TQM and Competitive Advantage: Experiences within the Engineering, Electronics, and IT Industrial Sectors in Amman

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Abstract

Purpose: This paper aims to explore the impact that Total Quality Management (TQM) has on achieving competitive advantage within the engineering, electronics, and information technology (EEIT) sectors in Amman from the perspective of senior managers.
Methodology: Following an extensive review of the current literature, and underpinned by a pragmatic theoretical approach, this study adopted a quantitative methodology gathering survey data via an online questionnaire from 154 senior managers across 15 different enterprises operating within the EEIT sectors.
Findings: The study indicated that from the perspective of senior managers, across the different sectors, TQM has a positive impact on competitive advantage in relation to reducing waste, increasing efficiency, improving quality and enhancing employee satisfaction which subsequently results in improved financial performance. The findings suggested that across the three sectors, TQM practices were relatively well established, and that senior managers support key principles of TQM. However, the study also identified a number of perceived structural barriers within the TQM implementation process which impact on competitive advantage including insufficient resources, under-developed systems and support structures and a lack of access to appropriate training.
Originality: This study makes a valuable contribution to the debate on the strategic value of TQM in delivering competitive advantage and helps to increase understanding of the relationship between the two. Its focus on three different industrial sectors enables diverse views and experiences to be compared and contrasted therefore making a useful addition to the body of evidence within this field.

Keywords
Competitive Advantage; Total Quality Management; TQM; Service Quality; Engineering, Electronics; Information Technology

1. Introduction

This paper presents the findings of a quantitative study exploring the impact that Total Quality Management (TQM) has on achieving competitive advantage within companies operating within the engineering, electronics, and information technology (EEIT) sectors in Amman from the perspective of senior managers.

Increasing globalization, international competition and constantly changing customer demands have had a significant impact on the business environment over the last few decades. Jordanian organisations have therefore tried to adapt to this change and the introduction of different quality management approaches has been one of the ways in which they have responded. Increasingly, TQM has been seen as a significant factor influencing an organisation's level of competitive advantage through differentiation and cost leadership (Almansour, 2012). However there have been disagreements over what elements of TQM are most influential (Al-Ettayyem and Zu'bi, 2015), and there is evidence that not all organisations implementing TQM practices have benefitted from its implementation (Álvarez-García and Rueda-Armengot, 2016).

This study therefore makes a valuable contribution to the debate on the strategic value of TQM in delivering competitive advantage and helps to increase understanding of the relationship between the two. Its focus on companies operating within three different industrial sectors enables diverse views and experiences to be compared and contrasted therefore making a useful addition to the existing body of evidence within this field.

2. Literature Review

2.1 Jordan's Engineering, Electrical and IT Sector (EEIT)

The overall economy in Jordan has been significantly reformed over the past three decades, beginning with the liberalisation and reform agenda led by His Majesty King Hussein, followed by a programme of reforms, during the first decade of the 2000's, focusing on expanding foreign trade and privatised state-owned enterprises led by His Majesty King Abdullah (Alhajahmad and Lockhart, 2017).

The EEIT sector is one of largest sectors in Jordan and comprises of a range of sub-sectors including electrical home appliances, electronic devices, agricultural and industrial equipment, vehicles and transport equipment, and electronic hardware. In 2016 in Jordan, there were over 6,000 companies operating in this sector which was more than in any other industrial sector in Jordan (Alhajahmad and Lockhart (2017).

Jordan's Information Technology sector in particular has been growing and is starting to receive acknowledgement for its growing global software outsourcing services. It is estimated that this industry contributes around 12% of Jordanian national GDP. In the Economic Policy Council's Jordan Economic Growth Plan 2018-2022 (p.12), it is stated that in relation to IT, Jordan aims to capitalize on its competitive advantages of "having high quality human capital, favorable project economies, competitive wages and its convenient time-zone". The electronics sector has also experienced growth in Jordan and is centered around the industrial expansion in the kingdom (Qadoumi and Dibie, 2008), and the ratio of engineers to the population in Jordan is amongst the highest globally.

A key strategic objective of the Jordan Chamber of Industry (2018) is to increase the competitiveness of the Jordanian industry sector overall and to use the technological component of industry as a means for improving comparative and competitive advantages.

2.2 Understanding Total Quality Management (TQM)

Due to the wide range and perspectives of quality management and 'total' quality management (TQM), it is difficult to reach a consensus on its definition (Idris and Zairi, 2006). However, according to Baird, Hu and Reeve (2011), TQM can be defined as an organisational-wide integrative philosophy which aims to continuously improve the quality of products, services and processes in order to meet the expectations of customers. Relatedly, Talib, Rahman and Qureshi (2011) suggest that TQM is a total system approach which spans across all functions and departments, involves all employees, and which aims to consistently meet or exceed the requirements of customers.

There are a wide range of TQM practices recognised in current literature which are focused around a number of different factors including: leadership and management (Khamalah and Lingaraj, 2007; Talib and Rahman, 2010); customer orientation and satisfaction (Mahapatra and Khan, 2006); training and development (Ueno, 2008); employee involvement and engagement (Samat, Ramayah and Saad, 2006; Lakhal, Pasin and Limam, 2006); and continuous improvement and innovation (Fotopoulos and Psomas, 2009).

TQM practices are often categorised into 'hard' and 'soft' TQM. 'Hard' practices are those where statistical analysis or performance standards are used to assess quality and are most relevant to production and operations management, whereas 'Soft' practices have a more qualitative focus encompassing factors such as leadership, employee involvement in decision making and team work approaches (Yunis, Jung and Chen, 2013).

Approaches to TQM have evolved considerably resulting in the creation of a range of models such as Six Sigma, Kanban, Total Productive Maintenance, Lean, and Just-in-time all of which are frequently adopted today in different settings and industries (Dhonogade, Singh and Shrouty, 2013). According to Zakuan *et al*. (2010), all organisations must implement quality management practices such as this if they want to be able to compete successfully in the global market.

2.3 TQM, Performance and Competitive Advantage

According to Porter (1985), competitive advantage can be defined as the advantage an organisation has over its competitors. Competitive advantage gives an organisation 'the edge' over its rivals and enables it to generate greater value for the organisation itself and its shareholders. Over the last few decades, a range of studies have demonstrated that TQM has benefited organisations and given them this 'edge', by improving the quality of products and services, helping to provide superior products to customers, and increasing performance (Hoang *et al*., 2010).

According to Tanninen, Puumalainen and Sandström (2010), TQM practices can influence organisational performance and competitive advantage through two key processes. The first is via internal performance with an increase in efficiency, reduced waste and a higher return on assets. The second is via higher levels of customer satisfaction which in turn impacts positively on brand value and customer loyalty.

Similarly, according to Summers (2006) TQM practices can: lead to improvements in the quality of products; make better use of resources and reduce costs; and minimise errors and

reduced delays which subsequently facilitate an organisation to enhance competitive advantage boosting market share. Kumar *et al*. (2009) share this view and also that TQM practices can significantly improve employee morale, increase efficiency, reduce customer complaints, and ultimately increase profitability. According to Jiménez-Jiménez et al. (2015), TQM practices also have an impact on competitive advantage by facilitating organisational learning and promoting innovation; a view supported by Jung and Chung (2016) in their study of TQM and innovation in Korea and Kafetzopoulos (2015) in his study conducted in Greece.

From their study of TQM and firm performance in the manufacturing industry in Jordan, Al-Refaie and Hanayneh (2014) found that Jordanian firms were generally successful in implementing quality improvement programmes but found that certain approaches such as Six Sigma were less well embedded than others. Another study focusing on the Jordanian manufacturing industry (Attiany, 2014) found that the use of benchmarking of internal and external processes as a TQM tool helped organisations gain competitive advantage in that it helps shift the corporate mind-set from one which is relatively complacent to one which has a strong sense of urgency for continuous improvement.

2.4 TQM Enablers and Inhibitors

Within the current literature on TQM and performance, a vast range of enablers and inhibitors have been proposed (Talib, Rahman and Qureshi, 2012). One of the most commonly identified factors impacting on the effectiveness of TQM is organisational culture (Kumar and Sankaran, 2007). Employee engagement and involvement has frequently been proposed as being a significant contributing factor to changing organisational culture into one which embraces quality improvement (Chuang, Chen, and Tsai, 2015). Another factor is the implementation process associated with TQM. According to Talib, Rahman and Qureshi (2011) this process is crucial to ensuring its long-term success and is something which is organisation-specific rather than generic.

Similarly, Weingarten et al. (2013) proposed that contextual factors such as an organisation's size, the local and national culture in which it operates, and the scope of its operations all impact on the success of TQM and that a 'one size fits all' approach is not appropriate in relation to TQM implementation. Another identified enabler of TQM is effective supplier quality management (Zakuan et al., 2010) which can help organisations achieve competitive advantage in both domestic and international markets through the establishment of long-term strategic relationships and the integration of logistics to deliver positive outcomes relating to delivery, flexibility, and cost performance.

With reference to the inhibitors, Polat, Damci, and Tatar (2011) identified: a lack of senior management commitment to the principles of TQM; problems in transferring TQM responsibility to the 'front-line'; disinterest and apathy from staff; and perceptions that TQM is too bureaucratic as barriers to maximizing the potential of TQM. Goetsch and Davis (2014) also highlighted: weak leadership; insufficiently supported or established teams; poorly constructed processes to link all of the organisation's key functions; and a lack of required TQM skills and experience as being key inhibitors.

3. Methodology

Underpinned by a pragmatic theoretical approach, this study adopted a quantitative methodology which involved gathering survey data via an online questionnaire from 155 senior

managers across 15 different enterprises operating within the EEIT sectors. The questions were derived from an extensive review of the current literature on TQM and competitive advantage and were developed into an online survey using an online survey provider. This was piloted prior to its full use to ensure the questions were clear and unambiguous. Questionnaires have been used in a number of studies of TQM and competitive advantage (Elshaer, 2014; Migdadi, 2017; Sweis et al., 2016) and were considered to be a pragmatic and efficient tool for this study also.

The questionnaire used in this study was based on the tool used in Zadry and Yusof (2006) which explored the views of managers working within the automotive industry in Malaysia in relation to: their general views and experiences of TQM in their company, their views on critical success factors, the impact of TQM on performance and the barriers faced. The validity of this questionnaire had been confirmed and the reliability of the different factors included in the survey was determined by establishing their alpha weighting using Cronbach's alpha coefficient. Construct validity was assessed using factor analysis. The results confirmed that the questionnaire had a high level of internal consistency and was therefore a reliable tool to use. For this study, additional questions specific to views on competitive advantage and TQM were added. A descriptive statistical method was used to analyse the survey results and identify the key characteristics.

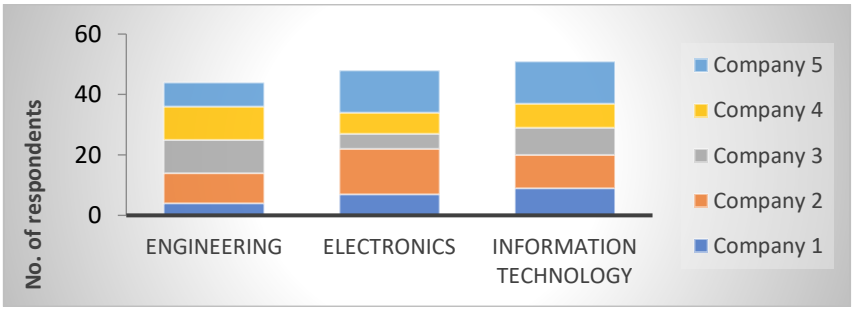
5 organisations in each of the identified sectors (Engineering, Electronics and Information Technology) based in Jordan were selected at random and were approached for permission to send the survey to their senior managers. All of those organisations approached agreed to participate in the study providing the results were anonymised. The link to the survey was therefore sent to the organisation to disseminate amongst their senior managers along with a covering email explaining the purpose of the study and giving assurances about anonymity.

4. Findings

4.1 Respondents

It is not possible to determine the exact response rate to the survey as it was distributed by the selected companies themselves and it is not known how many employees did not read the email containing the link to the survey due, for example, to being on annual leave during the survey period. However, 154 individuals responded to the survey with representation across each of the different companies and sectors. Figure 1 presents a breakdown of the number of responses per sector.

Figure 1: Number of Respondents by Sector and Company



The age of respondents ranged from 19 to 58 years (mean = 38 years; median = 39 years) and the majority (78%) were male. 82% of respondents had been in their post for 2 or more years (mean = 2.96 years; median = 3.0 years). All respondents held 'senior' posts in their respective organisations.

4.2 Understanding of TQM

The first set of questions in the survey examined the respondent's views and understanding of TQM principles. Respondents were asked to rate to what extent they agreed with a range of statements relating to TQM on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). A mean score was then calculated and aggregated to allow a comparison against the different sectors to be made. The results are shown in Table 1.

Table 1: Comparison of Mean Scores between Sector Respondents against TQM principles

TQM Principles	**Engineering (mean score) (n=55)**	**Electronics (mean score) (n=48)**	**Information Technology (mean score) (n=51)**
TQM is a management philosophy and practice to ensure effective and efficient use of all available resources	4.76	4.69	4.18
TQM aims to make customer satisfaction as the focus of a business	4.44	4.65	4.18
Teamwork and participation are important for achieving a continuous improvement culture	4.80	4.67	4.18
Training and education are vital elements with respect to TQM implementation	4.44	4.65	4.18
Statistical techniques are important to ensure consistency of product and process quality	4.58	4.60	4.18
Supplier involvement is vital in supporting quality improvement	4.44	4.65	4.18
Management leadership, commitment and support determine the success of new change initiatives	4.56	4.40	4.18
Management must provide adequate resources in every aspect of the business	4.64	4.69	4.18
A work environment, which is conducive for improvement, is created through management-worker partnerships	4.36	4.35	4.18
Initiatives such as Kaizen, suggestion schemes, quality circles, etc. will motivate employees to participate in quality improvement	3.96	4.06	4.18

4.3 Types of TQM Practices

Respondents were then asked about the different TQM practices that exist within their respective organisations and were asked to indicate the extent to which they were implemented using a Likert scale ranging from 1 (not implemented) to 5 (fully implemented). Again, a mean score was calculated to enable a comparison between the different sectors to be made (see Table 2).

Table 2: Comparison of Mean Scores between Sector Respondents against the level of implementation of different TQM initiatives

TQM Initiatives	**Engineering (mean score)**	**Electronics (mean score)**	**Information Technology (mean score)**
A dedicated quality department	3.05	2.98	3.71
Customer satisfaction initiatives	3.62	3.60	3.45
Employee satisfaction initiatives	3.00	3.10	3.82
Mechanisms for involving suppliers in quality	3.17	3.42	3.00
Employee Training programmes on TQM	3.20	3.15	3.69
Performance monitoring strategies	4.05	4.15	3.57
Dedicated resources are allocated to quality improvement	3.18	3.06	3.51

4.4 Impact of TQM on Competitive Advantage

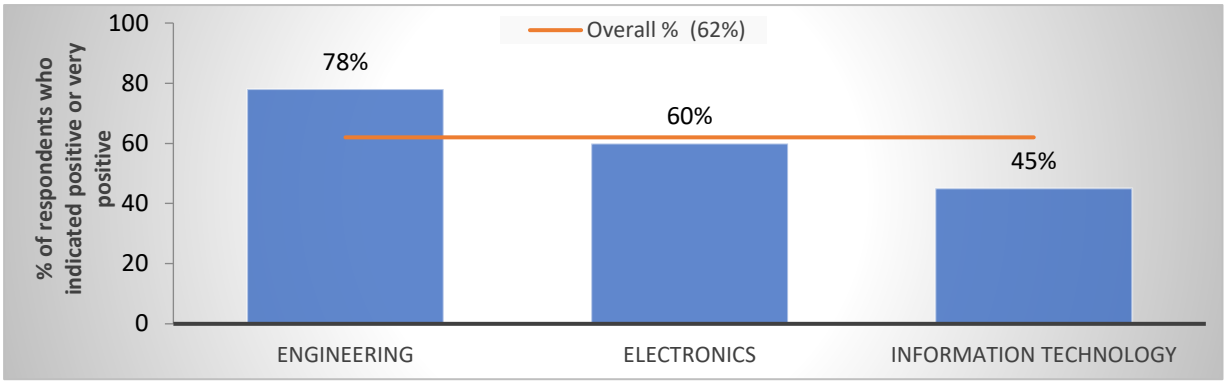
The next series of questions focused on respondents' perceptions of the impact of TQM on competitive advantage in their respective organisations. A scale ranging from 1 (significant negative impact) to 5 (a significant positive impact) was used to gauge respondents' views. Table 3 presents the mean scores for each sector:

Table 3: Comparison of Mean Scores between Sector Respondents against statements of the impact of TQM on competitive advantage

Impact of TQM on competitive advantage	**Engineering (mean score)**	**Electronics (mean score)**	**Information Technology (mean score)**
Customer satisfaction has improved	3.42	3.44	3.18
Customer complaints have reduced	3.42	3.44	3.18
There is a stronger quality culture	3.62	3.60	3.82
Financial results have improved	3.82	3.69	3.82
Wastage has reduced	3.42	3.56	3.82
Partnerships with suppliers have improved	3.16	3.19	3.18
Employee satisfaction has increased	3.38	3.35	3.82
Employee turnover has reduced	3.18	3.15	3.18

Respondents were then asked to indicate to what extent they felt that the TQM practices in their organisations had impacted on competitive advantage on a scale ranging from 'very negative impact' to 'very positive impact'. Overall, the majority indicated that it had provided a positive impact on their organisation's level of competitive advantage as shown in Figure 2 below:

Figure 2: Perceived Impact of TQM on Level of Competitive Advantage - % of respondents who indicated 'positive' or 'very positive' impact



4.5 Barriers to achieving competitive advantage through TQM

The final section of the questionnaire focused on respondents' views of the barriers which can impact on maximizing the potential of TQM on competitive advantage. Respondents were asked to rate a list of commonly cited barriers in terms of how much of a barrier they represented in their organisation ranging from 1 (no barrier) to 5 (significant barrier). The results are shown in Table 4.

Table 4: Comparison of Mean Scores between Sector Respondents against statements on the barriers

Barriers	**Engineering (mean score)**	**Electronics (mean score)**	**Information Technology (mean score)**
Lack of understanding of TQM	2.96	3.08	4.00
Lack of preparation	2.95	2.81	3.82
Resistance to change	3.25	3.50	4.00
Lack of vision and leadership	2.75	2.77	3.82
Lack of senior commitment	2.73	2.75	4.00
Lack of customer focus	2.78	2.81	3.82
Insufficient resources	3.87	4.27	4.82
Lack of systems and structures for TQM	3.69	4.13	4.65
Lack of training	3.25	3.73	4.82
Lack of rewards and recognition	3.16	3.08	3.00
Lack of effective measurement and evaluation	3.02	3.06	3.18

5. Discussion

Overall, the responses of 154 senior managers were obtained and all sectors were represented in the results. Consistent with the age profile of the population in Jordan, the majority of respondents were aged under 40 years old and were predominantly male.

Across each of the sectors there appeared to be a high level of understanding and agreement with common TQM principles. Whilst the mean score for the respondents from the Information Technology sector remained the same across all of the questions, it varied slightly in the other sectors with the principles of teamwork, philosophy and the provision of adequate resources. The use of formal quality improvement initiatives to promote employee motivation received the lowest mean level of support, although was still indicated as being useful.

The respondents also indicated that within the organisations they work within, the common TQM initiatives were relatively well implemented. Within the sectors of engineering and electronics, however, the existence of a dedicated quality department appeared to be less prevalent or less embedded within the different organisations. Within the information technology sector, mechanisms for involving suppliers appeared to be less well implemented. Across all sectors, performance monitoring strategies were identified as being generally well implemented, along with customer satisfaction initiatives.

The results indicated that across the board, TQM had impacted positively on different aspects of the respective organisations. For the engineering and electronics sector companies, positive effects were seen mainly in relation to financial results due to increased efficiency and improved quality and a stronger organisational quality culture. For information technology companies, positive results were felt to be in relation to these two factors along with reduced wastage and increased employee satisfaction. Overall, 62% of respondents felt that in terms of their organisation's level of competitive advantage, there had been a positive impact as a result of implementing TQM practices.

The key barriers to successfully implementing TQM to deliver increased competitive advantage stemmed from having insufficient resources dedicated to quality and having a lack of systems and structures in place to support TQM. Respondents working within the information technology sector also identified a lack of training as a key barrier.

6. Conclusion

The study indicated that from the perspective of senior managers, across the different sectors, TQM has a positive impact on competitive advantage due to a reduction in waste, increased efficiency, improved quality and enhanced employee satisfaction, resulting in improved financial performance.

The findings suggested that across the three industrial sectors, common TQM practices are relatively well established, and that senior managers support key TQM principles. However, the study also identified a number of perceived structural barriers within the TQM implementation process which were felt to inhibit opportunities to fully maximise competitive advantage. These included a lack of dedicated resources, under-developed systems and support structures and limited access to appropriate training.

7. Limitations and areas for further research

This was a quantitative approach to investigating the impact of TQM practices on companies within different industrial sectors. The use of a mixed method approach incorporating interviews with a sample of representatives from each of the identified companies may have enabled richer data to be elicited. This could represent an area for further research. In addition, it would be interesting to extend this study to other industrial sectors in Jordan to enable a comparison of the results to be made.

Acknowledgements

The author would like to thank all of those who took the time to share their views and experiences by participating in the survey, and the host organisations who allowed the survey to take place.

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