

# Northumbria Research Link

Citation: Shokri, Alireza (2019) Investigating the view of quality management success factors amongst future early career operations leaders. *International Journal of Quality and Service Sciences*, 11 (4). pp. 487-503. ISSN 1756-669X

Published by: Emerald

URL: <https://doi.org/10.1108/ijqss-02-2019-0027> <<https://doi.org/10.1108/ijqss-02-2019-0027>>

This version was downloaded from Northumbria Research Link:  
<http://nrl.northumbria.ac.uk/id/eprint/41743/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



**Northumbria  
University**  
NEWCASTLE



**UniversityLibrary**



**Investigating the view of quality management success factors amongst future early career operations leaders**

Journal:	<i>International Journal of Quality and Service Sciences</i>
Manuscript ID	Draft
Manuscript Type:	Research Paper
Keywords:	Quality Management, Operation management, Leadership behaviours, Total Quality Management, Quality Culture

SCHOLARONE™  
Manuscripts

## Investigating the view of quality management success factors amongst future early career operations leaders

### ABSTRACT

**Purpose** - This research aims to investigate the gap between the current vision and knowledge of future early career operations leaders (OL) and common strategic total quality management (TQM) frameworks such as Malcolm Baldrige National Quality Awards (MBNQA) and Competing Value framework (CVF).

**Design/Methodology/Approach** - A survey questionnaire was developed for different groups of participants as current higher education students to identify the gap and analyse the significance of these groups on the factors in TQM framework. The Kruskal-Wallis test as the non-parametric quantitative analysis technique was adopted for this research.

**Findings** – A new set of TQM factors with necessity of more knowledge and understanding of future generation was identified, followed by highlighting clear differences amongst different groups of this generation in terms of their demographic measures, perceived leadership style and organisational culture.

**Practical Implications** – A sustainable operations leadership practice needs managers and leaders with a sustainable knowledge development of quality management (QM); and as the result of this study, the current vision of future young operations leaders would not echo this.

**Research Limitations/Implication** – This research study contributed significantly to the existing research about common QM models and their integration with theories relevant to organisational culture and leadership. The data collection can be extended further in the higher education sector or beyond that.

**Originality/Value** - This study has a systematic, non-parametric approach towards currently fragmented QM analysis, and is integrated with human resource and visionary elements of future young OL and universal QM models and theories.

**Key words** – Quality Management, Operations Management, Leadership, Early Year Professionals, MBNQA Model, Non-Parametric Test

**Category** – Research paper

### 1. Introduction

Operations management philosophy has progressed significantly in recent decades as the result of globalisation, cultural integration and sustainable mass customisation. This obliges the future Operations Leaders (OL) to transform their operations management and leadership philosophy towards quality excellence and efficiency. It was argued by scholars (Starr, 2016 and Walker et al, 2014) that any sustainable operations management practice should be transformed towards achieving quality excellence and efficiency. Recent research has sought OL and their employees possess requisite job skills and a unifying sense of quality in their organisation (Jayaram and Xu, 2016). Quality is defined as delighting all stakeholders, taking context into consideration (Van Kemenade, 2014).

The “Context” paradigm of QM was introduced as the future trend embedded in operational and strategic factors and dimensions of operations management, to handle the emergent change in QM, with more contextual approaches promising flexibility and adaptability (Van Kemendae, 2014). Despite heavy longitudinal studies in QM in the context of industry and size of organisations and also innovative evolution of operations management (Dong et al, 2016; Dora and Gellynck, 2015; Mosadeghrad, 2015; Kanpp, 2015; Isa and Usmen, 2015; Graham et al, 2014; Bhat et al, 2014; Algasem et al; 2014; Ergun et al, 2014; and Phan and

Chambers, 2013), there is insufficient emphasis on QM philosophies, models, practices and data as part of OL evolution for the future to promote more sustainable and competitive management (Stanton et al, 2014). In spite of constant industrial evolution towards Industry 4.0 in the future, there is still strong argument of the pivotal role of QM with support from future OL (Yadav et al, 2017). According to Yadav et al (2017) and Fatorchian and Kazemi (2018), Industry 4.0 involves connection and integration of digital/virtual and real/practical world for the purpose of fundamental revolution in businesses that is only possible with support from future OL with strong view on QM.

On the other hand, the crucial role of top management commitment on QM (Njeru and Omondy, 2016) and the evolution of the QM concept from competition-driven to an established culture, with a proactive approach, has been highlighted (Weckenmann et al, 2015). Therefore, this puts more pressure on future OL to enhance the organisation, environment and workforce for the future in order to meet satisfactory customer quality standards. However, it was suggested that the examination of QM with a successful theoretical and conceptual approach in a business is strongly fragmented in the real world (Evans, 2013). This prescribes the necessity of more critical analysis of the vision of future OL about QM. We intended to identify the human and workplace elements – relate critical success factors for QM in the vision of future young OL and also investigate the distinctive gap between their vision and the common critical success factors of the respective QM models.

We describe the future young OL as “early year professionals (EYPs)” in their future roles and have still no professional and management experience and with critical need of sustaining leadership power (Starr, 2016; and Hallet, 2013). Despite introducing EYPs as a homogeneous group with differing values, attributes or operations than the previous generation (Ng et al, 2012), more recent studies revealed that their job attributes are heterogeneous (Guillot-Soulez and Soulez, 2014). This generation in different cohorts or proxy such as gender, age, work and education experience differs remarkably from previous generations. With the support from previous studies (Guillot-Soulez and Soulez, 2014), this study intends to focus on young potential graduates as future senior OL in order to exclude the effect of career stage, which is a recurrent problem in generational analysis.

## 2. Total Quality Management (TQM) model approaches

TQM is a crucial philosophy that facilitates young OL to experimental problems with unknown solutions in order to establish quality and sustainably enhance operations (Jimenez-Jimenez et al, 2015; and Phan and Chambers, 2013). TQM frameworks embrace quality critical components and should also consider evolution in leadership behaviour and be incorporated with emerging managerial and leadership aspects in the future (Dahlggaard-Park et al, 2018). However, despite a great level of recognition for this philosophy, some researchers admit that there is no guarantee of TQM success as this is a heterogeneous philosophy with a lack of clear prescription (Mosadeghrad, 2015 and Sabella et al, 2014). In response to this challenge, Graham et al (2014) have recommended operations management contribution and commitment to generate clear results and minimise the ambiguity of TQM as a key driver of TQM success.

The essence of operations management visibility and interdependency of critical factors, or TQM elements (Suarez et al, 2014) has revealed a greater need of systematic and well-proven models to be utilised in organisations. This advocates the role of any OL as facilitators to establish QM in their operations management and leadership philosophy through developing appropriate visions and utilising appropriate models. There are different QM models and

1  
2  
3 frameworks that directly or indirectly reflect principles and hard and soft elements of TQM  
4 such as the Malcolm Baldrige National Quality Awards (MBNQA) (Jones, 2014), European  
5 Foundation for Quality Management (EFQM) Excellence Model (Suarez et al, 2014),  
6 Competing Value Framework (CVF) (Do Nascimento Gambi et al, 2015) and Quality  
7 Management Extension Model (Slack et al, 2013). In addition to these models, the theories of  
8 some quality gurus such as Deming, Juran and Crosby (Singh et al, 2013) can be used as  
9 theoretical platforms to extract quality constructs which could be considered by any  
10 operations manager including future young OL with their distinctive personality in this  
11 century.  
12  
13

14  
15 EFQM model is an integrated learning and improvement TQM framework that  
16 encompasses a comprehensive and systematic self-assessment process that allows  
17 organisations to discern their strengths and weaknesses with the objective of quality  
18 improvement (Liu and Ko, 2018; and La Rotta and Prez Rave, 2017). Nevertheless, this  
19 model was criticised over its lack of distinction between soft and hard TQM elements  
20 associated to its building ingredients of leadership, people, strategy, partnership, process and  
21 result (Liu and Ko, 2018; and Gomez Gomez et al, 2011). Its generalisability and vibrant  
22 implementation across the Europe has also been questioned (La Rotta and Prez Rave, 2017).  
23 The MBNQA model was selected to be used as the main guiding framework for this research,  
24 as a highly recognised structured model with universality and relationship with seven  
25 different categories that has been acknowledged by both scholars and practitioners  
26 (Moonsamy and Singh, 2014). The categories or factors that each consists of various  
27 indicators include; “leadership”, “strategic planning”, “customer focus”, “measurement,  
28 analysis and knowledge management” integrated with “workforce focus”, “operations” and  
29 “result”, with all seven factors supported by the “core values” (Jones, 2014; and Sabella et al,  
30 2014).  
31  
32  
33

34  
35 The vision and insight of the OL within organisations towards principles of TQM  
36 philosophy articulates the TQM organisational culture that distinguishes them from other  
37 leaders by selecting the best possible business excellence practice (Kumar and Antony, 2009;  
38 and Dahlgaard and Dahlgaard-Park, 2006). Amongst several organisational culture models  
39 that were used in QM literature, the CVF model is one of the best established, theoretically  
40 sound and relatively widely used instrument (Zu et al, 2010). This model presents four  
41 different organisational cultures as: “Group Culture (emphasis on teamwork and facilitator-  
42 type leader)”, “Hierarchical Culture (emphasis on order with administrator-type leader”,  
43 “Rational Culture (emphasis on goal-setting with achievement-type leader)” and  
44 “Developmental Culture (emphasis on creativity with entrepreneurship – type leader)” (Do  
45 Nascimento Gambi et al, 2015), which are essential to be assessed for EYPs.  
46  
47

48  
49 Visionary and transformational leadership and organisational culture were introduced as  
50 main TQM constructs to facilitate change and creativity (Knapp, 2015; Dora and Gellynck,  
51 2015; Suarez et al, 2014; Moonsamy and Singh, 2014; and Asif et al, 2013). Visionary  
52 leadership style facilitates the organisational change initiatives to embark on TQM practices  
53 (Kanpp, 2015; and Manville et al. 2012). Conversely, the most recent study by Teoman and  
54 Ulengin (2018) highlighted the importance of improving leaders’ behavioural leadership  
55 skills such as teamwork and employee empowerment that needs to be emphasised as part of  
56 future OL development. The leadership styles are divided into participative, democratic,  
57 situational, goal-oriented and autocratic (dictatorial) (Knapp, 2015; and Laohavichien et al.,  
58 2011).  
59  
60

Strategic decision making in operations management and re-engineering was noted by  
current operations research (Venkat et al, 2015). Planning for QM was highlighted in Juran’s

1  
2  
3 theory of QM (Njeru and Omondi, 2016). Rao (2015) emphasised that successful leaders  
4 require clear strategy with stretched goals for employees, as Jack Welsh successfully did in  
5 General Motors (GM) through the Six Sigma quality tool. According to NIST (2016),  
6 efficient work systems must also be designed in a way that allows an organisation to be agile  
7 and protect intellectual property. For instance, workplace flexibility practices have a strong  
8 positive relationship with strategic corporate performance (Whyman et al, 2015).  
9

10  
11 Market research and customer engagement are essential for OL to identify customers'  
12 needs and translate them into appropriate organisational requirements in a timely fashion to  
13 satisfy them (Pakdil and Kurtulmusoglu, 2018; Njeru and Omondi, 2016; and Mosadeghrad,  
14 2015). Social media as a recently-used, digital marketing tool was suggested as one of the  
15 most efficient and interactive norms of capturing the ever-demanding voice of customer  
16 (VOC) and global market research for technology and innovation – oriented OL now and in  
17 the future (Lilja et al, 2017; Chan et al, 2016; and Evans, 2013).  
18  
19

20  
21 Longitudinal studies of TQM practices found a positive association between HR practices  
22 such as; empowerment, extensive training, performance appraisal and teamwork with TQM  
23 and organisational performance in the manufacturing and service sector (Stanton et al, 2014).  
24 Training and TQM-driven performance management were introduced as integral intellectual  
25 competence (IC) factors, which act as catalysts, to develop knowledge, skill and attitude  
26 (Harley et al, 2010). Hilton and Sohal (2012) supported the idea of developing a manager's  
27 and employee's capacity as the first priority to pursue any quality strategy.  
28  
29

30  
31 Research studies have revealed that the pursuit of QM at an operational or process level is  
32 the ultimate formula to TQM (Moonsamy and Singh, 2014; and Suarez et al, 2014). Process  
33 improvement and control is a result of strategic management and human resource  
34 development and was suggested as part of the TQM philosophy to minimise variation and  
35 promote QA culture in the organisation (Asif et al, 2013). This practice must be continuously  
36 reviewed and modified to create Continuous Improvement (CI) culture which is another  
37 important indicator to establish TQM. The contemporary research (Van Kemenade, 2014)  
38 recognised CI as an ongoing improvement process with a crucial role in a TQM environment  
39 and approachability towards innovation (Lilja et al, 2017) that makes it more appealing for  
40 future OL.  
41

42  
43 Emergence of technological-based management and effective, collaborative and interactive  
44 information management systems and performance measurement were recommended as the  
45 essential element to be more highly recognised and promoted by OL in the future ( Lilja et al,  
46 2017; and Mosadeghrad, 2015). Creating the knowledge management pool and a continuous,  
47 cohesive and collaborative tacit and explicit knowledge and information sharing would  
48 promote effective QM practices (Gutierrez Gutierrez et al, 2016; Pascal et al, 2013) and  
49 broaden effective operations management experiential learning (Roth et al, 2016).  
50

51  
52 The human-focused and intelligent two-folded approach of QM, as suggested by  
53 Weckenmann et al (2015), Jimenez-Jimenez (2015) and Van Kemendae (2014) would  
54 encourage OL to lead a higher quality organisation, environment and workforce for the future  
55 considering ethics, governance and financial performance. Notwithstanding, perceived  
56 customer satisfaction, in an ever-growing and considerably demanding environment, is a  
57 challenge for OL who want to excite their customers due to complex customer satisfaction  
58 rubric and possible external and internal mediating factors. Asif et al (2013) brought some  
59 very interesting issues to attention, which include social and ethical considerations in a  
60 broader context and environment as an essential indicator for the MBNQA. This has sparked  
significant attention towards ethics and social responsibility. Therefore, a three -dimensional

sustainable OL with social, environmental and financial perspectives has been increasingly promoted by scholars and OL as a future trend (Walker et al, 2014).

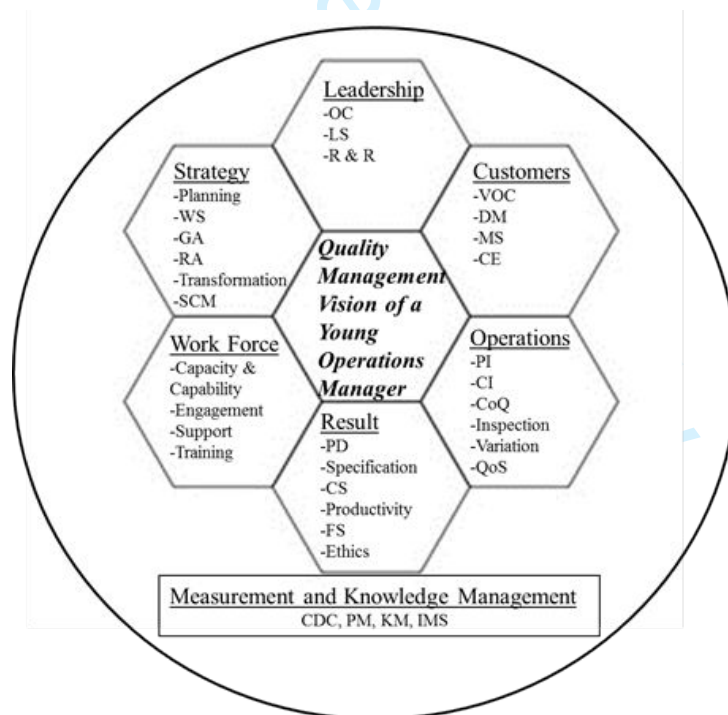
The system is used in any organisation in different sectors and of differing sizes to guide and measure the success of organisational and operational excellence in terms of quality and process improvement (Jones, 2014). The crucial TQM indicators that were presented in the MBNQA and other QM models and theories such as CVF model have guided authors to develop and propose a “multi-hexagonal conceptual framework” ( Figure 1).

Therefore, it was decided to investigate the vision of potential future, young OL for every single category in order to examine the current view of these future EYPs about QM key performance indicators (KPIs) and find the most significant gaps. Respectively, differences in relation to the QM vision amongst demographic and organisational leadership style groups of participants as future OL with hypothetically heterogeneous job attribute will be identified. Hence, three research questions (RQ) have been developed by authors:

*RQ1. What are the key TQM KPIs with greatest deal of knowledge gap for future OL?*

*RQ2. Is there any significant difference in the vision of future young OL in relation to their demographic aspects about TQM KPIs?*

*RQ3. Is there any significant difference in the vision of future young OL in relation to their perceived ranking of different leadership and organisational culture styles about TQM KPIs?*



Leadership: OC  
 GA(Gap Analysis  
 Customer), DM  
 Management: C  
 (Information Management  
 Quality), QoS (C

Figure 1 – A common Multi –Hexagonal Conceptual QM framework (retrieved from MBNQA

### 3. Research methodology

A survey questionnaire instrument was utilised to cover an appropriate number of future OL with purposive sampling. As supported by Guillot-Soulez and Soulez (2014), it was decided to target the young and educated generation, with no particular permanent management role and extensive experience as future OL, to prevent the effect of career stage in the survey. Nonetheless, their casual work experience, during or before their education has been considered as non-career stage and therefore was included in the survey. This means that the authors intended to investigate the pure vision of future OL among EYPs. Two different cohorts of people were targeted in the format of two case studies, as post A-level students and to be – graduated students, to investigate the knowledge gap and reflect RQ1. The demographic measures such as age, gender, casual work experience and course of study have been analysed to reflect RQ2. Perceived ranking of five different types of leadership styles (five as the top ranking to one as the low ranking) and four types of the CVF organisational culture approaches (four as the top ranking and one as the low ranking) by respondents have been analysed to reflect RQ3.

Questions reflected predominantly MBNQA and CVF factors and their indicators, while covering some demographic measures. Table I presents indicators in each MBNQA category that were used in this questionnaire and their corresponding TQM model and theory as well as literature sources. The questionnaire consists of two sections: Section 1 of the questionnaire concerned with demographic questions and Section 2 included questions to reflect all indicators in the MBNQA. The Likert score of 1 (as lowest level of agreement) to 7 (as highest level of agreement) and also ranking model were used in the questionnaire structure.

Having considered common ethical measures and practices, the questionnaire was disseminated among populations in both cohorts followed by a three week, follow-up period. In total, 1483 questionnaires were sent to potential respondents of both cohorts in a Business faculty as part of a UK-based University via physical or digital dissemination. Having had careful consideration of questions and terminology of indicators, researchers were confident about the level of potential respondents' self-knowledge and understanding of the questionnaire. This was also supported by conducting a pilot scheme and asking 10 individuals randomly from each cohort to review and answer questions in order to remove any ambiguity in the questionnaire.

The non-parametric testing was conducted for this investigation, since normal distribution was not considered as a pre-assumption, data points were independent from each other and dependent variables are not continuous (Field, 2013). The appropriateness of selecting quantitative data analysis was supported by the literature (Sabella et al, 2014; Moonsamy and Singh, 2014; and Do Nascimento Gambi, 2015). In order to answer RQ1, the median values were used to identify the lowest and highest overall scores for different constructs in each category. The non-parametric "Kruskal-Wallis" and "Mann-Whitney" tests were utilised to identify differences amongst groups in terms of "age", "gender", "casual work experience" and "studied courses" and answer RQ2. The non-parametric "Kruskal-Wallis" test was also utilised to identify differences amongst groups in terms of perceived ranking of different leadership styles and organisational cultures by respondents to answer RQ3. Statistical Package for the Social Sciences (SPSS) that accommodates non-parametric testing has been used as the software.



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

**Table I appears here**

#### 4. Median analysis

The median analysis was utilised for this study in order to answer *RQ1* and identify the gap between current vision and knowledge of EYPs as future OL and existing categories with different factors of a TQM framework (MBNQA). This is the appropriate test for this purpose as median is unaffected by the extreme scores on either side of distribution, is relatively unaffected by skewed distributions and can be used with ordinal data (Field, 2013). The variables from different categories of MBNQA framework that were analysed with the Likert score system, were investigated to identify the lowest and highest appreciation of participants towards these TQM variables. The variables with the middle range of median have been disregarded, as this would not represent the significant gap. The variables with the lowest and highest possible median were identified to reflect the least and most recognised factors in MBNQA framework (table II). Interestingly, participants recognised teamwork and dictatorial leadership style as two least important factors for the success of TQM. However, they strongly believe on reward, listening to customers and meeting their requirements via performance measurement and information exchange to promote TQM.

**Table II appears here**

#### 5. Kruskal-Wallis and Mann-Whitney Tests for demographic groups

In order to answer *RQ2*, the Kruskal-Wallis test was utilised to identify difference amongst various demographic groups of participants as future OL. The Mann-Whitney test has also been utilised to identify the possible differences between two groups within each category. The result is presented for each individual demographic factor and their groups. The summary of Kruskal-Wallis test for all TQM factors that address difference amongst groups was presented in table III.

##### *Age range factor*

It was revealed that there is a significant difference (*Asymp. Sig < 0.01*) amongst all age ranges in relation to importance of creativity and innovation (to reflect the developmental organisational culture) (*Asymp. Sig = 0.002*), listening to the VOC (*Asymp. Sig = 0.00*), and recognising the meeting customer specification (*Asymp. Sig = 0.001*) and retaining satisfied customers (*Asymp. Sig = 0.001*) as measure of TQM success. As the result of the Mann-Whitney test, it was suggested that there is a significant difference (*Asymp. Sig < 0.01*) between 18-19 years old participants with older ages (if aggregated in one group) in relation to the above variables alongside the view on Inspection, importance of collaboration and durability of products/services as critical factors of TQM.

##### *Gender factor*

As the result of the Kruskal-Wallis test, it was evident that there is a significant difference (*Asymp. Sig < 0.01*) between female and male participants when they have been asked about leadership style (*Asymp. Sig = 0.00*), importance of reward (*Asymp. Sig = 0.00*), VOC (*Asymp. Sig = 0.001*), employee involvement (*Asymp. Sig = 0.00*), support (*Asymp. Sig = 0.005*), training and supervision (*Asymp. Sig = 0.00*), process improvement (*Asymp. Sig =*

0.002) and inspection during production (*Asymp. Sig* = 0.006) in order to achieve TQM. Authors did not apply Mann-Whitney test to analyse the gender, since there were only two groups within this analysis that was covered by Kruskal-Wallis test.

#### *Education subject background factor*

It was concluded from the Kruskal-Wallis test that participants from different business and management courses are significantly different (*Asymp. Sig* < 0.01) when they were asked about the importance of information management system (*Asymp. Sig* = 0.002) to facilitate customer engagement and promote TQM. Notwithstanding, when more detailed analysis as a result of the Mann-Whitney test, between two individual and independent groups was conducted, the result was different. It was revealed that participants with course background in business management were significantly different compared to their counterparts with educational backgrounds in international business management. Here, differences were found in terms of the importance of creativity and innovation (to reflect the developmental organisational culture) and employee capacity and capability as a workforce factor to promote TQM culture. The level of customer engagement as a measurement tool for customer satisfaction was the only variable with significant difference (*Asymp. Sig* < 0.01) between participants with general business management educational background and those with financial management education. Participants with general business management educational background and accounting education were significantly different (*Asymp. Sig* < 0.01) in relation to agreeing on meeting customer specification as an important quality factor in TQM. There were no more significant differences between participants with other education backgrounds (i.e. marketing and human resource management management).

#### *Educational experience factor*

There were only two groups of participants involved in this study and therefore the Kruskal-Willis test could also represent the purpose of the Mann-Whitney test. It was revealed that post A-level participants are significantly different (*Asymp. Sig* < 0.01) with ready-to be graduated future YEPs in relation to importance of creativity and innovation (to reflect the developmental organisational culture) (*Asymp. Sig* = 0.00), flexibility of work systems (*Asymp. Sig* = 0.001) and meeting customer specification (*Asymp. Sig* = 0.001) as critical factors of TQM. Their view was also significantly different in terms of the importance of inspection before delivering to the customer (*Asymp. Sig* = 0.009) and also importance of customer retention (*Asymp. Sig* = 0.00) as the measure for customer satisfaction.

#### *Casual work experience factor*

This factor was decided to be analysed by authors to investigate whether the non-career informed casual work experience would have influence on the view of the participants. Two groups of participants with and without any work experience have been analysed via Mann-Whitney test. The result revealed that they are only different significantly (*Asymp. Sig* < 0.01) in relation to importance of social media to collect the VOC (*Asymp. Sig* = 0.006) and importance of employees' behaviour of supplier as the metric to measure supplier's quality (*Asymp. Sig* = 0.003).

**Table III appears here**

## **6. Kruskal-Wallis Test for leadership style and organisational culture groups**

In order to answer RQ3, the Kruskal-Wallis test was utilised to identify differences amongst various groups of participants as future OL in terms of their perceived ranking of leadership

1  
2  
3 styles and organisational culture that they will pursue in the future. Scholars recommended  
4 four types of organisational culture to represent four quadrants of CVF that are used in the  
5 analysis. This analysis was extended to also five groups of future OL with their perceived  
6 ranking of their leadership style to achieve TQM. This informed the Kruskal-Wallis grouping  
7 exercise to represent each group based on ranking of the factors. For instance, due to having  
8 four quadrants of organisational culture in CVF, four ranking groups were recommended in  
9 Kruskal-Wallis test (the most likely type of organisational culture to pursue by each  
10 respondent in the future was ranked four and the least likely type was ranked 1). Likewise,  
11 five ranking groups of leadership style was recommended in Kruskal-Wallis test (the most  
12 likely type of leadership style to pursue by each respondent in the future was ranked five and  
13 the least likely type was ranked 1).  
14  
15  
16  
17

### 18 *Organisational culture*

19 As the result of the Kruskal- Wallis test, it was evident that a significant difference (*Asymp.*  
20 *Sig < 0.01*) exists between groups of participants only in relation to “Group Culture”.  
21 Respectively and amongst different ranking groups in “Group Culture”, the significant  
22 difference was found only for two TQM KPIs of “importance of planning” (*Asymp. Sig=*  
23 *0.008*) and “importance of inspection before delivery to customer” (*Asymp. Sig= 0.004*). This  
24 means differences amongst participants in pursuing “Group Culture” makes significant  
25 differences of perception towards importance of planning and inspection before delivery to  
26 customers to establish TQM. The low median score of the teamwork that represents “group  
27 culture” and significant differences amongst population are the indications of greater concern.  
28 No other significant difference was found amongst different ranking groups of participants  
29 for other organisational cultures.  
30  
31  
32  
33

### 34 *Leadership style*

35 It was found from kruskal-Wallis test that significant differences (*Asymp. Sig < 0.01*)  
36 between groups of participants were evident in relation to four types of leadership styles. It  
37 was noted by the test result that different perceived rankings of “participative leadership”  
38 style makes significant difference in terms of their attitude or perception towards importance  
39 of “reward” (*Asymp. Sig= 0.00*), “planning” (*Asymp. Sig= 0.005*), “quality of supplied  
40 goods” (*Asymp. Sig= 0.004*), and “overall performance of the product (a customer  
41 satisfaction metric)” (*Asymp. Sig= 0.008*) as TQM KPIs. It was also evident that differences  
42 in perceived ranking of “democratic leadership” style makes significant difference in terms of  
43 their attitude or perception towards the importance of “employee involvement and  
44 engagement” (*Asymp. Sig= 0.008*) as a TQM KPI. The “importance of number of engaged  
45 customers as a customer satisfaction metric” was the only TQM KPI that was significantly  
46 different (*Asymp. Sig= 0.001*) amongst different groupings of participants in terms of their  
47 perceived ranking of the “goal-setting leadership”. It was found that differences in perceived  
48 ranking of “dictatorial leadership” style makes significant difference in terms of their attitude  
49 or perception towards the importance of “knowledge management” (*Asymp. Sig= 0.005*),  
50 “employee capability and capacity” (*Asymp. Sig= 0.002*), “quality of supplied goods”  
51 (*Asymp. Sig= 0.00*), “employee’s behaviour of supplier” (*Asymp. Sig= 0.00*) “appearance of  
52 the product” (*Asymp. Sig= 0.00*), and “durability” (*Asymp. Sig= 0.006*) as TQM KPIs.  
53 Finally, no significant difference was found amongst different perceived rankings of  
54 participants in relation to “situational leadership” style. The summary of the Kruskal-Wallis  
55 test for leadership styles was presented in table IV.  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

**Table IV appears here**

## **7. Discussion and research implications**

This research study followed on studies by Jones (2014) and Sabella et al (2014) who recognised MBNQA framework as a comprehensive TQM model to be approached by leaders in their organisation. Having focused on future EYPs and OL, this study also supports recommendation by Sabella et al (2014) about contextualising and moderating the generic MBNQA model. We have also followed the footsteps of other scholars (Dahlgaard – Park et al, 2018; Romdhane et al, 2017; Knapp, 2015; and Antony, 2014) who highlighted the importance of organisational culture, leadership and creating a sustainable future to succeed in any TQM- related practices. The importance of visionary leadership as one of the pivotal factors to facilitate organisational change to embark on TQM practices was also noted by previous studies (Knapp, 2015; Dora and Gellynck, 2015; Suarez et al, 2014; Moonsamy and Singh, 2014; and Asif et al, 2013). Nevertheless, our finding encompasses the indication of a significant gap in visionary leadership appreciation and its importance to drive other TQM KPIs by future OL. This indicates the clear position of our research study to fill the gap that currently exists in TQM, MNNQA and leadership and organisational culture literature. In fact, this finding plays an integral role in terms of flourishing skills of future OL to lead organisations towards best-in-class level that was highlighted in the literature before (Rao, 2013).

## **8. Concluding remarks and managerial implications**

This study intended to identify the clear gap between the current young and educated generation as future EYPs or OL with common TQM models such as MBNQA. It was also decided to identify if there is any difference amongst groups. It was clearly evident from this analysis that there are some serious concerns in relation to lack of appreciation towards the importance of organisational culture and leadership required to establish TQM culture amongst this generation. In fact, it was really difficult to identify to which CVF category this generation belongs to, since the gap in all of variables in this category was quite significant. Nevertheless, apart from those who appreciated “teamwork” with the “group culture” as their main organisational culture, there was no differences amongst others with other perceived organisational cultures in terms of importance of TQM KPIs. They recognised the participative leadership with teamwork decision making as the most important leadership style for TQM establishment. However, its low significance recommends lack of leadership appreciation amongst them. It was also evident that future OLs with participative or dictatorial leadership styles as two contrasting sides of spectrum are indicative in terms of the importance of TQM KPIs. This means that differences in other leadership styles would not necessarily make any differences in perceived attitude or perception towards importance of TQM KPIs. It was also worrying that higher education would not dramatically change the view of future OL in relation to QM. Therefore, EYPs need tremendous amount of supervision in their workplace and as part of their career development to recognise the strong HR integration with QM. In contrast, the customer orientation of TQM seems to be strongly recognised by this generation alongside integrated information and performance measurement systems.

Nevertheless, the journey in higher education seems to be effective in relation to changing the view of EYPs about recognition of developmental culture and customisation to support TQM establishment in organisations. It is clear that female EYPs as future OL recognised softer elements of TQM such as leadership, reward and employee involvement in decision making

more than their male counterparts do. This is also extended to some hard elements, such as supervision and training, which female future OL believe to be of higher importance. The educational subject background and experience made future EYPs heterogeneous in relation to recognition of organisational culture as a soft element and customisation as a hard element of TQM establishment.

Overall, it is obvious that the current young generation would not be able to follow TQM frameworks and models comprehensively to establish sustainable QM and operation in their organisation or department, unless changes in their attitude towards softer elements of these models, such as organisational culture and leadership as key derives for TQM, are made. This study only covered the business and management-related educated future OL and did not certainly have a comprehensive view. The similar study could be extended to other higher education backgrounds such as engineering, social sciences and health. As a future study, it is also crucial to investigate the differences amongst these higher-educated future leaders and future leaders with no higher education background to understand their view in relation to TQM.

### Reference

- Algasse, F., Yang, Q. P. and Au, J. (2014), "Application of Lean Six Sigma principles to Food Distribution SMEs", *American Academic and Scholarly Research Journal*, Vol. 6 No. 4, pp. 251-258.
- Antony, J. (2014), "Readiness factors for Lean six Sigma journey in higher education sector", *International Journal of Productivity and Performance Management*, Vol. 63 No. 2, pp. 257-264.
- Asif, M., Usman Awan, M. Khalid Khan, M. and Ahmad., N. (2013), "A model for total quality management in higher education", *Qual Quant* Vol. 47 No. 4, pp. 1883-1904.
- Bhat, S., Gijo, E.V. and Jnanesh, N. A. (2014), "Application of Lean Six Sigma methodology in the registration process of a hospital", *International Journal of Productivity and Performance Management*, Vol. 63 No. 5, pp. 613-643.
- Chan, H. K., Wang, X. Lacka, E. and Zhang, M. (2016), "A mixed-method approach to extracting the value of social media data", *Journal of Production and Operations Management*, Vol. 25 No. 3, pp. 568-583.
- Dahlgaard-Park, S. Reyes, L. and Chen, C. (2018), "The evolution and convergence of total quality management and management theories", *Total Quality Management and Business Excellence*, Vol. 29 No. 9-10, pp. 1108-1128.
- Dahlgaard, J.J., and Dahlgaard-Park, S.M. (2006), "Lean production, six sigma quality, TQM and company culture", *TQM Magazine*, Vol. 18 No. 3, pp. 263-281.
- Do Nascimento Gambi, L., Boer, H. Gerolamo, M. C. Jorgensen, F. and Carpinetti, L. C. R. (2015), "The relationship between organisational culture and quality techniques, and its impact on operational performance", *International Journal of Operations and Production Management*. Vol. 35 No. 10, pp. 1460-1484.
- Dong, Y., Xu, K. Xu, Y. and Wan. X. (2016), "Quality management in multi-level supply chains with outsourced manufacturing", *Journal of Production and Operations Management*, Vol. 25 No. 2, pp.290-305.
- Dora, M. and Gellynck, X. (2015), "Lean Six Sigma Implementation in a Food Processing SME: A Case Study", *Quality and Reliability Engineering International*, Vol. 31 No. 7, pp.1151-1159.
- Ergun, O. Gui, L. Stamm, J.L.H. Keskinocak, P. and Swann. J. (2014), "Improving humanitarian operations through technology-enabled collaboration", *Journal of Production and Operations Management*, Vol. 23 No. 6, pp. 1002-1014.

- 1  
2  
3 Evans, J. (2013), "Insights on the future of quality management research", *The Quality*  
4 *Management Journal*. Vol. 20 No. 1, pp. 48-55.
- 5 Fatorchain, H., and Kazemi, H. (2018), "A critical investigation of Industry 4.0 in  
6 manufacturing: theoretical operationalisation framework", *production Planning and Control*,  
7 Vol. 29 No. 8, pp. 633-644.
- 8 Field, A. (2013), "Discovering Statistics, Using SPSS, *Sage Publications Ltd*, London, UK.
- 9 Graham, N. K., Arthur, Y.D. and Mensah, D.P. (2014), "Managerial role in ensuring  
10 successful programme in Ghanaian printing firms", *The TQM Journal*, Vol. 26 No. 5, pp.  
11 398-410.
- 12 Gomez Gomez, J., Martinez Costa, M. and Martinez Lorente, A.R. (2011), "A critical  
13 evaluation of the EFQM model", *International Journal of Quality and Reliability*  
14 *Management*, Vol. 28 No. 5, pp. 484-502.
- 15 Guillot-Soulez, C., and Soulez, S. (2014), "On the heterogeneity of Generation Y job  
16 preferences", *Employee Relations*, Vol. 36 No. 4, pp. 319-332.
- 17 Gutierrez Gutierrez, L. Barrales-Molina, V. and Tamayo-Torres, J. (2016), "The knowledge  
18 transfer process in Six Sigma subsidiary firms", *Total Quality Management and Business*  
19 *Excellence*, Vol. 27 No. 5-6, pp. 613-627.
- 20 Harley, B., Sargent, L. and Allen, B. (2010), "Employee responses to high performance  
21 work systems practices: an empirical test of the disciplined worker thesis", *Work,*  
22 *Employment and society*, Vol. 24 No. 4, pp. 740-760.
- 23 Hellet, E. (2013), "We all share a common vision and passion: Early years' professionals  
24 reflect upon their leadership of practice role", *Journal of Early Childhood research*, Vol. 11  
25 No. 3, pp. 312-325.
- 26 Hilton, R.J. and Sohal, A. (2012), "A conceptual model for the successful deployment of  
27 Lean Six Sigma", *International Journal of Quality and Reliability management*, Vol. 29 No.  
28 1, pp. 54-70.
- 29 Isa, M. F. M. and Usmen, M. (2015), "Improving university facilities services using Lean  
30 Six Sigma: a case study", *Journal of Facilities Management*, Vol. 13 No. 1, pp.70-84.
- 31 Jayaram, J. and Xu, K. (2016), "Determinants of quality and efficiency performance in  
32 service operations", *International Journal of Operations and Production Management*, Vol.  
33 36 No. 3, pp.265-285.
- 34 Jimenez-Jimenez, D. Martinez-Costa, M. Martinez-Lorente, A.R. and Ahmed Dine Rabeh, H.  
35 (2015), "Total quality management performance in multinational companies, A learning  
36 perspective", *The TQM Journal*, Vol. 27 No. 3, pp. 328-340.
- 37 Jones, M.R. (2014), "Identifying critical factors that predict quality management program  
38 success: Data mining analysis of Baldrige Award Data", *The Quality Management Journal*,  
39 Vol. 21 No. 3, pp. 49-61.
- 40 Knapp, S. (2015), "Lean Six Sigma implementation and organisational culture", *International*  
41 *Journal of health Care Quality Assurance*, Vol. 28 No. 8, pp. 855-863.
- 42 Kumar, M. Antony, J. (2009), "Multiple case-study analysis of quality management practices  
43 within UK Six Sigma and non-Six Sigma manufacturing small-and Medium sized  
44 enterprises", *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of*  
45 *Engineering Manufacture*, Vol. 223, pp. 925-934.
- 46 Laohavichien, T. Fredendall, L. D. and Cantrell, R. S. (2011), "Leadership and quality  
47 management practices in Thailand", *International Journal of Operations and Production*  
48 *Management*, Vol. 31 No. 10, pp. 1048-1070.
- 49 La Rotta, D. and Prez Rave, J. (2017), "A relevant literary space on the use of the European  
50 Foundation for Quality Management model: current state and challenges", *Total Quality*  
51 *Management and Business Excellence*, Vol. 28 No. 13-14, pp. 1447-1468.
- 52 Lilja, J. Hansen, D. Fredrikson, J. and Richardsson, D. (2017), "Is innovation the future of  
53 quality management?", *International journal of Quality and Service Sciences*, Vol. 9 No. 2,  
54 pp. 232-240.
- 55  
56  
57  
58  
59  
60

- 1  
2  
3 Liu, Y. and Ko, P. (2018), "A modified EFQM excellence model for effective evaluation in  
4 the hotel industry", *Total Quality Management and Business Excellence*, Vol. 29 No. 13-14,  
5 pp. 1580-1593.
- 6 Manville, G. Greatbanks, R. Krishnasamy, R. and Parker, D. W. (2012), "Critical success  
7 factors for Lean Six Sigma programmes: a view from middle management", *International*  
8 *Journal of Quality & Reliability Management*, Vol. 29 No. 1, pp. 7-20.
- 9 Moonsamy, V. and Singh, S. (2014), "Using factor analysis to explore principal components  
10 for quality management implementation", *Qual Quant*, Vol. 48 No. 2, pp. 605-622.
- 11 Mosadeghrad, A. M. (2015), "Developing and validating a total quality management model  
12 for healthcare organisation, *The TQM Journal*, Vol. 27 No. 5, pp. 544-564.
- 13 Ng, E., Lysons, S.T. and Schweitzer, L. (2012), "Managing the new workforce: International  
14 Perspectives on the Millennial Generation", *Edward Elgar Publishing*, Northampton, MA.
- 15 NIST (National Institute of Standard and Technology) (2016), "2015-2016 Baldrige  
16 Excellence Framework", access via [http://www.nist.gov/baldrige/publications/business](http://www.nist.gov/baldrige/publications/business_nonprofit_criteria.cfm)  
17 [\\_nonprofit\\_criteria.cfm](http://www.nist.gov/baldrige/publications/business_nonprofit_criteria.cfm), accessed on 3<sup>rd</sup> Nov 2016.
- 18 Njeru, M. N. and Omondi, M. (2016), "Relationship between Total Quality Management and  
19 employee performance in public universities in Kenya: A case study of kirinyaga university  
20 college", *The Strategic Journal of Business and Change Management*, Vol. 3 No. 2, pp. 455-  
21 483.
- 22 Pakdil, F. and Kurtulmusoglu, F. B. (2017), "Quality improvement initiatives based on  
23 customer and service provider perspectives in shopping malls", *International Journal of*  
24 *Quality and Service Sciences*, Vol. 10 No. 2, pp. 176-195.
- 25 Pascal, A., Thomas, C. and Romme, A.G.L. (2013), "Developing a human-centred and  
26 science-based approach to design: The knowledge Management Platform Project", *British*  
27 *Journal of Management*, Vol. 24 No. 2, pp. 264-280.
- 28 Phan, P. and Chambers, C. (2013), "Advancing theory in entrepreneurship from the lens of  
29 Operations Management", *Production and Operations management*, Vol. 22 No. 6, pp. 1423-  
30 1428.
- 31 Rao D. (2013), "What should young professionals know about entrepreneurship?" *IEEE*  
32 *Potentials*, Vol. 32 No. 5, pp. 18-20.
- 33 Romdhane, T. B. Badreddine, A. and Sansa, M. (2017), "A new model to implement Six  
34 Sigma in small-and medium- sized enterprise", *International Journal of Production Research*,  
35 Vol. 55 No. 15, pp. 4319-4340.
- 36 Roth, A., Singhal, J. Singhal, K. and Tang, C. S. (2016), "Knowledge creation and  
37 dissemination in operations and supply chain management", *Journal of Production and*  
38 *Operations Management*, Vol. 25 No. 9, pp. 1473-1488.
- 39 Sabella, A., Kashou, R. and Omran, O. (2014), "Quality management practices and their  
40 relationship to organisational performance", *International Journal of Operations and*  
41 *Production Management*, Vol. 34 No. 12, pp. 1487-1505.
- 42 Singh, P. J., Ming Wee Dean, C. and Chee-Chuong, S. (2013), "Deming management  
43 method: Subjecting theory to moderating and contextual effects", *The Quality Management*  
44 *Journal*, Vol. 20 No. 3, pp. 41-69.
- 45 Slack, N., Brandon-Jones, A. and Johnson, R. (2013), "Operations Management", 7<sup>th</sup> edition,  
46 *FT Prentice Hall, Pearson Education*, Harlow, UK.
- 47 Stanton, P., Gough, R. Ballardie, R. Bartram, T. Bamber, G. J. and Soha, A.  
48 (2014), "Implementing lean management/six sigma in hospitals: beyond empowerment or  
49 work intensification? ", *International Journal of Human Resource management*, Vol. 25 No.  
50 21, pp. 2926-2940.
- 51 Starr, M. K. (2016), "Commentary on knowledge creation and dissemination in Operations  
52 and Supply Chain Management", *Journal of Production and Operations Management*, Vol.  
53 25 No. 9, pp. 1489-1492.

- 1  
2  
3 Suarez, E., Roldan, J. L. and Calvo-Mora, A. (2014), "A structural analysis of the EFQM  
4 Model: An assessment of the mediating role of process management", *Journal of Business*  
5 *Economics and Management*, Vol. 15 No. 5, pp. 862-885.
- 6 Teoman, S. and Ulengin, F. (2018), "The impact of management leadership on quality  
7 performance throughout a supply chain: an empirical research", *Total Quality Management &*  
8 *Business Excellence*", Vol. 29 No. 11-12, pp. 1427-1451.
- 9 Van Kemenade, E. (2014), "Theory C: the near future of quality management", *The TQM*  
10 *Journal*, Vol. 26 No. 6, pp. 650-657.
- 11 Venkat, A., Kekre, S. Hegde,, G. G. Shang, J. and Campbell, T. P. (2015), "Strategic  
12 management of operations in the emergency department", *Journal of Production and*  
13 *Operations management*, Vol. 24 No. 11, pp. 1706-1723.
- 14 Walker, H., Seuring, S. Sarkins, J. and Klassen, R. (2014), "Sustainable operations  
15 management: recent trends and future directions2", *International Journal of Operations and*  
16 *Production Management*, Vol. 34 No. 5, pp. 720-721.
- 17 Weckenmann, A., Akkasoglu, G. and Werner, T. (2015), "Quality management – history  
18 and trends", *The TQM Journal*, Vol. 27 No. 3, pp. 281-293.
- 19 Whyman, P. B., Baimbridge, M. J. Buraimo, B. A. and Petrescu, A. I. (2015), "Workplace  
20 flexibility practices and corporate performance: evidence from the British private sector",  
21 Vol. 26 No. 3, pp. 347-364.
- 22 Yadav, G., Seth, D., and Desai, T.N. (2017), "analysis of research trends and constructs in  
23 context to lean Six Sigma frameworks", *Journal of Manufacturing Technology Management*,  
24 Vol. 28 No. 6, pp. 794-821.
- 25 Zu, X. Robbins, T.L. and Fredendall, L. D. (2010), "Mapping the critical links between  
26 organisational culture and TQM/Six Sigma practices", *International Journal of Production*  
27 *Economics*, Vol. 123, pp. 86-106.
- 28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



Table I – MBNQA indicators and their TQM corresponding models and theoretical support

<i>MBNQA Factors</i>	<i>Indicators</i>	<i>Themes</i>	<i>Supporting quality management model</i>	<i>Theoretical support</i>
<i>Leadership</i>	Organisational culture	group culture, developmental culture, rational culture, hierarchical culture	CVF, EFQM, MBNQA, Deming Points, QM extension model	NIST (2016); Sabella (2014); Asif et al (2013)
	Leadership style	Participative, democratic, situational, goal oriented, dictatorial (autocratic)	CVF, EFQM, MBNQA, Deming Points, QM extension model	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
	Rewarding and recognition	Importance of the rewarding and recognition	EFQM, MBNQA, Deming Points	NIST (2016); Sabella (2014); Singh et al (2013)
<i>Strategy</i>	Planning	Stretched objectives	EFQM, MBNQA, Deming Points	NIST (2016); Sabella (2014); Asif et al (2013)
	Work system	Flexibility and adaptability	EFQM, MBNQA	NIST (2016); Sabella (2014)
	PDCA Cycle (Gap Analysis)	Agreement on gap analysis	EFQM, MBNQA, Deming Points, QM extension model	NIST (2016); Sabella (2014)
	Resource analysis	Agreement on resource analysis	EFQM, MBNQA	NIST (2016); Sabella (2014)
	Transformation	Importance of multi-approached transformation	EFQM, MBNQA, Deming Points	NIST (2016); Sabella (2014); Singh et al (2013)
<i>Customer</i>	Supply chain management and partnership	Agreement on partnership approach with suppliers	EFQM, MBNQA, Deming Points, QM extension model	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
	VOC	Importance of listening to VOC	MBNQA, QM extension model	NIST (2016); Sabella (2014); Asif et al (2013)
	Digital marketing	Importance of social media	MBNQA, QM extension model	NIST (2016); Sabella (2014)
	Market segmentation	Importance of segmentation to attain information	MBNQA, QM extension model	NIST (2016); Sabella (2014)
	Customer engagement	Importance of customer engagement	MBNQA, QM extension model	NIST (2016); Sabella (2014); Asif et al (2013)
<i>Measurement, analysis and knowledge management</i>	Comparative data collection	Importance of external information	MBNQA	NIST (2016); Sabella (2014); Asif et al, 2013
	Performance measurement	Importance of performance measurement	MBNQA	NIST (2016); Sabella (2014); Asif et al (2013)
	Knowledge management	Importance of explicit and implicit knowledge transfer	MBNQA, EFQM	NIST (2016); Sabella (2014); Singh et al (2013)
	Information management system	Importance of information management systems	MBNQA, EFQM	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)

<i>Workforce</i>	Employee capacity and capability	Importance of quality and quantity of employees	MBNQA, EFQM, Deming Points	NIST (2016); Sabella (2014); Asif et al (2013)
	Employee involvement and engagement	Importance of employee involvement and engagement	MBNQA, EFQM, Deming Points	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
	Support	Importance of management support	MBNQA, Deming Points	NIST (2016); Sabella (2014); Asif et al (2013)
	Training	Importance of on job training and supervision	MBNQA, Deming Points	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
<i>Operations</i>	Process improvement and design	Importance of integrated process improvement and design	MBNQA, EFQM	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
<i>Cont. Operation</i>	Continuous improvement	Importance of continuous process improvement	MBNQA, EFQM, Deming Points	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
	Cost of quality	Agreement on quality improvement being expensive	MBNQA, EFQM	NIST (2016); Sabella (2014)
<i>Result</i>	Inspection	Location of Inspection	MBNQA, EFQM, Deming Points, QM extension model	NIST (2016); Sabella (2014); Singh et al (2013)
	Variation	Importance of variation reduction	MBNQA, EFQM, Deming Points	NIST (2016); Sabella (2014)
	Quality of supply	Supplier Performance Dimensions	MBNQA, Deming Points	NIST (2016); Asif et al (2013)
	Product and service	Product and Service performance dimensions	MBNQA, EFQM, Deming Points	NIST (2016); Sabella (2014)
	Customer specification	Agreement on quality as reflection of customer specification	MBNQA, EFQM	NIST (2016); Sabella (2014)
	Customer satisfaction	Customer satisfaction factors	MBNQA, EFQM	NIST (2016); Sabella (2014); Asif et al (2013); Singh et al (2013)
	Productivity	Importance of productivity against quality	MBNQA, EFQM	NIST (2016); Sabella (2014)
	Financial stability	Importance of quality to bring financial stability	MBNQA, EFQM	NIST (2016); Sabella (2014)
	Ethics	Importance of social aspects of quality improvement	MBNQA, EFQM	NIST (2016); Sabella (2014); Asif et al (2013)

Table II – Top and bottom range of Median analysis of MBNQA framework factors

	N		MEAN	MEDIAN	MODE
	Valid	Missing			
Reward	611	535	5.7234	6.0000	7.00
Gap Analysis	611	535	5.3879	6.0000	6.00
Voice of customer (VOC)	611	535	5.6825	6.0000	7.00
Performance measurement	611	535	5.4157	6.0000	7.00
Support	611	535	5.3584	6.0000	6.00
Information management system	610	536	5.3131	6.0000	6.00
Creativity & innovation	611	535	2.6596	3.0000	3.00
Order & control	611	535	2.7823	3.0000	4.00
Setting & achieving goal	610	536	2.6328	3.0000	4.00
Democratic leadership	611	535	3.1817	3.0000	3.00
Situational leadership	611	535	3.2750	3.0000	4.00
Goal-oriented leadership	611	535	3.2619	3.0000	3.00
Team work	611	535	2.2897	2.0000	1.00
Dictatorial leadership	611	535	1.9836	1.0000	1.00

Table III – Summary of TQM measures that address significant differences amongst demographic groups

Demographic measure	TQM Factor with differences amongst groups	Chi-Square	df	Asymp. Sig
Age Range	Creativity & innovation	12.547	2	0.002**
	Voice of customer	15.507	2	0.000**
	Customer specification	13.252	2	0.001**
	Number of customer retention	13.287	2	0.001**
Gender	Dictatorial leadership	18.206	1	0.000**
	Reward	24.584	1	0.008**
	Voice of Customer	11.825	1	0.001**
	Employee involvement and engagement	22.080	1	0.000**
	Support	7.860	1	0.005**
	Training & supervision	22.221	1	0.000**
	Process improvement & design	9.583	1	0.002**
	Inspection during production	7.469	1	0.006**

Education subject background	Information system	22.785	7	0.002**
Education experience	Creativity & innovation	18.119	1	0.000**
	Work system	10.669	1	0.001**
	Customer specifications	10.236	1	0.001**
	Inspection before delivery to customer	6.728	1	0.009**
	Number of customer retention	15.260	1	0.000**

Table IV - Summary of TQM measures that address significant differences amongst ranking groups of different leadership styles

Perceived leadership style by future OLs	TQM Factor with differences amongst groups	Chi-Square	df	Asymp. Sig
Participative leadership	Reward	13.205	4	0.000**
	Planning	4.844	4	0.008**
	Quality of supplied goods	N/A	4	0.004**
	Overall performance of the product	N/A	4	0.004**
Democratic leadership	Employee involvement and engagement	13.710	4	0.008**
Situational leadership	None			
Goal-oriented leadership	Number of engaged customers	17.667	4	0.001**
Dictatorial leadership	Knowledge Management	10.287	4	0.005**
	Employee capability and capacity	15.161	4	0.002**
	Quality of supplied goods	N/A	4	0.000**
	Employee's behaviour of supplier	41.128	4	0.000**
	Appearance of the product	16.167	4	0.000**
	Durability	15.986	4	0.006**