A Total Management System – A Further Development of TQM Model to Meet Organisations' Development Needs

Y K Chan, L C Koo, F K C Tao and K Y Chau

Abstract: While there are many successful cases where application of the TQM model has reaped substantial benefits (Corcoran, 1996; Hayday, 1996 and Massey, 1996), there is little attempt to further develop the TQM model to meet organisations' development needs. The purpose of this paper is introduce the process of development of a fit-for-purpose management system model to meet the development needs of the MTR Corporation Limited, a metro company of Hong Kong. The new management system model is formulated based on the previous research results on TQM but comprises a new approach to bridging their pitfalls. The formulation of the TMS elements is based on the common factors of four National Quality Awards (Japan, USA, Europe and Australia) and the critical factors developed by seven studies. These studies include those of Saraph et al. (1989), Flynn et al. (1994), Anderson et al. (1995), Powell (1995), Handfield and Ghosh (1995), Black and Porter (1996), and Ahire et al. (1996).

Keywords: TMS, TQM, Seven Studies

1. The Total Management System Concept

In the past decade, we have seen enormous progress in quality management, whereby the ISO 9000 quality assurance system has gained its foothold all over the world, expanding from the manufacturing industry into the service sector and other industries at large. At the same time, Total Quality Management (TQM) has achieved substantial developments through the various presentations of National Quality Awards by individual and governments. The parallel development of these two approaches has made the ISO9000 a *"model with an embedded philosophy"* and *"TQM as a philosophy that can be expressed through a model such as MBNQA."*(Lopez-Fresno and Fernandez-Gonzalez, 2000) A quality management approach based on ISO 9000 framework and modelled upon TQM seems to be a widely pursued trend in the future. This

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approach has been adopted by ISO's committee draft on ISO 9000 Version 2000. However, this approach has to be extended to integrate health and safety and environmental issues in order to demonstrate commitment to compliance with the law. As revealed by the literature review, all integration approaches and models tend to integrate all standards requirements into the quality management framework. A more effective way to achieve fully integration will be based on the organisation's core business processes, which is flexible enough to cater for future changes. Table 1 summarises the merits and shortfalls unveiled from the literature review

Models	**Merits**	**Shortfalls**
ISO 9000 Standards	A good management structure	Focus on quality assurance only
ISO 9000 Version 2000	A stepping stone towards TQM	Lack of methodology for integrating the increasing management standards
Integrated Management System	Amalgamates various management standards into one system	Only Partial integration and formal integration methodology was not available
National Award-based TQM	A model of business excellence	Integration of other management standards was not considered
Other Management Model	Holistic TQM implementation initiatives	Integration of other management standards was not considered

Table 1 Merits and Shortfalls of Various Models

The result of the literature review affirms the need to develop an effective and fully integrated single management system to bridge the above deficiency gaps. The authors recommend that a logical and systematic approach to developing a single management system focus on core business processes, enhance the ISO 9000 framework, integrate with other management standards requirements and incorporate the TQM philosophy that can manage the total business of the organisation. This forms a basic concept for developing a total management system model for the MTR. The new system model should be able to integrate various management systems embedded with TQM philosophy that can manage the total business of the Corporation. The authors term this system the Total Management System (TMS). The TMS is defined as a management system model, which focuses on core business processes, integrates various management standards, embraces the business excellence model criteria, and is able to manage the total railway operations with a view to improving overall organisational performance. The cornerstone of the TMS is to incorporate all merits of ISO 9000, TQM and other management

models while bridging their gaps. To this end, the following considerations have been incorporated:

1. The system should be based on ISO 9000 management framework (i.e. a systematic documentation structure with system assurance features – management review and audit);
2. It should be able to integrate all necessary management standards (e.g. ISO 9000, ISO 14000, BS 8800, etc.) into a single management framework which focuses on core business processes; and
3. Incorporation of the TQM philosophy (such as the seven categories of the Malcolm Baldrige National Quality Award judging criteria).

The TMS enhances the TQM model to cover the total business aspects and focus on business purpose. The heart of TMS is to provide a framework in which various management systems such as ISO 9000, ISO 14000 and BS 8800 are integrated with the incorporation of the TQM criteria. The whole framework spearheads the overall corporate purpose and is supported by the eclectic approach of implementation initiatives required to produce successful results.

2. Critical Elements of the Total Management System Model

Total Quality Management (TQM) is an important topic in business and academic fields. Over the past few decades, quality gurus such as Deming (1986), Juran (Juran and Gryna, 1993), Crosby (1984), Feigenbaum (1991) and Ishikawa (1985), the primary authorities of TQM, have developed certain propositions, which have gained significant acceptance throughout the world. Though have different views about TQM, their insights provide a good understanding of the TQM philosophy, principles and practices. In the field of TQM implementation, much research has already been conducted (e. g. Saraph et al., 1989; Flynn et al., 1994; Anderson et al., 1995; Powell, 1995; Handfield and Ghosh, 1995; Black and Porter, 1996 and Ahire et al., 1996). Different researchers have adopted different definitions of TQM. The concept is still a subject of debate (Easton and Jarrell, 1998), and still a hazy and ambiguous concept (Dean and Bowen, 1994). So far, TQM has come to mean different things to different people (Hackman and Wageman, 1995).

The formulation of the TMS elements is based on the common factors of four National Quality Awards (Japan, USA, Europe and Australia) and the critical factors developed by seven studies. These studies include those of Saraph et al. (1989), Flynn et al. (1994), Anderson et al. (1995), Powell (1995), Handfield and Ghosh (1995), Black and Porter (1996), and Ahire et al. (1996).

2.1 Common Factors of National Quality Awards

A comparison of the national quality awards (NQA) of Japan, the USA, Europe and Australia show similarity in purpose – economic viability and the ability to achieve business excellence. There are also basic similarities (Table 2) in the evaluation criteria as each of the national quality awards aims to recognise successful TQM approaches based on customer focus in all functions that result in greater organisational performance and overall business achievements.

Common Factors	***Japan***	***USA***	***Europe***	***Australia***
Leadership	Organisation & its management	Leadership	Leadership	Leadership
Strategic Planning	Company policy & planning	Strategic planning	Policy and strategy	Strategy, policy and planning
Customers	Services and relations	Customer & market focus	Customer satisfaction	Customer focus
Information	Use information & analysis	Information & analysis	Impact on society	Use information & analysis
Employees	Labour and personnel	Human resource development & management	Resources, people, management and satisfaction	People
Processes	Quality Assurance and Control	Process management	Process	Quality of process, product and service
Results	Standardisation & Effects	Business results	Business Results	Business Results

Table 2 Comparison of National Quality Award Criteria

The major four quality award models provide a universal framework for evaluating aspects of TQM practices in a firm. They also provide a framework for identifying a range of intangible and tangible processes that influence the firm's TQM implementation and the end results. Although each award has some different emphases, there are common areas:

1. Each award model has two parts: the criteria of the TQM model (that is, the enablers); and the overall business result. The criteria of the TQM model make overall business results happen.
2. All four award models emphasise the importance of leadership and strategic management, people management, process management, information management, customer focus and business results.

The quality award models provide firms with a means to measure their position against a set of universal criteria, and to identify their strengths and weaknesses in the areas of quality management

practices and business results. These models provide an insight into the way to apply TQM in practice, as well as a solid foundation for this research, and gave the author a better understanding of the concept of TQM.

2.2 Comparison of the Critical Factors Developed by the Seven Studies

Regarding the implementation of the TQM model, much research has been conducted in the field of identifying critical factors for TQM implementation. Different researchers adopted different TQM definitions and frameworks based on their own understanding of TQM and research objectives. Among numerous studies associated with TQM critical factors, quite a number of these studies have been validated empirically. The areas of studies are summarised as follows:

1. Saraph et al. (1989), Powell (1995), Ahire et al. (1996) based on the work of quality gurus;
2. Flynn et al. (1994), Powell (1995), Ahire et el. (1996b) focused on practitioners and empirical literature;
3. Handfield and Ghosh (1995) based on the Malcolm Baldrige National Quality Award criteria and TQM literature; and
4. Anderson et al. (1995) based on Demings management methods.

Most researchers agree that TQM is a philosophy or approach to management focusing on continuous improvement, customer focus, process management, supplier partnership, teamwork and performance management. The results of this research are very much similar to the seven common factors of the NQA-based TQM Model (See Table 2). The research results also indicate that the implementation of such a management philosophy would lead to organisational improvement. The study concludes that these models provide a holistic approach to identify critical factors for implementing TQM. Table 3 demonstrates how the different critical factors used in these studies compare with the seven common factors of the four NQA-based models (Table 2):

Common Factors of NQA Criteria (Table 2)	Saraph et al. (1989)	Flynn et al. (1994)	Anderson et al. (1995)	Handfield and Ghosh (1995)	Powell (1995)	Black and Porter (1996)	Ahire et al. (1996b)
Leadership	Top management leadership	Top management support	Leadership	Leadership	Executive commitment and adopting philosophy	Strategic quality management	Top management commitment
Planning	Role of the Quality Department	-	Continuous improvement	Strategic planning	Adoption and communication of TQM	Corporate quality culture	-
Customer	-	Customer involvement	Customer Focus	Customer focus and satisfaction	Closer customer relationships	Customer satisfaction orientation	Customer focus
Information	Quality data and reporting	Quality information		Information and analysis	Measurement	Quality improvement	Internal quality information usage
					Benchmarking	Measurement and info system	Benchmarking
Employee	Employee relations and training	Workforce management	Learning	Human resource development and management	Employee empowerment and increased training	Teamwork structure	Employee involvement, empowerment and training
Processes	Process management and product / service design	Process management and product design	Process management	Process management	Process improvement and flexible manufacturing	Operational quality planning and external interface management	SPC usage and design quality management
	Supplier quality management	Supplier involvement	Internal and external co-operation		Closer supplier relations	Supplier partnerships	Supplier quality management
Results	Quality reporting	Quality information	Employee fulfilment	Business results	Benchmarking	Quality measurement	Benchmarking

Table 3 A Comparison of TQM Critical Factors

The comparison in Table 4 has demonstrated that although each researcher has slightly different TQM elements, they are quite consistent and can be covered by the seven common factors of NQA criteria as illustrated in Table 2. These seven common factors have been adopted as the basis to develop the total management system model. Table 4 below demonstrates the seven critical factors finally selected for the TMS model as compared with the seven NQA common factors:

NQA Common Factors	TMS Critical Factors
Leadership Strategic Planning	Leadership and Strategic management
Customer	Customer Focus
Information	Information Management
Employee	People management
Process	Process management
Results	Organisational performance
	Continuous improvement

Table 4 Comparison of NQA Common Factors with TMS Critical Factors

With an aim to formulate equivalent attributes to be used by the TMS model, seven critical factors were identified as a result of the benchmarking with NQA criteria, other TQM research results and discussions in the focus group consisting of senior management team of the Operations Division of the Company. These critical factors have addressed the development needs of the MTR. The factors of "leadership" combine with the "strategy management" into one factor to address the needs of the MTR management to play a more important role to formulate and implement strategies in achieving corporate mission. One additional factor "continuous improvement" has been added to elevate the importance of this factor in meeting anticipated challenges of the MTR. Some of the TQM elements suggested by the authors (See Table 3) such as the role of quality department, supplier quality, training and benchmarking would be covered at the process level, the same treatment as MBNQA. Their requirements will be stated in the TMS Manual.

2.3 Development of an Initial TMS Model

While this set of critical factors of TMS is consistent with the conceptual definitions of the Malcolm Baldrige National Quality Award (MBNQA), they have been enhanced to address the development needs of the MTR. These factors have incorporated the interview results of the MTR senior executives and the extensive self-assessment exercise. Among the seven critical

factors of the TMS model, the factors of *"leadership and strategic management"* are manifestations of the importance of senior management's role in the implementation of TQM. The *"process management and information management"* highlight the importance of streamlining the overall processes of the organisation. The *"people management"* addresses the importance of aligning teamwork towards the corporate goals. The *"continuous improvement"* is an important element to ensure the sustainability of the whole system and drive for continuous improvement. The *"customer focus and organisational performance"* are the means to ensure business results are achieved. The dynamic relationship of the TMS seven critical factors forms the proposed initial TMS model as shown in Figure 2 below:

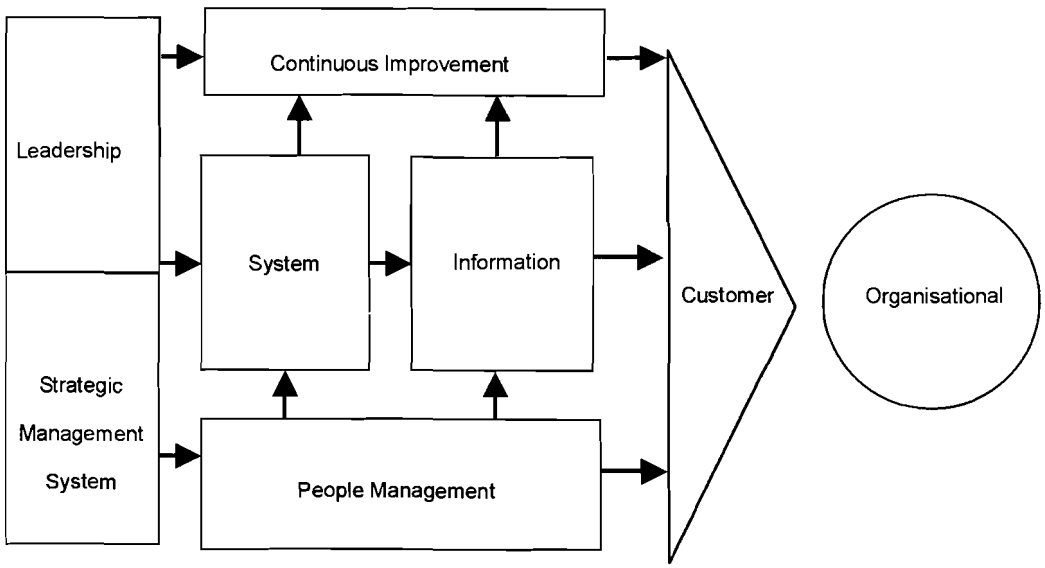

Figure 2 Model of the TMS

Similar to the MBNQA, the TMS model as illustrated in Figure 2 can be divided into three groups: driver, systems and results. The leader is the driver of the whole system. According to Deming (1986), *"the effectiveness of TQM arises from leadership efforts towards the simultaneous creation of a co-operative and learning organisation to facilitate the implementation of process-management practice, which, when implemented, supports customer satisfaction and organisational survival through employee fulfillment and continuous improvement of processes, product and services"*. Hence, the leader drives the resources and efforts of the organisation towards excellence. The result aspects of the TMS model are concerned with "what" the organisation should achieve. This group includes business results and customer satisfaction. The systems are concerned with "how" the results are being achieved. Customer satisfaction and business results are achieved through the leadership driving policy and strategy, team driven organisation, enforcing system integration and implementation via cyber documentation

and information system. These systems provide a framework to facilitate continuous improvement for constantly meeting customers' requirements, which in turn, improves the overall organisational performance. The idea behind the seven categories is that a breakthrough organisational performance can be achieved if consistent effort is paid to these categories.

3. TMS Implementation

The implementing award-based TQM has a positive effect on overall organisational performance (Ritter, 1991). Ross (1995) believes that the MBNQA criteria offer a tool to help a company identify its strengths and weaknesses and to form a strategy for planning company-wide improvement. The MBNQA's self-assessment protocol has been used to drive improvement initiatives. These initiatives include those needed for the TMS implementation such as system integration, adoption of the latest information technology as a vehicle for TMS implementation and the use of the balanced scorecard for performance measures, etc. Using the action research spiral, the self-assessment exercise comprises the following activities:

Reflect	1. Perform self-assessment as per the Hong Kong Management Association (HKMA) Quality Award Criteria. A 58-page report has been produced outlining the current status of the OED and gaps as compared with the criteria.
Plan	2. Formulate a list of improvement projects (totally 24 improvement projects have been identified) to meet these criteria.
Act	3. Consolidate the Corporation's quality initiatives by means of compiling a Submission Report (50 pages) for the Hong Kong Management Association (HKMA) Quality Award. 4. Conduct a pre-audit review (27 pages) on the Submission for the HKMA Quality Award.
Review	5. Identify improvement strategies based on the Examiner's Feedback Report.

Table 5 Self-assessment Process

Key elements of TQM such as customer focus, obsession with quality, long-term commitment, teamwork, continuous improvement, and employee involvement, have been instrumental to the implementation of the TMS. The series activities as discussed above have concluded that the MTR is in a position to benefit from adopting the principles of the MBNQA Model. The self-assessment exercise can be seen as a health check for the Corporation in TQM. It indicated gaps between the existing management approach and the TQM model based on MBNQA, from which an integrated plan can be devised heralding to the objectives of total quality. The following

summarise the major deficiencies between the current management approach and the TQM model:

1. There is no departmental policy and longer-term strategy – a need to develop a strategic management system;
2. There is a lack of evaluation of overall performance against departmental strategies and objectives – a need to develop a performance management system;
3. System is not in place for aggregating and analysing key data and information from a holistic business perspective against specific strategies and goals – a need to develop an information management system;
4. An overall composite Policy, Strategy and Plan, which links business initiatives with departmental and corporate objectives, is not evident; and
5. Linkages between the strategic directions and goals of the business at executive level and the general staff levels are insufficient – the last two items can be tackled by a strategic management system.

4. Contributions to the Organisational Performance

With the successful implementation of the TMS, the service performance has been enhanced as illustrated in Figure 3 below. The actual performance levels in various major areas were well above the performance levels set by the Government and the Customer Service Pledge (CSP) in 2002.

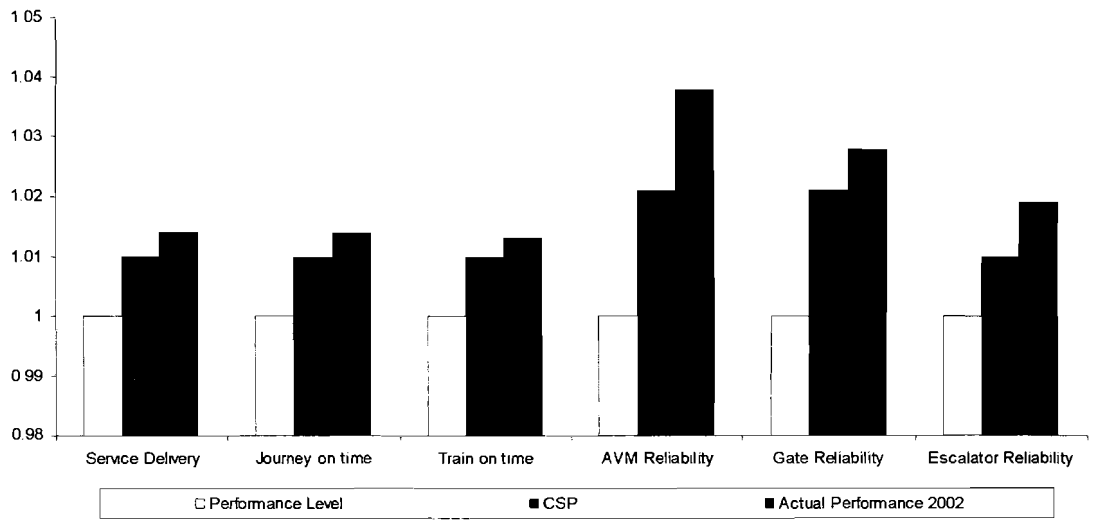

Figure 3 - Service Performance

Since the IMS implementation in 1998, the system has been well received and reaping benefits in

terms of efficiency and effectiveness by strengthening management while streamlining operation. The implementation of the IMS contributes to the continuous improvement in cost effectiveness as shown in Figure 4 below:

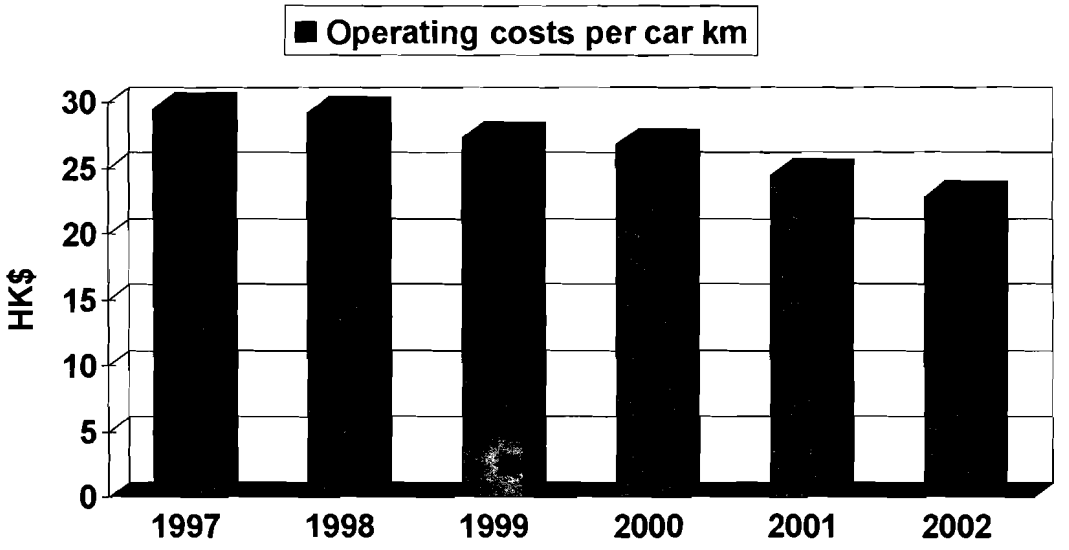

Figure 4 - Cost Effectiveness

5. Summary

The paper summarised the development process in formulating a fit-for-purposed management system model to meet the development needs of the MTR. In the paper, four national quality awards elements are compared as they have high impact on the Hong Kong economy. The comparison result has been summarised into seven common factors. These factors are then compared with the critical factors of seven research studies. The results of these comparisons unveil that although each research has slightly different TQM elements, they are quite consistent and can be covered by the seven common factors of the NQA's.

Based on the seven common factors and their dynamic relations, the initial TMS model has been developed. The model is then implemented in the MTR by means of self-assessment. Gaps are identified and an implementation plan formulated to put this new model into practice. Based on this experience, a more comprehensive implementation instrument in the form of a self-assessment questionnaire has been developed. This instrument was compared with three studies dealing with an empirically validated scale for TQM implementation. Certain TMS features in particular the important ones in marketing focus; people management and process management have been added to meeting the MTR's need for organisation.

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【摘要】 已經證明許多運用全面質量管理模式（TQM）的企業都取得了極大的成效，但為配合企業發展的需要，TQM 系統還是存在一定的發展空間，本論文目的推介目標管理系統的發展步驟以運用在香港地鐵有限公司的未來發展，新的管理系統建基於對 TQM 的研究結論，同時也參照了新的管理方向以減少企業營運風險，而全面管理系統（TMS）的設計則建基於日本、美國、歐州及澳大利亞 National Quality 大獎所定出的評核指標以及由此引申的七大研究板塊。

【關鍵詞】 全面管理系統、全面質量管理、七大研究板塊

Chan, Y. K., Koo, L. C., Tao, F. K.C., and Chau, K.Y. (2005) "A Total Management System - A Further Development of TQM Model to Meet Organisations' Development Needs" Asia International Open University (Macau) Journal, June Issue, pp. 18-30