Managing healthcare quality in project management framework

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Abstract: Healthcare professionals routinely deploy various quality management tools and techniques in order to improve performance of healthcare delivery. However, they are characterised by fragmented approach *i.e.*, they are not linked with the strategic intent of the organisation. This study introduces a holistic quality improvement method, which integrates all quality improvement projects with the strategic intent of the healthcare organisations. It first identifies a healthcare system and its environment. The Strengths, Weaknesses, Opportunities and Threats (SWOT) of the system are then derived with the involvement of the concerned stakeholders. This leads to developing the strategies in order to satisfy customers in line with the organisation's competitive position. These strategies help identify a few projects, the implementation of which ensures achievement of desired quality. The projects are then prioritised with the involvement of the concerned stakeholders and implemented in order to improve the system performance. The effectiveness of the method has been demonstrated using a case study of an intensive care unit at the Eric Williams Medical Sciences Complex Hospital in Trinidad.

Keywords: quality management; healthcare services; Strengths, Weaknesses, Opportunities and Threats matrix; SWOT; project prioritising; Analytic Hierarchy Process; AHP.

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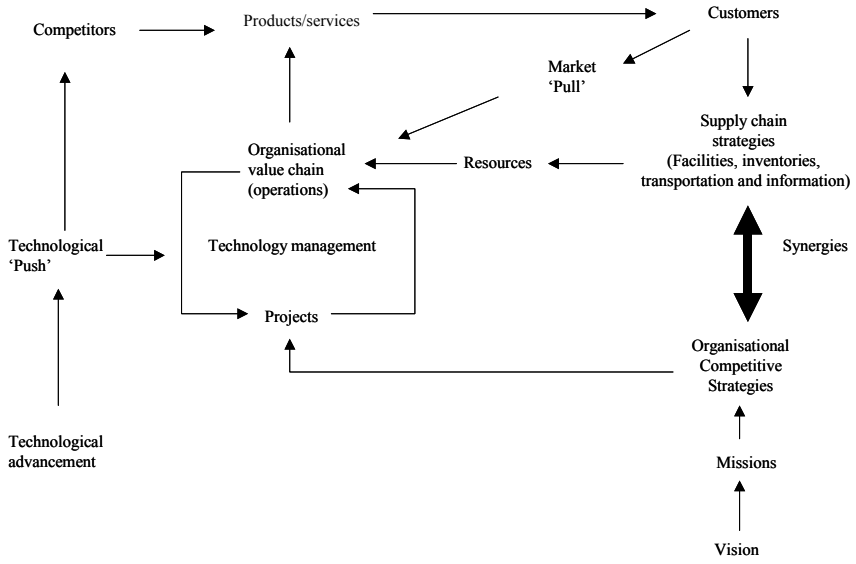
1 Introduction

Today's business is driven by 'customers' pull' and 'technological push'. In order to sustain in this dynamic business environment organisations are routinely deploying various measures for improving business process performance. However, unless those measures match with the strategic intent of the organisation, they fail to improve business performance. Therefore, in order to improve organisation's performance the entire value chain is required to be analysed from a systems perspective by determining various strategies in line with the organisations capabilities and external opportunities (Figure 1).

High-technology medical care has become one of the necessities of modern society (Feeney and Zairi, 1996). Like in any other industry, the organisation in healthcare industry also consists of series of processes, and optimal performance of these processes is essential in order to remain competitive as well as to provide customer satisfaction. Continuous Quality Improvement (CQI) has been applied to many areas of healthcare especially in the Emergency Department (Re and Krousel-Wood, 1990; Fernandes and Christenson, 1995; 1996). Models such as Data-Attitude-Tools (D*A*T), Deming's PDCA cycle, Utilisation Review and Management have been suggested for quality improvement in healthcare units (Van Matre, 1992). However, many of these are general guidelines and do not specifically approach the unique problems of the different units of the hospital-based healthcare system. Moreover, they are characterised by their fragmented approach *i.e.*, they are not linked with the strategic intent of the organisation. In the hospital-based medical practice, there are few uniform and global approaches towards identifying the unit's weaknesses and threats, find the real strengths and opportunities and plan the strategies to mitigate the deficiencies and achieve the objectives (Lurie *et al*., 2002).

Figure 1 Role of quality management in achieving business excellence



Quality improvement should ideally target all the factors of an organisation in a global outlook. Many of the currently employed performance measures of healthcare units are fragmented. Most healthcare units use the peer-review process to identify the deficiencies of the existing performance (Snelson, 1992).

One of the most important areas of a hospital is the Intensive Care Unit (ICU), which provides support for critically ill patients. ICU consumes large share (about 10%) of budgetary allocations of a hospital. Conventionally, Performance measurement of an ICU is done by prognostic scoring systems such as Acute Physiology and Chronic Health Evaluation (APACHE), Simplified Acute Physiology Score (SAPS), and Mortality Prediction Model (MPM) (Zimmerman, 2002). These methods of performance appraisal consider patient outcome alone as a quality measure, hence remarkably missing the other aspects of quality improvement such as process of healthcare delivery as well as the infrastructure available. Other performance measurement methods of ICU involve data envelopment analysis and specific functions of ICU such as measurements and guidelines to improve patient care and resource utilisation in the ICU, to establish and implement best practices (Field and Emrouznejad, 2003; Dlugacz *et al*., 2002). Many of the outcome-based models do not incorporate root cause analysis of the problems which may be the causative factors for the reduced performance. They do not suggest enablers for correcting the problems once they are identified and do not provide a framework for strategies for correction and improvement. The managers of the units design their own methods from the performance appraisal level to the implementation strategy level. With the presently available models of performance measurement, most of the units qualify with honours and it is difficult to distinguish whether they genuinely perform well or it is grade inflation. (Green *et al*., 1997; Popovich, 2002) Therefore there is a need of new models, which provide all these aspects of quality improvement as a package for the manager and link them with the organisational strategies.

The objective of the paper is to develop an integrated quality improvement model for healthcare organisation.

2 Methodology

This research adopts a case study approach in order to validate the proposed quality improvement model with the involvement of the concerned stakeholders using focus group discussions. The proposed quality improvement model has been applied to the ICU of EWMSC Hospital in Trinidad in order to demonstrate its effectiveness in improving quality of specific healthcare unit.

Two focus group discussions were carried out with the involvement of the clinicians (anaesthetists and senior intensive care nurses). The first one was focused on the strategic intents of the organisation and the second one was on operational requirements focusing on quality.

The organisation of the paper is as follows. Section 3 introduces the proposed quality improvement model, Section 4 demonstrates the application of the model in specific healthcare organisation, Section 5 discusses the utility of the proposed model in order to improve organisational performance and Section 6 concludes the study with the illustration of specific findings of this study.

3 The proposed quality improvement model

The proposed model has the following steps:

Step 1 Identifying a system for quality improvement and its environment

Like any other quality improvement methods, the first step is to identify a system for analysis in order to suggest improvement measures. Entire organisational operations can be classified into a few systems. The successful operations of each system would contribute towards overall success of the organisation. Organisations need to dynamically measure the performance of each subsystem in order to satisfy customers and remain in business. Accordingly, they identify and prioritise a specific system for quality improvement on the basis of its criticality with respect to overall operations. The other related systems and the entire business environment remain as an environment of the system understudy.

Step 2 Deriving Strengths, Weaknesses, Opportunities and Threats (SWOT) of the system under study

In order to suggest improvement measures, the strengths and weaknesses of the system and the opportunities and threats of the environment require to be analysed. The strengths and weaknesses reveal the internal positives and negatives of the system under study, respectively. Similarly, the opportunities and threats reveal the external positives and negatives of the system under study, respectively.

Step 3 Formulating SWOT matrix with various strategies

The analysis of SWOT of the system leads to derive various organisational strategies (strengths-opportunities, strengths-threats strategies, weaknesses-opportunities and weaknesses-threats) in order remain in business. Figure 2 shows SWOT matrix format.

Figure 2 SWOT matrix

Internal / External	Strengths (S)	Weaknesses (W)
Opportunities (O)	SO - Strategies	WO - Strategies
Threats (T)	ST - Strategies	WT - Strategies

Step 4 Deriving projects from strategies

The above four types of competitive strategies collectively derive projects in order to improve quality of the organisation through both internal and external customer satisfaction.

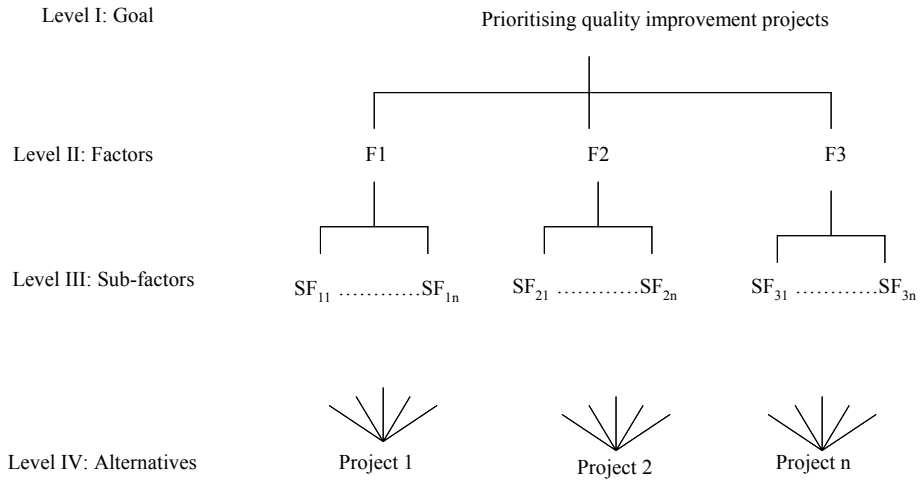
Step 5 Identifying criteria for project prioritising

The identified projects for competitive advantage cannot be implemented simultaneously mainly because of resource limitation. Therefore, the projects are prioritised in order to optimise the system performance. The projects are prioritised on the basis of the criteria identified by the concerned stakeholders. Cost of the projects, customer satisfaction, project complexity, risk, financial benefit, *etc*. are considered as the typical factor for prioritising the projects. The factors can be further classified to subfactors.

Step 6 Developing hierarchical framework for project prioritising

A hierarchical analytical framework is then formed using the identified factors, subfactors and projects as shown in Figure 3.

Figure 3 Hierarchical model for project prioritising



Step 7 Prioritising projects for implementation using Analytic Hierarchy Process (AHP)

In this step, projects are prioritised using AHP, a multiple attribute decision-making technique (Saaty, 1980).

The above steps are demonstrated using a case study of ICU of hospital.

4 Application

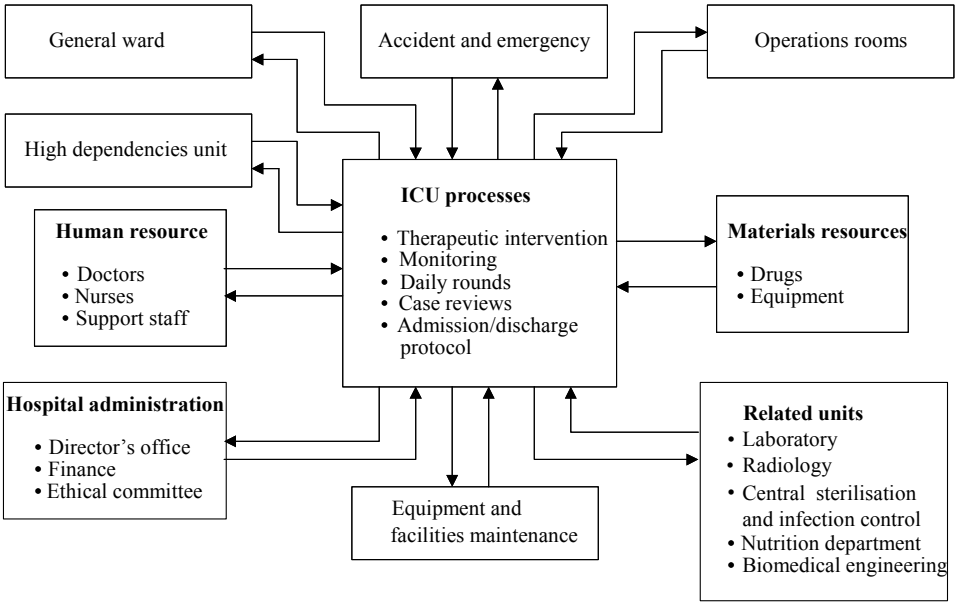
Hospital and ICU setting

Trinidad and Tobago is a twin island in the Republic of the Caribbean, with a population of 1.2 million. It is an English-speaking country of the British Commonwealth. The Eric Williams Medical Sciences Complex (EWMSC) is a 650-bed tertiary care centre, affiliated to the University of the West Indies and a referral centre for several Caribbean countries. The multidisciplinary ICU in the EWMSC is a 6-bed open unit, admitting patients from all specialties.

Step 1 Identifying a system for quality improvement and its environment

An organisation may select a specific system for performance improvement on the basis of either the criticality of its operations in terms of customer satisfaction and business success or unsatisfactory current performance. In this study, ICU of hospital had been chosen on the basis of criticality of its operations for overall patient satisfaction. Figure 4 shows the ICU system for the case under study and its environment.

Figure 4 ICU system and its environment



Step 2 Deriving SWOT

After identifying the system for the study, the next step of the model was to identify the SWOT of the ICU. Strengths and weaknesses refer to those within the organisation of the ICU. Opportunities and threats are those forces arising from developments or changes often outside the ICU. The clinicians involved in the day-to-day management of the ICU were interviewed and the existing problems of the ICU were identified by discussions and brainstorming sessions.

The participants identified appropriate ICU setting for 14-bed occupancy, availability of state of art monitoring equipment, aggressive therapeutic intervention, competent clinical professionals, presence of high dependency unit close to ICU, availability of adequate research facilities, link with academia and good working environment as strengths of the ICU in EWMSC. They also identified critical shortage of nurses and support staff, weak patient administration, weak human resource management practices, poor information and communication technology framework and slow adoption of newer recommendations and technology as the weaknesses. Additionally, advancement in healthcare technology as well as information technology, government support in healthcare, rapid development in healthcare management research and globalisation were identified as the opportunities and increasing awareness. Competition from other hospitals, increasing legal complication and poor functioning of other units of hospital were identified as the threats to the ICU under study.

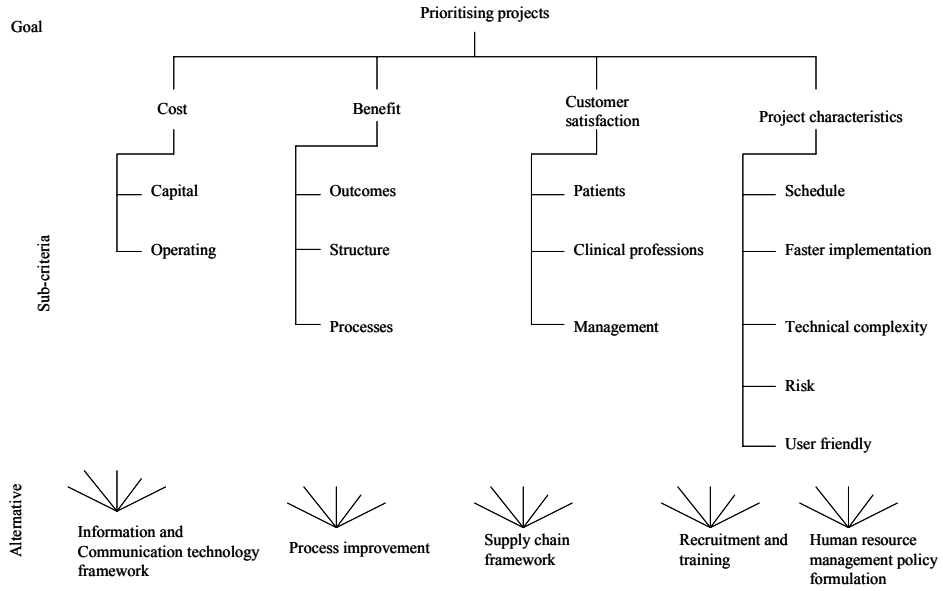
Step 3 Formulating SWOT matrix with various strategies

The next step was to construct the SWOT matrix using information from the previous step. Figure 5 depicts the SWOT matrix for the ICU under study. It revealed various strategies of the ICU under study. The strategies, which had been formulated by capitalising organisation's strengths and environmental opportunities are developing supply chain management framework in order to develop long-term relationship with technology providers, equipment, drug and disposable suppliers; Retaining competent consultants and doctors; encouraging the clinical professionals to get involve in healthcare management research; and developing information and communication technology framework. Recruitment of competent clinicians and development of human resources management policy for ICU management were derived as WO – strategies. The participants derived continuous performance improvement, integrating medical practices with legal framework, and developing communication framework with other units of hospital were derived as ST – strategies. Organising both technical and management training for clinical professionals and emphasising a changing hospital policy for customer focused patient care using standardised process were WT – strategies as derived by the participants of the ICU under study.

Figure 5 SWOT matrix of ICU under study

Internal / External	**Strengths** 1.Appropriate ICU setting for 14-bed occupancy 2. Availability of state-of-the-art monitoring equipment 3. Aggressive therapeutic intervention 4. Competent clinical professionals 5. Presence of high dependency unit close to ICU 6. Availability of adequate research facilities 7. Link with academia 8. Good working environment	**Weaknesses** 1. Critical shortage of nurses and support staff 2. Weak patient administration 3. Weak human resource management practices 4. Poor information and communication technology framework 5. Slow adoption of new technology
Opportunities 1. Technological advancement in healthcare technology 2. Advancement in information and communication technology 3. Government support in healthcare management 4. Rapid development in healthcare management research 5. Globalisation (It improves supply chain management in terms of technology adoption, equipment, drugs and disposables purchasing).	**SO – Strategies** 1. Developing supply chain management framework in order to develop long-term relationship with technology, equipment, drug and disposables 2. Retraining of competent consultants and doctors 3. Encouraging the clinical professionals to get involve in healthcare management research and applications 4. Developing information and communication technology framework	**WO – Strategies** 1. Recruitment 2. Developing human resources management policy for ICU management
Threats 1. Increasing customer awareness 2. Competition from other hospitals 3. Increasing legal complication 4. Poor functioning of other units of hospital	**ST – Strategies** 1. Continuous performance improvement 2. Integrating medical practices with legal framework 3. Developing communication framework with other units of hospital	**WT – Strategies** 1. Organising both technical and management trainings for clinical professionals 2. Emphasising on changing hospital policy for customer focused patient care using standardised process

Figure 6 Project selection in AHP framework



Step 4 Deriving projects from strategies

The participants then identified five projects from the above strategies after thorough brainstorming. The projects were implementing information and communication technology framework; improving ICU processes; developing supply chain framework by integrating customer relationship management, internal supply chain management and supplier relationship management; recruiting and training; and human resource management policy formulation. The brief descriptions of the projects are as follows:

Project 1 Implementing Information and Communication Technology (ICT) framework

The project would improve intra- and inter-unit communication. Additionally, communication with concerned stakeholders (clinical professionals, management, patients, government, consultants, technology suppliers, drug and disposables suppliers, and contractors) would also improve. The scope of works include installation of hardware, software, networking and security system; recruiting ICT professionals; and training of clinical professionals for effective use of ICT.

Project 2 Improving ICU processes

The project would improve treatment protocol covering therapeutic intervention, antibiotic protocol, infection control, monitoring, daily rounds, case reviews, and admission and discharge protocol and would also improve healthcare management processes with customer focus. This could be done in process reengineering framework using the following steps:

1 reviewing all the existing processes

2 identifying key issues

3 eliminating non-value added processes and including required processes

4 implementing new processes.

Project 3 Developing supply chain framework

This project would form partnership among concerned stakeholders and an integrated clinical and management processes. The scope of works would include establishing long-term contract/partnership among suppliers, contractors, consultants and technology suppliers and establishing integrated clinical and management processes.

Project 4 Recruiting and training

Recruitment and training would ensure increased number of competent clinical professionals. The project would consists of recruiting clinical professionals and administrative personnel after thorough human resource requirement analysis, identifying their training needs along with identifying training needs of current employees dynamically and managing entire processes.

Project 5 Human resource management policy formulation

The project would improve human processes in intensive care unit for improved patients care. Developing separate Human Resource (HR) management policy for ICU in line with the hospital HR policy and constantly reviewing HR policy in line with the customers' demand and competitors' movement are the activities to be performed in this project.

Step 5 Identifying criteria for project prioritising

The above projects planned to be implemented on the basis of their priorities in relation to the organisation's competitive strategy. The participants identified overall cost of the projects, likely benefits, customer satisfaction and project characteristics as the criteria for project prioritisation.

Both the capital and operating cost of the project are important factors for project selection. Outcomes, structure and processes measure the likely benefits in healthcare (Hariharan *et al*., 2005). Hence, they are important in order to prioritise projects. Various stakeholders are involved in healthcare services. Their satisfaction is important in order to improve patient satisfaction. Various improvement projects would bring varied level of satisfaction to the customer. The analysis of customer satisfaction with respect to patients, clinical professionals (doctors, nurses, and support staff) are important for project prioritisation. Each project has its own characteristics (work contents), which determine its technical complexity, schedule, risk, faster implementation and user friendliness during operations. Project prioritising would depend on those characteristics of the projects.

Step 6 Developing hierarchical framework for project prioritising using AHP

The Steps 4 and 5 demonstrate the characteristics of the projects and the factors for their prioritising. These reveal that factors are both objective as well as subjective. Additionally, they are conflicting in nature *i.e.*, if a specific factor prioritise a project, other factors may prioritise another project. This calls for multi-attribute decision-making technique for prioritising projects for quality improvement. The participants decided to use AHP, a multi-attribute decision-making technique (Saaty, 1980) in order to prioritise quality improvement projects for ICU under study. Figure 4 shows the hierarchical project selection framework for ICU using AHP.

Step 7 Prioritising projects for implementation using AHP

The AHP developed by Saaty (1980) provides a flexible and easily understood way of analysing complicated problems. It is a multiple criteria decision-making technique that allows subjective as well as objective factors to be considered in decision-making process. The AHP allows the active participation of decision-makers in reaching agreement, and gives managers a rational basis on which to make decisions. AHP is based on the following three principles: decomposition, comparative judgement and synthesis of priorities. The AHP is a theory of measurement for dealing with quantifiable and intangible criteria that has been applied to numerous areas, such as decision theory and conflict resolution (Vargas, 1990). AHP is a problem-solving framework and a systematic procedure for representing the elements of any problem (Saaty, 1983).

Formulating the decision problem in the form of a hierarchical structure is the first step of AHP. In a typical hierarchy, the top level reflects the overall objective (focus) of the decision problem. The elements affecting the decision are represented in intermediate levels. The lowest level comprises the decision options. Once a hierarchy is constructed, the decision-maker begins a prioritisation procedure to determine the relative importance of the elements in each level of the hierarchy. The elements in each level are compared as pairs with respect to their importance in making the decision under consideration. A verbal scale is used in AHP that enables the decision-maker to incorporate subjectivity, experience, and knowledge in an intuitive and natural way. After comparison matrices are created, relative weights are derived for the various elements. The relative weights of the elements of each level with respect to an element in the adjacent upper level are computed as the components of the normalised eigenvector associated with the largest eigenvalue of their comparison matrix. Composite weights are then determined by aggregating the weights through the hierarchy. This is done by following a path from the top of the hierarchy to each alternative at the lowest level, and multiplying the weights along each segment of the path. The outcome of this aggregation is a normalised vector of the overall weights of the options. The mathematical basis for determining the weights was established by Saaty (1980).

Project selection is usually a team effort, and the AHP is one available method for forming a systematic framework for group interaction and group decision-making (Saaty, 1982). Dyer and Forman (1992) describe the advantages of AHP in a group setting as follows:

1 both tangibles and intangibles, individual values and shared values can be included in an AHP-based group decision process

2 the discussion in a group can be focused on objectives rather than alternatives

3 the discussion can be structured so that every factor relevant to the discussion is considered in turn

4 in a structured analysis, the discussion continues until all relevant information from each individual member in a group has been considered and a consensus choice of the decision alternative is achieved.

A detailed discussion on conducting AHP-based group decision-making sessions including suggestions for assembling the group, constructing the hierarchy, getting the group to agree, inequalities of power, concealed or distorted preferences, and implementing the results can be found in Saaty (1982) and Golden *et al*. (1989). For problems with using AHP in group decision-making, see Islei *et al*. (1991).

The participants derived through extensive brain storming the importance of each factor and the sub-factors by pair-wise comparison using nine-point numerical scale (Table 1). Table 2 shows the pair wise comparison in factor level and Table 3 shows the normalised matrix with weights of each factor. Similarly, relative importance of each subfactor was also derived. Subsequently, the alternatives are pair wise compared with respect to each subfactor in order to develop priorities of each alternative. Then the results were synthesised across the hierarchy to derive the overall priority of the projects. The results were shown in Table 4. The study used Expertchoice™ software and consistencies of all the matrices were checked along with overall consistency, which were within 10%.

Table 1 Nine-point scale for pair-wise comparison

Intensity of pair-wise comparison	*Importance*
1	Equal importance, two activities contribute equally to the object
3	Moderate importance, slightly favours one over another
5	Essential or strong importance, strongly favours one over another
7	Demonstrated importance, dominance of the demonstrated importance in practice
9	Extreme importance, evidence favouring one over another of highest possible order of affirmation
2, 4, 6, 8	Intermediate values, when compromise is needed

Source: Saaty (1980)

Table 2 Pair-wise comparison in factor level to derive factor importance

	Cost	*Benefit*	*Customer satisfaction*	*Project characteristics*
Cost	1.00	0.50	1.00	2.00
Benefit	2.00	1.00	2.00	3.00
Customer satisfaction	1.00	0.50	1.00	2.00
Project characteristics	0.50	0.33	0.50	1.00
Column sum	4.50	2.33	4.50	8.00

Table 3 Normalised matrix

	Cost	*Benefit*	*Customer satisfaction*	*Project characteristics*	*Weights*
Cost	0.22	0.21	0.22	0.25	0.23
Benefit	0.44	0.43	0.44	0.38	0.42
Customer satisfaction	0.22	0.21	0.22	0.25	0.23
Project characteristics	0.11	0.14	0.11	0.13	0.12

In a common objectives context where all members of the group have the same objectives, there are four ways that could be used for setting the priorities:

1 consensus

2 vote or compromise

3 geometric mean of the individuals' judgments

4 separate models or players (Dyer and Forman, 1992).

In the present study, all pair wise comparisons were made using group consensus.

The participants gave highest priority to the 'improving ICU processes' project. They ranked 'recruitment and training', developing supply chain management framework', 'formulating new HR policy' and 'information and communication technology framework' as second, third, fourth and fifth, respectively. The participants came to consensus on 'benefit' as the most important criteria for quality improvement project prioritisation. Lower capital cost, benefit to ICU processes, patient satisfaction and project risk are considered as the most important subcriteria.

Currently, the 'ICU process improvement' project has been implemented using process-reengineering framework (Dey, 2001). In the reengineered processes the following changes are made:

Table 4 Prioritising projects using AHP

					Project 1: ICT		*Project 2: Process improvement*		*Project 3: SC framework*		*Project 4: Recruitment and training*		*Project 5: HR policy*	
Criteria		*Sub-criteria*	*LP*	*GP*	*LP*	*GP*	*LP*	*GP*	*LP*	*GP*	*LP*	*GP*	*LP*	*GP*
Cost	0.23	Capital cost	0.600	0.138	0.080	0.011	0.150	0.021	0.230	0.032	0.170	0.023	*0.370*	0.051
		Operating cost	0.400	0.092	0.030	0.003	0.330	0.030	0.090	0.008	0.130	0.012	*0.420*	0.039
Benefit	0.42	Structure	0.280	0.118	0.350	0.041	0.060	0.007	0.070	0.008	*0.420*	0.049	0.100	0.012
		Outcomes	0.300	0.126	0.230	0.029	*0.260*	0.033	0.230	0.029	0.200	0.025	0.080	0.010
		Processes	0.420	0.176	0.160	0.028	*0.350*	0.062	0.250	0.044	0.200	0.035	0.040	0.007
Customer satisfaction	0.23	Patient	0.480	0.110	0.150	0.017	*0.330*	0.036	*0.320*	0.035	0.100	0.011	0.100	0.011
		Clinical professionals	0.270	0.062	0.180	0.011	0.240	0.015	0.100	0.006	*0.350*	0.022	0.130	0.008
		Management	0.250	0.058	*0.290*	0.017	0.130	0.007	0.250	0.014	0.100	0.006	0.230	0.013
Project characteristics	0.12	Risk	0.330	0.040	0.100	0.004	0.180	0.007	0.120	0.005	0.280	0.011	*0.320*	0.013
		Faster implementation	0.120	0.014	0.050	0.001	0.180	0.003	0.080	0.001	*0.380*	0.005	0.310	0.004
		Complexity	0.230	0.028	0.100	0.003	0.190	0.005	0.120	0.003	*0.420*	0.012	0.170	0.005
	1													
		Schedule	0.170	0.020	0.150	0.003	0.300	0.006	0.100	0.002	0.300	0.006	0.150	0.003
		User friendly	0.150	0.018	*0.350*	0.006	0.320	0.006	0.210	0.004	0.070	0.001	0.050	0.001
						0.173		*0.238*		0.192		0.219		0.177

Notes: LP: Local Percentage; GP: Global Percentage

A Therapeutic Intervention Scoring System (TISS) was adopted to assess the intensity of therapeutic interventions received by the patients admitted to the ICU. This scoring system was applied on a daily basis from the day of admission to the day of discharge of every patient. The overall result showed that the therapeutic intensity of ICU under study is comparable with international standards. Regular teaching sessions for the junior medical officers and the critical care nurses were organised in order to prevent iatrogenic complications. Additionally, a database was set up to record the illness severity of the patients admitted to the ICU. The Simplified Acute Physiology Score – version II (SAPS II) and the Pediatric Index of Mortality – version 2 (PIM2) were adopted regularly for adult and paediatric patients, respectively, in order to assess the severity of illness of the case-mix admitted to the ICU and follow up their outcome.

Information from the microbiology laboratories, was assimilated to know the spectrum of microbial infections in the ICU and their sensitivity to various antibiotics. This culminated in formulating an antibiotic protocol. The clinical director of the ICU had arranged conferences with the various departments who admit their patients in the ICU, which improved interdepartmental communication The Ministry of Health had recently formulated a National Policy for admission and discharge to ICUs, which had also been implemented in the institution.

5 Discussion

Quality in healthcare is usually assessed by three parameters namely structure, process and outcome of healthcare (Donabedian, 1988). Quality improvement measures should always include all the three parameters, which are remarkably missing in the current models. The structure of the hospitals is assessed by the human and material resources available in each hospital. Processes of hospital operations has been difficult to measure by specific metrics (US News & World Report, 1990). Some authors have recommended process measures, but this may require large databases, which may not be consistently available (Palmer, 1997). Researchers used various performance measurement methods using Data Envelop Analysis (DEA), fuzzy theory, balanced score card, AHP, *etc*. in order to identify quality improvement projects in healthcare system (Hariharan *et al*., 2005). However, they suffer from not having sufficient link with the organisational strategies (Hariharan *et al*., 2004; 2006). The proposed model incorporates all the three parameters (structure, process and outcome) of healthcare evaluation along with the consideration of organisational strategies.

As mentioned earlier, most of the performance appraisal methods of healthcare units have fragmented approach. Some institutions have peer review committees to audit the morbidity and mortality of patients (Snelson, 1992). Peer review is invariably done retrospectively and analyses the deficiency in patient care, which could have probably contributed to the adverse patient occurrences. Although effective as a quality improvement measure with respect to the patient care, there are many inherent difficulties when this is considered as the major or one and only approach (which is true in many institutions). The multifarious schools of thought involved in patient care could justify the approach taken towards the patient, unless it is an obvious deficiency in patient care. Peer review predominantly approaches the technical aspect of patient care and most often may not give weight to the other aspects such as human and material resources, which

could have possibly contributed to the morbidity and mortality. Thus this method does not appraise the performance as a whole. Furthermore, it is too focused to the aspect of the deficiency of patient care and may not approach the performance of the organisation from other factors not involved with the deficiency of patient care. Additionally, this method could only find the deficiencies and may not be able to provide enablers to mitigate various factors involved in a framework for the manager to implement.

The present model addresses many of the aforementioned disadvantages of the existing quality improvement methods:

- it approaches the performance of the organisation from a holistic point of view by incorporating every factor
- it does not limit itself to the morbidity and mortality of patients
- it reviews the various important aspects of the infrastructure of the healthcare unit such as material and human resources
- it also provides the manager with a project management framework in order to implement improvement projects
- it is not necessary to wait for adverse patient occurrences to do a retrospective analysis, but the model may be applied in continuum on an ongoing basis for CQI
- it also facilitates the prioritisation of implementation measures objectively to quickly improve the performance of the unit
- quality improvement measures are linked with the strategic intent of the organisation
- it involves the process owners in making decision.

The major pitfall of the present model is that it has been applied in only ICU setting of a hospital. Additionally, both SWOT matrix and project prioritising using AHP totally rely on organisational effectiveness in making right decision.

Outcome measures of the patients which is the endpoint of the healthcare delivery may not have received due importance in the present model, which mainly considers the infrastructure and process measures of the healthcare unit. Our previous research showed that process measures are equally or even more important in performance appraisal of an ICU. We suggest that the present model may be combined with other methods such as the peer reviews to maximise the performance appraisal and quality improvement.

6 Conclusion

Quality improvement projects are not always linked with the strategic intents of the organisation. A synergy between bottom-up and top-down approach for quality improvement improves organisational effectiveness. An integrated approach to quality improvement by identifying quality improvement projects using strategic management tools like SWOT and subsequently prioritising those projects using AHP with the involvement of the concerned stakeholders ensures synergies between operational requirements and organisations' business strategies. Today's healthcare services are extremely demanding because of constant variations of customers' needs, intense

competitive environment and rapid technological advancement. Hence, dynamic analysis of environment with the involvement of the stakeholders, deriving the improvement measures and fast implementation of those improvement projects are the keys to success. The proposed model has been successfully implemented in the ICU of a hospital in a developing country and subsequent stakeholder validation survey revealed that the model could be used dynamically for evaluating performance of any system along with other existing performance measurement models in healthcare services.

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