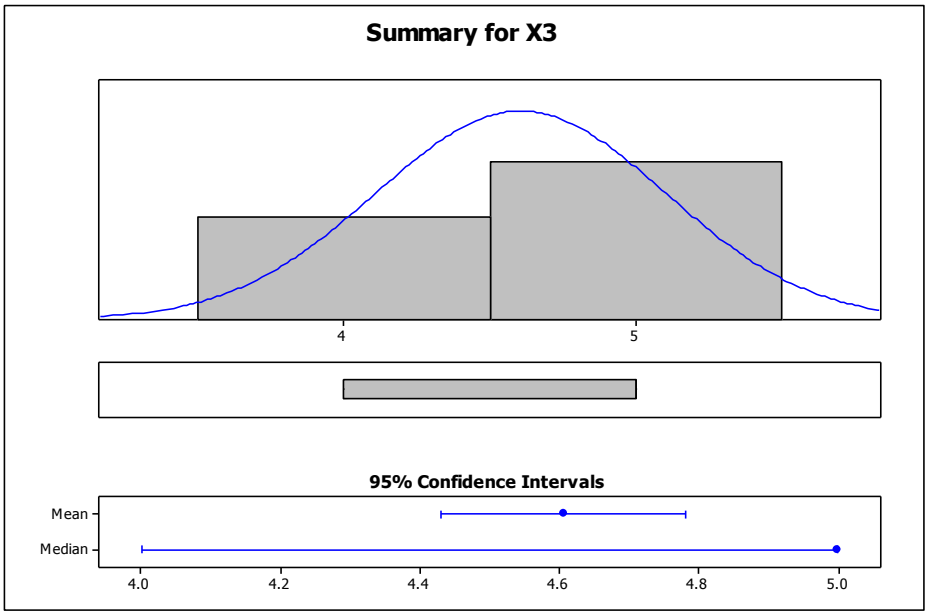


Figure No. 10. Descriptive statistics for key variable X_6.

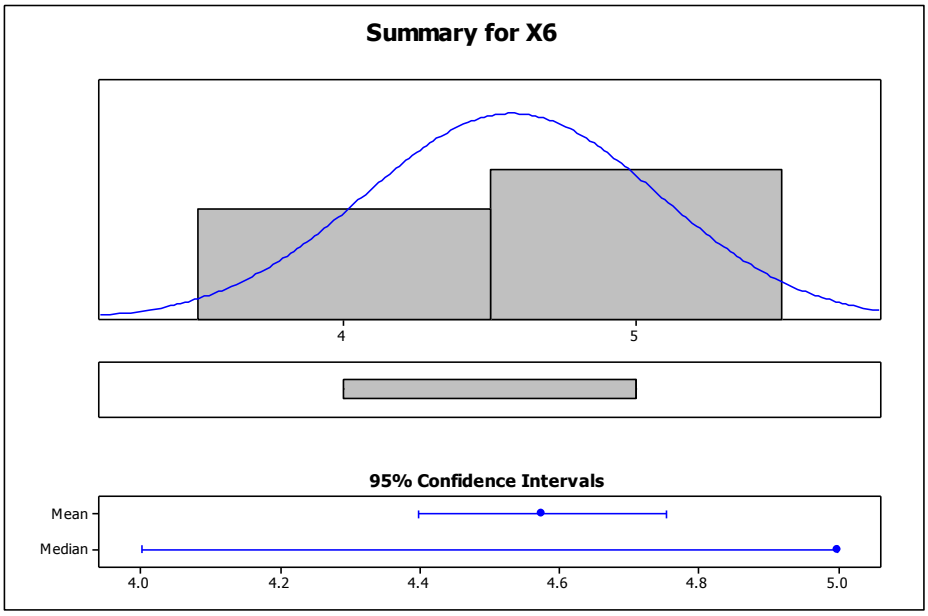


Figure No. 11. Descriptive statistics for key variable X_8.

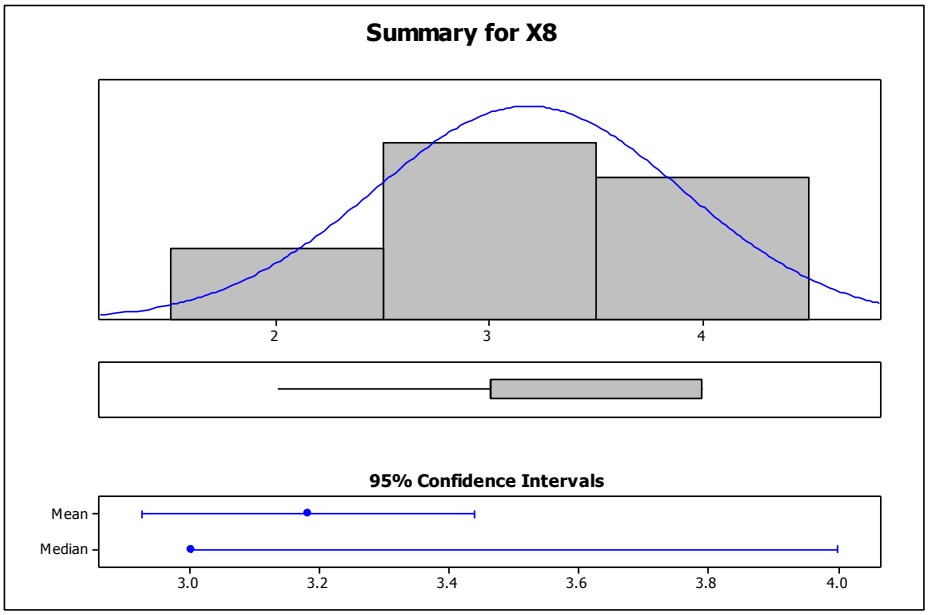


Table No. 4. Hypothesis test results.

Hypothesis	Test statistic	Approve or Reject
H_1: Leadership has no positive impact on financial results.	ANOVA / Stepwise	Reject
H_2: Strategic planning has no positive impact on financial results.	ANOVA / Stepwise	Approve
H_3: Customer focus has no positive impact on financial results.	ANOVA / Stepwise	Reject
H_4: Human capital has no positive impact on financial results.	ANOVA / Stepwise	Approve
H_5: New product, process and service development has no positive impact on financial results.	ANOVA / Stepwise	Approve
H_6: Operation management has no positive impact on financial results.	ANOVA / Stepwise	Reject
H_7: Supplier development has no positive impact on financial results.	ANOVA / Stepwise	Approve
H_8: Social responsibility has no	ANOVA / Stepwise	Reject

Hypothesis	Test statistic	Approve or Reject
positive impact on financial results.		
H_{o2}: X1, X2, X3, X5, and X6 have no positive impact on financial results.	ANOVA / Stepwise	Approved

Discussion

The theoretical framework identifies key elements to be considered into a holistic model to drive business results based on total quality management theory; however TQM (Total Quality Management) considers all elements as key drivers with the same weight or impact to business results. Several studies have been made in order to demystify this hypothesis and there is no a common agreement in such matter, nevertheless in this empirical research we can identify key elements of the TQM model as the high impact drivers to business results: X_1: Leadership, X_3: Customer focus, X_6: Operation management and X_8: Social responsibility.

- X_1: Leadership. The theoretical framework clearly identifies that leadership is one of the key elements in almost all top management models to drive productivity. People engagement thru leadership is a key in all business environments. In particular TQM theory is based on Leadership.

- X_3: Customer focus. All organizations are driven by its customers for either public or non public organization; they provide product and services to the customers or service users. Customers are the reason why a firm was built. All products and services are driven by customer's needs.

- X_6: Operation management. We can think about TQM and how a firm can be managed, but we can not think about any firm that has no specific operational guidelines to convey its manufacturing process or service process to assure having a product/service that meet customer specifications. Operation management is a key element that provide de operational parameters, guidelines, set ups sheets, work instructions, etc. in order to manage the manufacturing process thru productivity and effectiveness.

- X_8: Social responsibility. Social responsibility is not a typical variable into the TQM equation, however; Social responsibility has been identified in recent years as one of the primarily roles of any organization. The respect of all stake holders is a key for any business environment.

One idea that arises in this theoretical model is the competitiveness context of the company that influences the mix of key drivers of the TQM model, in such way that some variables can be more significant to another in regards of the competitive environment of the firm.

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