Attitude of personnel at South African Air force bases towards a framework for the implementation of Total Quality Management (TQM) in the South African Air Force: An empirical view

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Abstract

The purpose of this article is to discuss the attitude of personnel at the eight South African (SA) Air Force bases towards the nature and scope of a Total Quality Management (TQM) framework, which was developed for the implementation of TQM in the SA Air Force. Fourteen TQM dimensions, identified to represent the TQM framework, were used as a basis for conducting the empirical research. This article also discusses whether the implementation of TQM was acceptable at the air force bases.

1.   Background

Owing to an insufficient South African National Defence Force (SANDF) budget in view of the extensive obligations the SANDF has towards members of society and the management of resources within this budget, managers in the South African (SA) Air Force currently find themselves in an uncertain and demanding situation. They have to ensure harmony within the institution, on the one hand, while on the other hand, they have to ensure that resources are utilised cost-effectively to the satisfaction of the SA Air Force and society. The challenge is to achieve more objectives with the limited resources available. In the light of the restricted budget of the SANDF over the past few years, indications are that the decline in the tendency to provide sufficient resources relative to the increase in peace-keeping and humanitarian aid-related needs, among other things, will continue. The decline in providing sufficient resources has made it essential for top

management to strive for continuous improvement in management. A strong emphasis is placed on improved results with current or fewer personnel, products and systems in order to promote quality in the rendering of services both internally and externally. The SA Air Force strives to show an improvement regarding operational results, financial results, marketing results, community results and customer and employer satisfaction. Management wrestles with questions such as how to manage diverse challenges in the changing political, social, economic, cultural and technological environment, and how to ensure that resources are utilised effectively. The SA Air Force is currently in an era where military operations enjoy low priority; however, the development of high levels of expertise and professionalism remains essential in order to maintain the desired credibility and degree of military preparedness.

The challenges presented by (1) the transformation process since 1994 whereby the SA Air Force as a whole is more streamlined, (2) its responsibility to the Southern African Development Community (SADC), (3) its role and functions in peace-keeping operations on the African continent, (4) humanitarian aid that has to be offered to neighbouring countries and (5) the announcement of the Strategic Defence Packages in 1996 that will, among other things, result in the purchasing of new air craft systems, compel the SA Air Force to continuously strive for better work performance and to take pro-active steps to comply with the changing environment. The essential role played by employees, providers and users of goods and services in the SA Air Force is regarded as more important as changes develop. To survive, the SA Air Force management realises that a new management approach is essential in order to manage output correctly.

This resulted in the SA Air Force management pondering the question whether it needs to act pro-actively and establish quality-focused programmes that are customer-centred, or if it should rather cling to the past at the expense of the future. It was agreed that the SA Air Force can make a valuable contribution over the next few decades should it institute a Total Quality Management (TQM) philosophy in order to focus itself on improvement. In 1998 a decision was made to apply more 'quality management techniques' in order to increase performance results and productivity.

One of the methods followed was the establishment of a formal self-assessment programme based on the model of the European Foundation for Quality Management (EFQM). This programme was launched in August 1999 by the Inspector-General of the SA Air Force with the following specific instruction: 'The SA Air Force must be evaluated on a continuous basis in order to increase productivity, to determine exactly what the weak and strong points of the SA Air Force are and to manage the SA Air Force according to an integrated management philosophy' (Msimang 1999, 6). At the end of 2001 the SA Air Force changed the formal self-assessment programme from the EFQM model to the South African Model, instituted by the South African Excellence Foundation (SAEF).

It was decided that the emphasis should be on service rendering, employee empowerment and the use of the SAEF model as management model based on national quality criteria for self-assessment purposes. The top management of the SA Air Force decided to use the SAEF model for the following reasons:

- Based on total quality principles, the model serves as a solid basis to manage the eight SA Air Force bases according to a recognised management model.
- It serves as a prerequisite for an institution to become a world-class institution.
- The model provides all the important dimensions needed to implement TQM.
- It serves as a method to integrate all the existing management systems of the SA Air Forces into a single management system, with the aim of steering all air force bases in the same strategic direction.
- It can be used to improve communication, participation and co-operation.
- The SAEF model can be used to continuously identify areas for improvement.
- It can be used on a daily basis to improve performance.
- The model can serve as a framework for further integration.

The adoption of TQM is currently very popular in the SA Air Force as a method to improve general service rendering, productivity and customer satisfaction. Although it is a relatively new and revolutionary approach in South Africa, more divisions in the SANDF are committing themselves to invest in TQM in the long term. Many articles on TQM have been published in South Africa; however, the focus has been mainly on the importance of TQM techniques and the success thereof, with the result that to date, little attention has been paid to the nature and scope of TQM implementation at military institutions.

Although the majority of articles emphasises the specifics of TQM, Yoo (2003, 119) and Sureshchandar, Rajendran and Anantharaman (2001, 343) state that little empirical research has been done on the effect of the implementation of TQM in the public sector and service institutions. Djerdjour and Patel (2000, 5) state clearly that while TQM ideas are not new in developed nations, there is little literature and empirical studies available on TQM implementation in developing countries. Munro (2003, 49) also indicates that TQM is an ubiquitous organisational phenomenon that has been given little attention in empirical research. Dale, Wu, Zairi, Williams and van der Wiele (2001, 440) point out that the concept of TQM has been in existence for a long time, but has been given little attention by research teams in various institutions, and that TQM still needs to pass the empirical tests in order to derive general conclusions.

Taking the above-mentioned aspects into account, this research is an attempt to contribute to the empirical research on TQM that has been conducted over the years. The focus will be on the implementation of TQM with specific reference to the determination of the attitudes of personnel at the eight SA Air Force Bases towards a framework developed as a plan for the implementation of TQM in the SA Air Force.

2.   Framework for the implementation of TQM

The development of a sound TQM implementation framework is crucial and should be one of the first things to be done before embarking on TQM. The framework will make the institution more aware of TQM itself, and be able to introduce its elements and features in a more comprehensive, controlled and timely manner. The framework is to be used when TQM is introduced and implementation plans are designed for quality improvement. The purpose of the framework is to provide guidance to institutions introducing TQM to indicate the way in which the various dimensions and features of TQM fit together. The TQM framework developed for this research was customised to fit the needs of the SA Air Force and forms the basis for the empirical study.

The TQM framework is based on 14 TQM dimensions derived from an extensive review of the vast literature on TQM. The 14 dimensions, which are divided into six primary and eight supportive dimensions, are most probably applicable and critical to all types of institutions intending to create a TQM environment. These dimensions can be considered as those aspects necessary for shaping the development of TQM. The six primary dimensions, that drive the TQM transformation are: (1) leadership and top management commitment, (2) strategic planning, (3) empowerment, (4) teamwork, (5) continuous improvement, and (6) customer and employee satisfaction. The eight supportive dimensions, namely (1) communication, (2) training, (3) change management, (4) culture forming, (5) support structures, systems and resources, (6) systems thinking, (7) self-assessment and (8) processes, should be continuously considered in all six primary dimensions. Figure 1 shows the relationship between the primary and supportive dimensions of TQM. All 14 dimensions affect every part of the institution and are interwoven with one another.

Each of these dimensions is briefly outlined below.

2.1 Primary dimensions

- *Leadership and top management commitment*: The TQM implementation framework should be based on the main primary dimension of leadership and top management commitment to establish unity of purpose and direction for the institution in order to reach desired outcomes. It is to be 'the driver' for all types of institutions when implementing TQM.
- *Strategic planning:* strategic planning should be used to plan, develop and implement strategies that should result in improved customer and employee satisfaction. TQM and strategic planning should become a single process, and TQM should be fully integrated and linked to the strategy and operation of the institution.
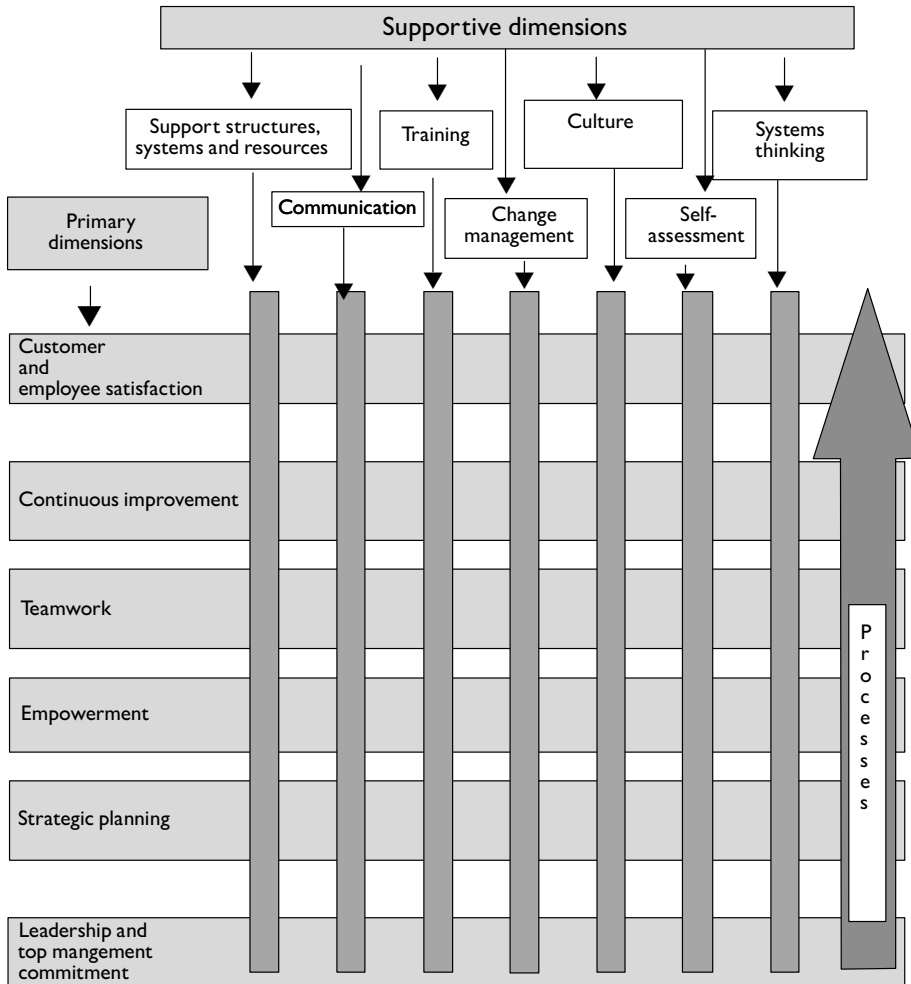
Source: Own research observation

Figure I: Integration of I4 dimensions

- *Empowerment and investment in people*: Employees should be empowered as they are at the centre of any TQM approach, since they are involved in managing and improving processes, as well as and serving customers. Employees have to be involved from the onset to transform to the TQM philosophy. Employees, at all levels of the workforce, should also be empowered and encouraged to provide innovation and creativity.

- *Teamwork*: Institutions should foster a team-based approach to the TQM programme, with each member actively seeking ways to improve total quality. Teamwork is necessary for the propensity of the institution to engage in internal

non-competitive activities among employees, and externally with suppliers and customers.

● *Continuous improvement*: The propensity of the institution to pursue incremental and innovative improvements of its processes, products and services should be the driver to achieve continuous improvement. Any institution should have established procedures and processes to ensure that incremental and ongoing improvements are made to products and services.

● *Customer and employee satisfaction:* Customer-driven quality should be the focus of any institution to ensure that products and services are delivered with the objective of satisfying customer needs. The customer is the primary arbiter of product and service quality. Customer needs and requirements and how to deliver value should be deeply understood.

The full potential of employees should be released through shared values and through a culture of trust and empowerment. There should also be a culture of involvement and communication in order to achieve employee satisfaction. In the TQM framework, employee satisfaction is considered an indicator of operating performance and customer satisfaction.

2.2 Supportive dimensions

● *Communication*: Communication should be used to make employees to focus on customer satisfaction in order to eliminate discrepancies between internal and external perceptions of quality. Leaders should effectively communicate the link between customer satisfaction and increased service delivery, and encourage sceptical management to support quality programmes by stressing the link.

● *Training:* Any institution should have a comprehensive approach to education and training, which includes quality standards, procedures and skills for quality improvement. In-service training should be instituted to educate and train employees on the TQM philosophy.

● *Culture forming:* Institutions should develop a culture that would make quality initiatives the responsibility of everyone in the different departments of an institution.

● *Change management:* TQM requires continual change in the way things are done in institutions. Strategies to manage and cope with change should be adopted to maintain order in an institution. Change should be seen as inevitable, and it should be planned for to minimise the associated risks.

● *Support structures, systems and resources:* TQM is dependent on the creation of support structures and systems. The resources of the institution should be linked to its demands and its support structures and systems. These should not be static, but flexible and should encourage the flow of new ideas and information to improve the management of quality.

- *Systems thinking:* For an institution to be successful, it should be managed in accordance with the characteristics of the systems approach. An institution should be viewed as a system, as institutions are systems that employ various processes to convert inputs into outputs.
- *Self-assessment:* Self-assessment should be a comprehensive, systematic and regular review the activities of an institution. The results should be referenced against a recognised model (SAEF) of performance excellence. The self-assessment process should allow the institution to clearly identify its strengths, as well as areas in which improvements can be made.
- *Processes:* A key part of any TQM strategy is the management of processes. The basic essence of TQM is that it should be a process that training, and institutional education is supported by leadership. All work should be seen as a process, and TQM should be seen as a continuous process of improvement for individuals, groups of people and the whole institution. To improve the total implementation process of TQM, people should know what to do and how to do it, have the right tools to do it, and be able to measure the improvement of the process and the current level of achievement.

3. Methodology for collecting data

The focus of this article is to discuss the attitude of personnel at SA Air Force bases towards the nature and scope of TQM dimensions that are considered necessary for the implementation of TQM; to determine whether the personnel is positive about the effectiveness with which these dimensions are performed at the air force bases. The focus is further on identifying the acceptability of TQM implementation at the air force bases.

The research questionnaire, at the eight air force bases, was targeted for 543 respondents (questionnaires were distributed to 15 per cent of the total personnel of each air force base). The questionnaires were directed at a representative number of the personnel (both uniformed and civilian) at all levels in the organisational structures of the air force bases. As management plays an important role in TQM, the research was divided to target three categories, namely (1) top management, (2) middle management and (3) low-level management. For purposes of the empirical analysis, the category of low-level management is referred to as the *workers,* since this category includes both the low-level managers and the operational workers who do not occupy management positions. The top management (operational, logistic, base support, finances, intelligence, security and personnel heads of department) at air force bases includes the officer commanding (brigadier, general or colonel) and the seven heads of department, that is the operational, air servicing, intelligence, base support, financial, security and personnel heads of department. This group usually holds the rank of colonel or lieutenant colonel. Middle management includes divisional heads and section heads (personnel,

finances, operations, intelligence, security, base support and air servicing). They hold the rank of warrant officer to major. The category of workers includes all the ranks lower than warrant officer.

The distribution of the questionnaire occurred centrally at air force bases during normal working hours. The researcher was personally responsible for the distribution of, and briefing on, the questionnaire. The approach of the central distribution of the questionnaire and the presence of the researcher was to the advantage of the research process and, therefore, all 543 questionnaires were returned on completion for processing and analysis. In this manner a response rate of 100 per cent was obtained.

Structured response questions were used, in which respondents were asked to select one answer from a list of alternatives. These structured questions were based on the 14 dimensions of the TQM implementation framework. In order to gather relevant information and to present it in an orderly and systematic fashion, each dimension was divided into a number of questions, each relating to that particular dimension.

Answering the questionnaire was based on a five-point scale that ranged from 'do not know' to 'absolutely true'. Numerical values that varied from 1 to 5 were linked to the scale codes. The scale codes for this study are explained in Table 1. The numerical values 1 and 2 were regarded as negative, 3 as neutral and 4 and 5 as positive.

Table I: Scale codes and description

Scale code	Scale description
1 Negative	*Do not know.* Indicates that the respondent has no knowledge of the element that is evaluated.
2 Negative	*Not true at all.* Indicates that this part of the dimension plays no role within the dimension.
3 Neutral	*Slightly true.* Indicates that this part of the dimension does play a role in the dimension.
4 Positive	*True in most cases.* Indicates that this part of the dimension is important to the dimension and that it should be part of the dimension.
5 Positive	*Absolutely true.* Indicates that this part of the dimension plays an active role in the dimension and that it is essential and should definitely be included in the dimension.

As far as the analysis of the results are concerned, specific emphasis was placed on the average scores that emerged per TQM dimension. Average scores with a numerical value of less than 2.5 (< 2.5) were regarded as being *negative*, average scores equal to or greater than 2.5 ($\geqslant 2.5$) but less than 3.5 were regarded as scores

that, *although positive*, *do not represent the ideal situation,* whereas an average score equal to or greater than 3.5 ($\geqslant$ 3.5) was regarded as *very positive,* representing the *ideal situation*.

The methodology used for this research was based on the dissertation of Smit (1991, 107), entitled '*Die evaluering van die arbeidsverhoudingefunksie van eerstevlaktoesighouers ten einde 'n ingrypingstrategie te ontwikkel'*. The data were captured in the Statistical Analysis System (SAS) (data processing program) Version 8.2 (SAS Institute Cary, North Carolina NC: 27513, USA) for statistical processing and analysis. As far as the average scores are concerned, all the average scores in section A to M (see Tables 4 and 5) needed to have values equal to or greater than 2.5 ($\geqslant$ 2.5) in order to be indicative of a positive attitude by the respondents towards a particular dimension. Average scores with a numerical value equal to or greater than 3.5 ($\geqslant$ 3.5) were considered as the ideal situation and indicative of a very positive attitude by the respondents. Average scores with a numerical value of less than 2.5 ($<$ 2.5) were regarded as a negative attitude.

An average score of at least 2.5 was thus regarded as the minimum numerical value a specific dimension needed to have in order to be indicative of a positive attitude. Although an average score equal to or higher than 2.5 ($\geqslant$ 2.5) was regarded as a positive attitude, an average score equal to or higher than 2.5 ($\geqslant$ 2.5) but lower than 3.5 could not be considered as representative of the ideal situation as it was indicative of specific deficiencies that require attention. As indicated, any average score lower than 2.5 was regarded as a negative attitude that is indicative of a serious problem that requires special attention (Smit 1991, 107). No average scores lower than 2.5 were, however, obtained in this study. See Table 2 for a summary of the interpretation of scores.

Table 2: Interpretation of scores

Average scores	Interpretation
A score equals to or higher than the level of 3.5 ($\geqslant$ 3.5).	*Ideal situation* and regarded as a *very positive attitude* of the respondents.
A score equals to or higher than 2.5 ($\geqslant$ 2.5) but lower than 3.5 ($<$ 3.5). (All these scores (average) are indicated in the colour grey in the tables)	*Not ideal situation* as deficiencies exist, although regarded as a *positive attitude* shown by respondents.
Scores of less than 2.5 ($<$ 2.5).	*Unacceptable situation* as serious deficiencies exist and are regarded as a *negative attitude* of the respondents.

4. Analysis and interpretation of results

4.1 Management levels

The level of the positions of respondents involved in TQM are presented in Table 3. From the Table it is clear that the majority of respondents (56.32%) are employed under the category 'workers' at the air force bases. Of the respondents, 36.25 per cent stated that they serve at middle management level, while 7.43 per cent serve at top management level. In total, 43.68 per cent of the respondents occupy top and middle management posts at air force bases. These statistics confirm that personnel at air force bases participating in the TQM dimensions represent all management levels. This made it possible to ensure that further related responses would be obtained.

Table 3: Management level

Management level	Frequency	Percentage (%)	Cumulative frequency	Cumulative percentage (%)
Top management	40	7.43	40	7.43
Middle management	195	36.25	235	43.68
Workers	303	56.32	538[3]	100.00

4.2 Attitude of personnel towards the TQM framework

According to the scores in Figure 2(a), Figure 2(b) and Table 4, it is only in three of the six primary TQM dimensions, namely leadership and top management commitment, strategic planning and empowerment, that the attitude of respondents can be regarded as being very positive, which represents the ideal situation (see Table 4, the average scores of these three are all equal to or higher than the level of 3.5).

The other three primary dimensions (i.e. teamwork, continuous improvement and customer and employee satisfaction (see Table 4)) were awarded average scores equal to or higher than 2.5, but lower than 3.5. This cannot be interpreted as the ideal situation, although regarded as a positive attitude by the respondents. The workers obtained the highest scores in all six primary TQM dimensions.
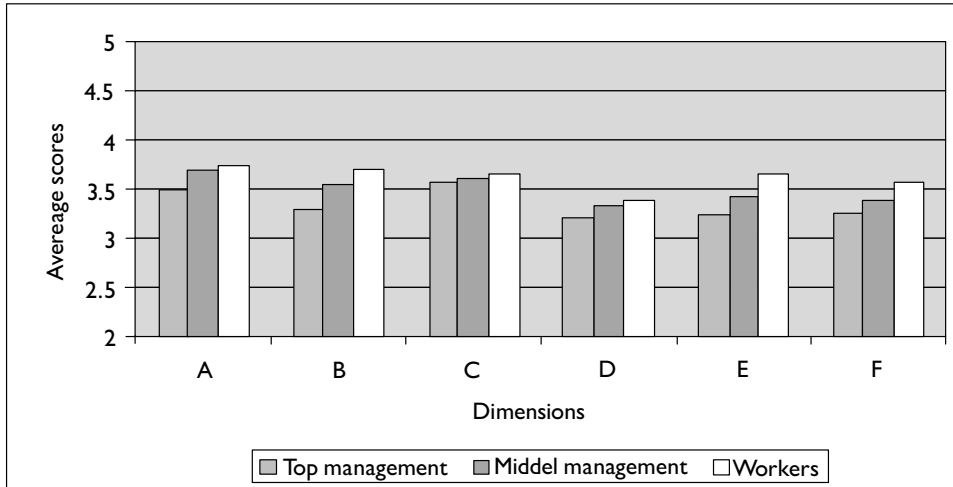
Figure 2(a): Average scores of the primary dimensions per management level
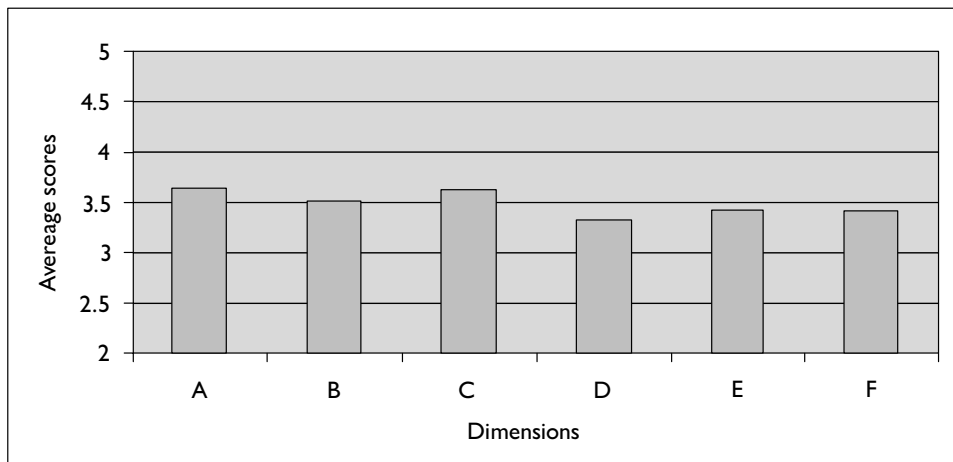

Figure 2(b): Average scores of the primary dimensions

The histogram in Figure 2(a), Figure 2(b) and Table 4 highlights an important trend, namely that there are important differences between the views of top management, middle management and workers as far as the nature and scope of the implementation of the six primary TQM dimensions at air force bases are concerned. In general, workers and middle management have favourable views about this, whereas top management holds moderate views. The average scores in Table 4 indicate that there are no negative views (< 2.5) about the six primary TQM dimensions.

Table 4: Average scores per section (sections A to F — primary dimensions) awarded by top management, middle management and workers

Dimensions	Top management	Middle management	Workers	Average	Hierarchy
A. Commitment of leadership and top management to TQM	3.5l	3.7l	3.75	3.66	l
B. Strategic planning	3.3l	3.56	3.72	3.53	3
C. Empowerment	3.57	3.62	3.66	3.62	2
D. Teamwork	3.2l	3.34	3.40	3.32	6
E. Continuous improvement	3.25	3.42	3.63	3.43	4
F. Customer/employee satisfaction	3.26	3.39	3.58	3.4l	5

Table 4 shows that, as far as section A (leadership and top management commitment) is concerned, all three categories of respondents are very positive. An average score of 3.66 was awarded by all three categories of respondents — middle management and the workers with average scores of 3.7 and 3.75 respectively, which indicates a more positive view than top management with an average score of 3.51. This shows that top management does not really have a positive view in this regard as middle management and the workers. Table 4 shows that (1) middle management (3.71) and the workers (3.75) awarded the highest score to the dimension of leadership and top management commitment, (2) as far as this section is concerned, middle management and the workers also awarded the highest score for all six primary dimensions to leadership and top management commitment and (3) the average score (3.66) awarded by the three categories of respondents is the highest score awarded for all the primary dimensions, which indicates that the general attitude of personnel towards this dimension is quite positive.

Table 4 shows that, as far as section B (strategic planning) is concerned, all three categories of respondents are less positive towards the dimension of strategic planning when compared to leadership and top management commitment. An average score of 3.53 was awarded by the three categories of respondents — middle management and the workers with average scores of 3.56 and 3.31 respectively, which shows a more positive view than top management with an average score of 3.51, which is just above the ideal situation. This shows that top management does not really have a positive view in this regard as middle management and the workers. The averages score of 3.53 for this dimension represents a very positive attitude. Table 4 shows that (1) the workers (3.72) awarded the second highest score to the

dimension of strategic planning and (2) the average score (3.53) awarded by the three categories of respondents is the third highest score among the primary dimensions.

All three categories of respondents, except the workers, are more positive towards section C (the dimension of empowerment to which the second highest score of all the primary dimensions was awarded) than they are towards section B (strategic planning which has the third highest score under the primary dimensions). From Table 4, by top management the average score of 3.57, the average score of 3.62 by middle management and the average score of 3.66 by workers indicate that, in general, their attitude is positive. It is worth noting that there are slight differences among the three categories of respondents about their views on empowerment at air force bases. Table 4 shows that (1) top management (3.57) awarded the highest score to the dimension of empowerment (2) middle management (3.62) awarded the second highest score and (3) the workers (3.66) the third highest score.

Respondents in all three categories are less positive towards section D (the dimension of teamwork) when compared to the other five primary dimensions. The average score awarded in this section is 3.32, which is the lowest for the six primary dimensions. This is reflected in an average score of 3.21 for top management, an average score of 3.34 for middle management and an average score of 3.40 for workers. On the whole, this indicates that although the attitude towards teamwork is positive, it does not represent the ideal situation.

The views of the respondents on section E (continuous improvement) are also not that positive. The average score awarded by respondents in the three categories in this section is 3.43, which is the third lowest score of the six primary dimensions (Table 4). Top management awarded an average score of 3,25, middle management an average score of 3.42, and the workers an average score of 3.63. The workers (3.63) have a more positive view in this regard than top and middle management. The response by the workers also represents the ideal situation. However, the general attitude towards this dimension is only positive and does not represent the ideal situation.

The scores in section F (customer and employee satisfaction), as shown in Table 4, indicate that the average score awarded by respondents in the three categories is 3.41, which is the second lowest score of the six primary dimensions. Apart from the attitude of the workers (3.58), the general attitude does not represent the ideal situation. Also, in this dimension middle management and the workers have a more positive view than top management.

According to the histogram in Figure 3(a), Figure 3(b) and Table 5, it is only in four of the eight TQM supportive dimensions (culture forming, change management, support structures, systems and resources and self-assessment) that the attitude of the respondents can be viewed as being very positive and representing the ideal situation. The scores for the four supportive dimensions (communication, training, systems thinking and processes) are all equal to or higher than 2.5, but lower than 3.5. Therefore, although positive, these scores cannot be interpreted as representing the

ideal situation as they indicate certain deficiencies. As in the case of the primary dimensions, the workers awarded the highest score to all eight of the supportive TQM dimensions (see Table 5 and Figure 3(a)).
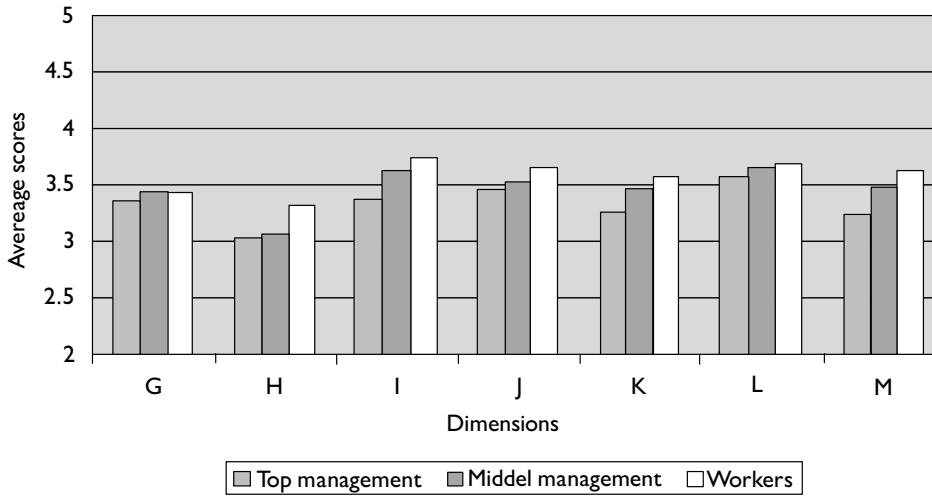

Figure 3(a): Average scores of the supportive dimensions per management level
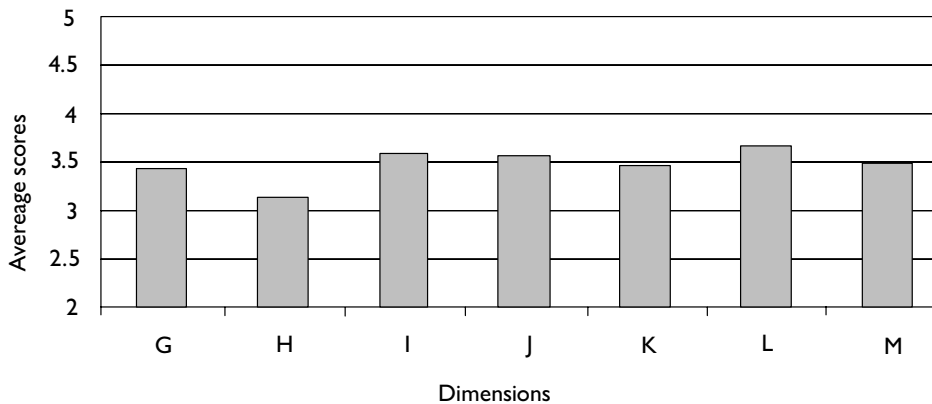

Figure 3(b): Average scores of the supportive dimensions

The histogram in Figure 3(a), Figure 3(b) and Table 5 highlights the same trend that appears in response to the primary dimensions, that is, there are important differences in the opinions of top management, middle management and workers about the nature and scope of the implementation of the eight supportive TQM dimensions at air force bases. In general, workers and middle management have

favourable opinions about this, whereas top management holds moderate views. The average scores in Table 5 indicate that there are no negative views (< 2.5) on the eight supportive TQM dimensions.

The views of the respondents on section G (communication) are not very positive (see Table 5). An average score of 3.41 was awarded by respondents in the three categories — middle management with an average score of 3.44, and the workers with an average score of 3.44 awarded the second lowest score to the dimension of communication, which is below the ideal situation (3.5). However, workers and middle management have a more positive outlook on this dimension than top management (3.35). In general, the attitude towards communication is positive, although it does not represent the ideal situation.

Table 5: Average scores (sections G to M — supportive dimensions) awarded by top management, middle management and workers per section

Dimensions	Top management	Middle management	Workers	Average	Hierarchy
G. Communication	3.35	3.44	3.44	3.41	6
H. Training	3.03	3.06	3.31	3.14	7
I. Culture forming and change management	3.39	3.62	3.72	3.57	2
J. Support structures, systems and resources	3.47	3.53	3.64	3.55	3
K. Systems thinking	3.26	3.47	3.58	3.44	5
L. Self-assessment	3.57	3.66	3.69	3.64	1
M. Processes	3.25	3.48	3.64	3.46	4

The respondents in all three categories are less positive towards section H (the dimension of training) than in the case of all the other supportive dimensions (Table 5). The average score awarded by the respondents for the dimension of training is 3.14, which is the lowest score of all the supportive dimensions. Table 5 indicates that top management awarded an average score of 3.03, middle management an average score of 3.06 and the workers an average score of 3.31. In general, this reflects that the attitude towards training is positive, although it is not the ideal situation because there seems to be the prevalence of important deficiencies that influenced the views of the respondents.

All three categories of respondents are quite positive towards the dimensions of culture forming and change management (Table 5). Of the eight supportive dimensions, the workers awarded the highest score to culture forming and change management (3.72), while middle management awarded the second highest score (3.62). The average score of 3.57 awarded by respondents in the three categories in

this section is the second highest of all the supportive dimensions (after self-assessment, which has an average score of 3.64). The averages indicate that, on the whole, the attitude of respondents, except that of top management, towards culture forming and change management is quite positive and represents the ideal situation.

Table 5 shows that respondents (except top management) are less positive towards section J (support structures, systems and resources) than they are towards culture forming and change management. It also shows that top management awarded the second highest score to this dimension (3.47), while middle management (3.53) and the workers (3.64) awarded this dimension the third highest score. The average score of 3.55 awarded by the respondents in the three categories is the third highest of all the supportive dimensions. This average score indicates that the general attitude of respondents — except that of top management — is very positive, which represents the ideal situation.

The scores in section K (systems thinking), as shown in Table 5, indicate that the average score (3.44) awarded by the respondents in the three categories is the third lowest average score for the supportive dimensions. The average scores for top management (3.26), middle management (3.47) and the workers (3.58) indicate that middle management and the workers have a more positive view in this dimension than top management. Respondents in all the categories are more positive about systems thinking than they do with communication and training dimensions. This shows that certain deficiencies prevail in highly important dimensions, such as communication and training.

As regards section L (self-assessment), Table 5 shows that the respondents in all the categories are very positive and that their views represent the ideal situation. An average score of 3.64 was awarded by all the respondents. Again, both middle management with an average score of 3.66, and the workers with an average score of 3.69 have a more positive view than top management with an average score of 3.57. It also shows that top management (3.57) and middle management (3.66) awarded the highest score to this dimension while the workers (3.69) awarded the second highest score. This average score (3.64) awarded by the respondents in the three categories is the highest of all the supportive dimensions. It is clear that respondents in these categories show a slight difference from one another about their attitude towards self-assessment.

The respondents in all of the three categories awarded an average score of 3.46 for section M (processes), which is the fourth lowest score of the supportive dimensions. This indicates that the general attitude of the respondents is positive, although it does not represent the ideal situation. The workers have a more positive outlook about this dimension than top management and middle management. Top management awarded an average score of 3.25, middle management an average score of 3.48 and the workers an average score of 3.64.

4.3 Acceptability of TQM

Table 6: Acceptability of TQM at air force bases

TQM	Frequency	Percentage (%)	Cumulative Frequency	Cumulative Percentage (%)
Yes	382	70.30	382	70.30
No	161	29.70	543	100.00

Respondents were also asked to express their views on whether they find the implementation of TQM at their air bases acceptable. They had to respond to this question by providing a 'yes' or 'no' answer. 70,30 percent of the respondents, (382 out of 543) found TQM acceptable at their air force bases, while 29.70 percent did not (161 out of 543) find TQM acceptable at their air force bases (see Table 6). This result correlates with the general attitude of the respondents towards TQM, in that the results of sections A to M indicate that the attitude of the respondents is positive.

5. Conclusion

On the basis of the analysis and the interpretation of results, the most important research findings are as follows:

(a) Taking into account the average scores per section (sections A to M), it is clear that the lowest average scores per section were recorded in the supportive dimension of training with an average score of 3.14, and the primary dimension of teamwork with an average score of 3.32 (see Table 7). On the contrary, the dimensions leadership and top management commitment (3.66), self-assessment (3.64), empowerment (3.62), culture forming and change management (3.57), support structures, systems and resources (3.55) and strategic planning (3.53) elicited relatively high average scores (all equal to or greater than 3.5). These relatively high average scores represent the ideal situation and can be regarded as indicative of a very positive attitude among the respondents. A trend worthnoting is that seven of the 14 dimensions were awarded average scores equal to or higher than the level of 3.5 ($\geqslant$ 3.5), which is considered as being very positive.

(b) Another interesting trend is that the scores of the remaining seven dimensions, namely processes (3.46), systems thinking (3.44), continuous improvement (3.43), communication (3.41), customer and employee satisfaction (3.41), teamwork (3.32) and training (3.14) are equal to or higher than 2.5 ($\geqslant$ 2.5). Although the scores for these dimensions are lower than the ideal situation of $\geqslant$ 3.5, they still indicate that the attitude of the respondents towards these dimensions is positive. It should be noted, however, that the existence of seven dimensions with scores lower than the ideal situation and the fact that 29.70 per cent of the respondents stated that they do not find the implementation of TQM

acceptable at their air force bases, are indicative of prevalent deficiencies that require attention.[4]

Table 7: Average scores per dimension together with the hierarchical order

Dimensions	Average	Hierarchy
A. Leadership and top management commitment	3.66	1
B. Strategic planning	3.53	6
C. Empowerment	3.62	3
D. Teamwork	3.32	11
E. Continuous improvement	3.43	9
F. Customer/employee satisfaction	3.41	10
G. Communication	3.41	10
H. Training	3.14	12
I. Culture forming and change management	3.57	4
J. Support structures, systems and resources	3.55	5
K. Systems thinking	3.44	8
L. Self-assessment	3.64	2
M. Processes	3.46	7
	Overall average: 3.48	

(c) The average scores in Table 7 indicate that there are no negative views (< 2.5) about the 14 TQM dimensions.

(d) A disturbing trend is the occurrence of differences between the views of the respondents of different categories especially top management and the workers. This is less visible between top management and middle management and between middle management and the workers. The views of top management (see Tables 4 and 5) are almost consistently less positive than the views of middle management and the workers. The differences between the average scores of top management and those of the workers cannot simply be dismissed, as they were not expected. In fact, the opposite were to be expected. It can possibly be argued that middle management is more positive than top management in the way middle management experiences TQM, and that there is a positive relationship between workers and the TQM dimensions as a result of them being influenced by middle management.

(e) The order of the TQM dimensions from the highest to the lowest average score, giving an indication of the dimensions towards which respondents have the most

positive attitude, is: section A (leadership and top management commitment to TQM), followed by section L (self-assessment), section C (empowerment), section I (culture forming and change management), section J (support structures, systems and resources), section B (strategic planning), section M (processes), section K (systems thinking), section F (continuous improvement), section E (customer and employee satisfaction), section G (communication), section D (teamwork), and section H (training).

(f) The majority of respondents indicated that they find the implementation of TQM acceptable at their air force bases which correlates with the general attitude of the respondents towards TQM, in that the results of sections A to M indicate that the attitude of respondents is positive (an overall average score of 3.48 is recorded for all the TQM dimensions (Table 7)).

Notes

1. Dr Oschman is Officer Commanding at the Air Publication Service Centre of the South African Air Force.

2. This article is a product of the writer's D.Admin. degree which was successfully completed under the supervision of Prof E. C. Ströh as promoter and Prof C. J. Auriacombe as joint promoter at the University of South Africa's Department of Public Administration and Management.

3. Five of the respondents did not indicate their rank.

4. See Oschman (2004, 405–482) for detail on deficiencies identified in this regard as well as the recommendations on how to eliminate them.

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