
Answers

**1 To: The Directors of the Glasburgh Trust
From: Management Accountant
Subject: Performance of Royal Laurel and King Hardy Hospitals
Date: June 2009**

As requested I have prepared the attached report having adopted a balanced scorecard approach using the following dimensions:

- (i) Access to services
- (ii) Clinical
- (iii) Efficiency
- (iv) Financial management.

I should be only too pleased to provide any explanations relating to the contents of the report should you have any queries.

Signed: Management Accountant
Date: June 2009

Report

(a) Re: Performance of Royal Laurel and King Hardy Hospitals for the year ended 31 May 2009.

Access to services:

Waiting times for admission to each hospital are a measure of the quality of service provided by our hospitals. Relevant data in respect of the year under review is as follows:

Inpatient statistics:

	RLH Actual	RLH Budget	KHH Actual
Total inpatients	37,000	36,500	40,000
Number of inpatients who waited more than five weeks after consultation for admission to hospital	3,330	365	320
% of inpatients who waited more than five weeks after consultation for admission to hospital	9%	1%	0.8%
Number of inpatients who waited more than 11 weeks after consultation for admission to hospital	740	0	0
% of inpatients who waited more than 11 weeks after consultation for admission to hospital	2%	–	–

The statistics in respect of inpatients to each hospital reveal that KHH provided superior access to service than RLH. RLH targeted to admit 99% of all inpatients to hospital within five weeks of their consultation. However, RLH only admitted 91% of all inpatients within five weeks from the time of their consultation. In comparison KHH admitted 99.2% of all inpatients within five weeks. Furthermore, 2% of all inpatients treated by RLH waited more than 11 weeks for admission to hospital whereas RLH had not anticipated any inpatient waiting for this length of time for admission to hospital. Again, KHH provided superior access to services with none of its inpatients having to wait more than eleven weeks prior to admission to hospital.

Outpatient statistics:

	RLH Actual	RLH Budget	KHH Actual
Total outpatients	44,000	43,800	44,000
Number of outpatients who waited more than five weeks for treatment	4,400	2,190	352
% of outpatients who waited more than five weeks for treatment	10%	5%	0.8%
Number of outpatients who waited more than 11 weeks for treatment	1,320	438	220
% of outpatients who waited more than 11 weeks for treatment	3%	1%	0.5%
Number of outpatients who waited more than 13 weeks for treatment	220	0	0
% of outpatients who waited more than 13 weeks for treatment	0.5%	–	–

With regard to the access to service provided to outpatients of each hospital, then a similar picture appears. 10% of all outpatients waited more than five weeks for an appointment at RLH which was exactly twice the target of 5%. In a similar vein, 3% of all outpatients at RLH waited more than 11 weeks for an appointment against a target of 1%. Moreover, 220 outpatients at RLH had to wait more than 13 weeks for an appointment. In comparison KHH provided a far superior access to service with only 0.8% and 0.5% of outpatients waiting more than five and 11 weeks respectively for an appointment. Indeed, no outpatient at KHH had to wait for more than 13 weeks for an appointment.

Other statistics:

	RLH Actual	RLH Budget	KHH Actual
Number of cancelled or delayed operations (working 1)	592	0	160
Achievement (%) of target waiting time of two weeks for admission to the Rapid Access Chest Pains Clinic	70	98	100
Number of emergency admissions	300	400	300
Number of 12 hour 'trolley' waits for emergency admissions to a hospital bed	4	0	0
Achievement (%) of target of four hours or less time spent in Accident and Emergency ward	96	98	100

With regard to other statistics relating to 'access to service', RLH scheduled to perform 29,600 operations (Working 1) which was 400 operations more than the budgeted number of 29,200. This was due to the fact the actual number of inpatients admitted at 37,000 was greater than the budgeted number of 36,500. However, the number of operations performed was 29,008 from which indicates that 592 operations did not take place as scheduled (Working 2). Hence we can deduce that 2% of scheduled operations were either cancelled or postponed. The statistics in respect of KHH reveal that only 0.5% of scheduled operations were postponed.

It is clear that RLH did not achieve its target maximum waiting time of two weeks for admission of 98% of patients to the Rapid Access Chest Pains Clinic. In fact, it fell well short at 70% of patients requiring to be admitted to the clinic. In stark contrast KHH admitted 100% of patients to its clinic within two weeks.

Whilst the number of emergency admissions is difficult (if not impossible) to forecast with accuracy, four patients who were admitted to RLH on an emergency basis spent at least 12 hours on a 'trolley' before being allocated a hospital bed. RLH had targeted that no patient admitted to hospital on an emergency basis would have to spend 12 hours before being admitted to hospital and given the fact that such admissions can have life-threatening implications this can be regarded as poor performance. Again, in stark contrast no patient admitted to KHH on an emergency basis had to wait for 12 hours before being allocated a hospital bed.

RLH was unable to meet its target that 98% of patients admitted to the accident and emergency ward would spend less than four hours in the ward. RLH achieved a percentage of 96% whereas 100% of patients admitted to KHH's accident and emergency ward spent less than four hours in the ward.

It is quite apparent from the available statistics in respect of 'access to service' that RLH has not been able to meet its targets and that KHH has performed much better. In the absence of information regarding targets of KHH then we cannot conclude whether or not KHH has actually met its targets but we certainly can conclude that the performance of KHH is very good.

Clinical:

	RLH Actual	RLH Target	KHH Actual
% of Complaints responded to within 25 days	95	100	99
Number of deaths (inpatients)	600	730	800
Infection control – number of instances of infections reported	2	6	0
Number of drug administration errors	80	100	20
Number of staff shortages	80	60	20

In terms of a clinical focus it is apparent that KHH with 420 complaints, 1% of which are not responded to within 25 days, is better at responding to complaints than RLH which was unable to respond to 5% of the total complaints received within its target timeframe of 25 days. However one needs to be mindful that we do not know the nature of the complaints made by the patients of each hospital since a comparison of the nature of complaints can be far more revealing than the number of complaints. However, in the absence of such information it would seem reasonable to conclude that KHH is extremely capable in responding to complaints from patients.

It is observable that the number of deaths among inpatients is lower at RLH than in KHH in both absolute and relative terms. However, such a statistic should be viewed with the utmost caution since much will depend upon the seriousness of the illnesses of patients at each hospital and therefore one cannot deduce that the hospital with the lower death rate is more efficient in terms of its clinical focus.

Infection control measured in terms of the number of infections reported was excellent at KHH with no instances of infections being experienced during the year. On the other hand RLH bettered its target of six such instances but nevertheless there remains the fact that there were two reported instances of infections throughout the year.

With regard to the number of drug administration errors then staff at RLH made 80 such errors which was 20% better than the targeted number of 100. However, this was four times the level of such errors made by staff at KHH.

Again, the number of staff shortages of 80 at RLH was four times higher than that of KHH. It is reasonable to conclude that such staff shortages will inevitably precipitate problems especially within organisations such as hospitals which are so dependent upon staff being available according to hospital schedules.

Efficiency:

	RLH Actual	RLH Target	KHH Actual
Bed occupancy (number of inpatient bed nights)	138,750	146,000	134,320
Theatre utilisation (%)	88.3	88.9	96.9
Number of patient days per member of medical staff (Working 4)	8.4	7.4	9.2
Number of times of government or agency staff usage	80	60	20

Actual bed occupancy at RLH was 90.5% compared with a target of 95.3% of total bed nights available during the year. There were 500 more inpatients treated than the target number of 36,500. The average patient stay at RLH was 3.75 bed nights (Working 3) which compares favourably with a target of 4 bed nights. KHH had an actual bed occupancy rate of 87.6% and an average patient stay of 3.36 nights.

Theatre utilisation at RLH amounted to 88.3% (Working 4) of available capacity which was below the targeted level of 88.9% (36,500 x 80% = 29,200/32,850). In comparison KHH used 96.9% of available capacity which is significantly higher than RLH.

Staff productivity may be measured in terms of patient days per member of medical staff. Comparative actual and target statistics for RLH are 8.4 and 7.4 days respectively. KHH has a higher figure at 9.2 patient days per member of medical staff. More patient days per member of medical staff implies greater levels of efficiency. However, this might mean that there are issues relating to the quality of patient care. There is no information to suggest that this might be the case with regard to either hospital.

The use of government/agency staff reflects the number of staff shortages reported under the above 'Clinical focus' of this report. A hospital cannot cope with staff shortages due to the very nature of its work; i.e. patient care.

Financial:

	RLH Actual	RLH Target	KHH Actual
Revenue from clinical and non-clinical activities (\$m)	54.2	55.2	60.2
Medical staff costs (\$m)	22.3	22.2	19.6
Other staff costs (\$m)	5.5	5.5	4.0
Income and expenditure surplus/(deficit)	(1.0)	0.0	4.0
Other operating costs (net of any other revenues received)(Working 5)	27.4	27.5	32.6
Number of days cash in hand	31	30	35

The financial information contained within the scenario is extremely limited, however, it can be deduced that RLH had a deficit of \$1 million. It was targeted to operate at a zero surplus/deficit. Other than with regard to medical staff costs which were \$0.1m above budget, RLH appears to have excellent cost control given that it treated more inpatients and outpatients than the budgeted numbers in respect of each category of patient.

In comparison KHH had an operating surplus of \$4 million. It is noticeable that its level of operating costs (\$32.6 million) is appreciably higher than the \$27.4 million incurred by RLH.

RLH days cash in hand at 31 days was a day above target. By way of comparison KHH had 35 days cash in hand,

- (b) The balanced scorecard approach used by the Glasburgh Trust uses four 'perspectives' or 'focuses' which are critical in the assessment of the performance of hospitals. The provision of good 'Access to services' is fundamental to the performance of each hospital because even if a hospital has excellent clinical and operating efficiency, unless patients can access the services then no benefits can be gained.

A primary consideration in the requirement for the inclusion of a clinical focus within the scorecard is the fact that 80% of inpatients are expected to undergo an operation. Hence the importance of the adoption of relevant performance measures relating to issues such as infection control and drug administration.

Resource allocation assumes critical significance in government funded institutions such as the Glasburgh Trust, hence the need for relevant performance indicators in order to assess levels of efficiency attained by each hospital. Government funded hospitals have finite resources which are funded by the taxpayer and thus in terms of public accountability it is important that appropriate performance indicators such as bed occupancy and theatre utilisation are monitored.

A focus on financial management is fundamental to any business whether they are profit seeking or not for profit organisations. By definition there is competition between publicly owned organisations for funds and hence it is critical that organisations such as the two hospitals under review are able to demonstrate that the funds made available to them are deployed in the most economic, efficient and effective manner.

The patient is in reality the 'customer' and hence a large number of the performance measures used within the scorecard are customer focused.

The scorecard utilised by the Glasburgh Trust could be improved by the inclusion of a staff perspective or focus. People are an organisation's largest asset and therefore performance measures focused upon hospital staff would add significant value to the scorecard. For example, performance indicators related to staff sickness, absence and turnover are relatively easy to measure and would assist in the management of operations within each hospital.

The usefulness of the scorecard would also be enhanced by the inclusion of a 'service quality' perspective or focus. In this regard the use of non-financial performance measures would add significant value to the scorecard. Examples of information that would enhance the usefulness of the scorecard used by the Glasburgh Trust are as follows:

- Full details of the schedule of operations in order to review the % of operations performed in accordance with scheduled activities
- The number of complaints received as a percentage of patients
- The % of patients who need a second operation because their initial operation was unsuccessful
- The number of complaints from concerned relatives of patients regarding the lack of/timeliness of information made available to them.

The scorecard could also be improved by the use of more detailed financial information in the measurement of the performance of each hospital. Examples of information that would enhance the usefulness of the scorecard used by the Glasburgh Trust are as follows:

- Details of the number of staff employed at each hospital by category of employee i.e. the number of consultants, doctors, nurses and other medical staff with a detailed breakdown of total staff costs
- A detailed breakdown of the clinical and non-clinical income received by each hospital
- A detailed breakdown of the operating costs of each hospital
- Details of the funds employed by each hospital.

Please contact me should you require any further information regarding, or clarification of, any of the matters contained in this report.

Signed:

Date:

Workings:

(1) Number of planned operations

	RLH Actual	RLH Budget	KHH Actual
Total inpatients	37,000	36,500	40,000
% of inpatients requiring a single operation	80%	80%	80%
Number planned operations	29,600	29,200	32,000

(2) Number of cancelled or delayed operations

	RLH Actual	KHH Actual
Number of planned operations (Working 1)	29,600	32,000
Number of operations performed	29,008	31,840
Number of cancelled or delayed operations	592	160
Planned operations cancelled or delayed	2.0%	0.5%

(3) Bed occupancy (%) and average patient stay

	RLH Actual	RLH Budget	KHH Actual
Bed occupancy (number of days)	138,750	146,000	134,320
Bed days available (42 x 10 x 365)	153,300	153,300	153,300
Bed occupancy (%)	90.51	95.24	87.62
Number of patients	37,000	36,500	40,000
Average patient stay (days)	3.75	4	3.36

(4) Theatre utilisation (%)

	RLH Actual	RLH Budget	KHH Actual
Theatre capacity – number of operations(10 x 9 x 365)	32,850	32,850	32,850
Number of operations performed (Working 2)	29,008	29,200	31,840
Utilisation (%) =	88.3%	88.9%	96.9%

(5) Operating costs

	RLH Actual \$m	RLH Budget \$m	KHH Actual \$m
Revenue	54.2	55.2	60.2
Medical staff costs	22.3	22.2	19.6
Other staff costs	5.5	5.5	4.0
Operating costs (Balancing figure)	27.4	27.5	32.6
Income and expenditure surplus/(deficit)	(1.0)	0	4.0

2 (a) Contribution per franchise = sales revenue – variable cost
 = \$20,000 – \$6,000
 = \$14,000

Net operating cash flow each year before taxation = (\$14,000 x 300) – \$600,000 = \$3,600,000

Net operating cash flow each year after taxation = \$3,600,000 x 70% = \$2,520,000

Net present value (NPV) at a discount rate of 11%

Net operating cash flow – initial investment – development costs

$$= (2,520,000 \times 4.231) - (6,000,000) - (1,000,000 \times 0.812) - (1,000,000 \times 0.731)$$

$$= \$3,119,120$$

The positive NPV indicates that the proposal should be undertaken.

Note: A real discount rate of 11% has been used. It has been calculated as follows:

$$(1 + \text{money cost of capital}) / (1 + \text{rate of inflation}) - 1$$

$$= (1 + 0.1544) / (1 + 0.04) - 1$$

$$= 0.11 \text{ or } 11\%$$

- (b) There are barriers to the creation and revision of a performance measurement system. Key drivers are not easily measured. This applies specifically to the issue of intellectual capital.

Intellectual capital will include assets such as employee know-how, skills and creativity. Such assets cannot be measured using traditional financial measures. It is necessary to identify and value a number of alternative measures such as years of experience or service of key employees, or the proportion of employees generating new ideas for the development of the business.

The rise of intellectual capital statements has been driven by the decreasing information relevance of aspects of traditional financial statements. There is a role for accountants (in particular management accountants) in classifying the intellectual (and intangible) assets in the organisation.

In F4U the development of new franchises will rely heavily on the intellectual capital input. This will require the ongoing development of existing employee knowledge and expertise and the recruitment of new expertise/knowledge as required by the trend in the franchise range.

There will be specific costs incurred in the retention and development of existing staff expertise and in the acquisition of new staff/expertise and its development within the ethos of F4U.

- (c) A Performance Measurement system (PMS) must be comprehensive for the following reasons:

- Financial is only one dimension of value – as such it is inadequate in evaluating strategic performance of an organisation in its entirety.
- Financial measures are traditionally backward looking – in today's volatile markets, a poor predictor of future performance.
- Financial measures take no account of the intangible value drivers – especially important in knowledge intensive companies.
- Fixation with bottom line profit pushes for short-term decisions to boost earnings streams in short term.
- Alternative perspectives are needed to satisfy demands of providing a sustainable competitive environment.

The effectiveness of a PMS based solely on financial performance may be reduced due to key drivers not being easily measured such as, for example, the degree of innovation required for new franchises.

Also, there may be conflict between the PMS with the culture of an organisation. The culture will probably focus on innovation in franchise development. This will not be enhanced by a solely financial based PMS. It is important that a culture is developed which recognises and rewards the contribution of employees to achieving corporate goals and strategy fulfilment.

It is important to focus on sustaining competitive advantage through superior strategic management in all aspects of franchise development and implementation. There is a need for better business intelligence capability from both within the organisation and from external sources, in the assessment of likely demand for new franchise areas and how best to satisfy such demand. In this regard there is need for non-financial performance measures in order to enhance the effectiveness of the PMS.

- (d) The **maximax** rule looks for the largest possible outcome. In this case F4U will choose a fee per franchise of \$18,000 where there is a possibility of an NPV of \$4,348,226. This may be seen as risk seeking since F4U has not been put off by the possibility of a lower NPV than if a \$22,000 fee is charged and variable costs are \$6,000 or \$7,000.

The **maximin** rule looks for the fee per franchise which will maximise the minimum possible NPV. Hence maximin is a risk averse strategy. In this case F4U will choose a fee per franchise of \$22,000 where the lowest NPV is \$2,674,865. This is better than the lowest figures applying where franchise fees of \$18,000 or \$20,000 apply.

The **minimax regret** rule requires the choice of the fee per franchise which will minimise the regret from making the wrong decision. Regret in this context is the opportunity lost through making the wrong decision. Using the calculation from the payoff matrix given in the question, a regret matrix may be created as follows:

		Regret matrix		
		Fee per franchise (\$000)		
		\$18	\$20	\$22
variable cost per franchise (\$000)	5	0	340,596	74,043
	6	177,702	355,404	0
	7	429,446	444,255	0
Maximum regret		429,446	444,255	74,043

This shows that the minimax regret rule leads to the choice of a fee per franchise of \$22,000. This minimises the regret to an amount of \$74,043.

- 3 (a) (i) Agency theory considers the relationship between a principal and an agent. The problem is how the agent can be motivated and monitored. The key requirements are that the agent must have to account for his/her performance to the principal and that the principal must be able to hold the agent to account. The agent performs a task through the application of judgement and skill. The outcome depends on the efforts and methods adopted by the agent.

In the context of Universal University, the lecturer is the agent in using his/her skill and judgement in the creation, delivery and assessment aspects of the department/school on behalf of the university (the principal). The lecturer may be seen as adopting a risk seeking stance in using new/innovative approaches to the teaching/learning process or a risk averse stance where he/she continues with currently used approaches to teaching and learning.

The observability of the role of the lecturer as agent may be measured, by observing outcomes achieved. Examples of such measures may include the pass rates in assessments or levels of future choice of a module by students. The effort of the lecturer may be observed insofar as all lectures took place. However, the level of effort applied by the lecturer may be more difficult to measure in the short term. It could be observed retrospectively through patterns of attendance, feedback from students or pass rates achieved.

- (ii) Expectancy theory focuses on the view that the individual (or group) chooses to act on the basis of a level of preference and expectation. Expectancy theory may be illustrated by the formula:

Force or strength of motivation to do X = (Valence or strength of preference for outcome Y) x (Expectation that doing X will result in Y)

In the University example: X may be, for example, the publication of articles by the lecturer. Y may be the wish by the lecturer to achieve promotion (extrinsic preference) or a feeling of 'achievement' (intrinsic preference) from the publication recognition.

In considering the suitability of the process, it may be asked to what extent the lecturer will be motivated in publishing regularly (X), through the expectation of promotion (Y). The level of motivation will be affected by the strength of preference of the lecturer for promotion. If promotion is a relatively insignificant aspect in relation to the overall objectives of the lecturer, there may be little strength of preference. If promotion is a significant incentive, there may be a high strength of preference.

- (b) Hard accountability may be viewed in the context of three specific areas. It will require (i) the accounting for the numbers, (ii) ensuring the numbers are accounted for and (iii) the group being held accountable for the events and circumstances leading to the numbers.

In the context of the application of **hard accountability** to the lecturing staff, it may be pursued through:

- (i) **'accounting for the numbers'** may be implemented by monitoring the number of articles published, role in new courses developed or innovations in methods applied. Feedback from students and the number and type of comments received about the lecturing quality and lecturer support to students. The combination of these in the context will determine its value.
- (ii) **'ensuring the numbers are accounted for'** may be addressed by reporting on the reasons 'how' and 'why' the figures have occurred. For example will the publication of a specific quality of articles (X) lead to the achievement of a high choice of a module by students (i.e. HOW?). Will a high level of student complaints occur through an inability to achieve the desired quality of lecturing when it is implemented and lead to a lower level of attendance or uptake of a module (i.e. WHY?).
- (iii) **'being held accountable for events and circumstances leading to the numbers'**. For example, where the lecturer is deemed responsible after attendance at lectures is poor or student pass rates achieved are unduly low. It may be deemed that the quality of the lecturing is inadequate. Senior staff may be held accountable where there is a failure to ensure that all lecturers are adequately trained, briefed, motivated.

The motivation and application of lecturing staff may be monitored on an ongoing basis in order to determine whether the work structure/environment is ensuring that the accountability of the team is being equitably reflected in areas such as rates and levels of publication OR student numbers enrolling for, and achieving success, in a module.

(Alternative discussion points and illustrations would be accepted.)

4 (a) Different approaches can be used in order to arrive at the profit-maximising combination of double-room prices and quantities demanded. Two alternative approaches are shown below:

(i) Using a profit-maximising algebraic approach where $P_x = P_0 - aX$

$$\text{Then } 400 = P_0 - 0.25 \times 1,440$$

$$\text{Where } a = 10/40 = 0.25$$

$$\text{and Double occupancy} = 75\% \times 2,400 = 1,800 \times 80\% = 1,440$$

$$\text{Hence } P_0 = 400 + (0.25 \times 1,440) = \$760$$

$$\text{Therefore } P_x = 760 - 0.25X$$

$$TR = 760X - 0.25X^2$$

$$MR = 760 - 0.5X$$

$$MC = 200 \text{ (2 persons } \times \text{ \$100).}$$

In order to achieve maximum profit then $MR = MC$

$$\text{Therefore } 760 - 0.5X = 200$$

$$\text{And } X = (760 - 200)/0.5 = 1,120 \text{ units}$$

Therefore the selling price per double room at the profit-maximising level (P):

$$= 760 - 0.25 \times 1,120$$

$$= 760 - 280$$

$$= \$480$$

Note that a tabular approach to finding the profit maximising combination of selling price per room and quantity of double rooms demanded could be used. However, this is likely to be time consuming. The following example is for *illustrative purposes only* and shows that the correct answer can be derived as follows:

Selling Price per room per night (\$)	Quantity Demanded	Variable costs per room per night (\$)	Contribution per night (\$)
380	1,520	200	273,600
390	1,480	200	281,200
400	1,440	200	288,000
410	1,400	200	294,000
420	1,360	200	299,200
430	1,320	200	303,600
440	1,280	200	307,200
450	1,240	200	310,000
460	1,200	200	312,000
470	1,160	200	313,200
480	1,120	200	313,600
490	1,080	200	313,200

(ii) Statement of profit attributable to staging the Robyn Cup

Sales revenue:	No of rooms	Fee/room	Nights	Total \$000
Double	1,120	480	5	2,688
Single	15%	360	5	540
Family	10%	240	5	720
Total revenue				<u>3,948</u>

Variable costs:

	Guests per room	V. costs per guest per night (\$)				
Double	2 x	1,120	x	100	x	5 = 1,120
Single	1 x	360	x	100	x	5 = 180
Family	4 x	240	x	100	x	5 = 480
Total variable costs:						<u>1,780</u>
Incremental fixed costs:						
Double rooms						516,000
Single & family rooms						<u>300,000</u>
Profit						<u>1,352,000</u>

- (b) The key to this part of the answer is the recalculation of the profit-maximising combination of price and occupancy for double rooms as follows:

In order to achieve maximum profit then $MR = MC$

Therefore $760 - 0.5X = 160$

And $X = (760 - 160)/0.5 = 1,200$ units (double rooms)

Therefore the selling price per double room at the profit-maximising level (P):

$= 760 - 0.25 \times 1,200$

$= 760 - 300$

$= \$460$

Statement of revised profit attributable to staging the Robyn Cup:

Sales revenue:		No of rooms	Fee	Nights	Total \$000
Double		1,200	460	5	2,760
Single	15%	360	300	5	540
Family	10%	240	600	5	720
Total revenue					<u>4,020</u>

Variable costs:

	Guests per room	V. costs per guest per night				
Double	2 x	1,200	x	80	x	5 = 960
Single	1 x	360	x	80	x	5 = 144
Family	4 x	240	x	80	x	5 = 384
Total variable costs:						<u>1,488</u>
Incremental fixed costs:						
Double rooms						516
Single & family rooms						<u>300</u>
Additional fixed costs						200
Profit						<u>1,516</u>

Management would be advised to undertake changes in proposed operational activities on purely financial grounds as this would result in an increased profit of $(\$1,516,000 - \$1,352,000) = \$164,000$. The correct answer can be derived as follows:

An alternative basis of calculating the profit-maximising combination of selling price per double room and quantity of double rooms demanded using a tabular approach is as follows:

Selling Price per room per night (\$)	Quantity Demanded	Variable costs per room per night (\$)	Contribution per night (\$)
380	1,520	160	334,400
390	1,480	160	340,400
400	1,440	160	345,600
410	1,400	160	350,000
420	1,360	160	353,600
430	1,320	160	356,400
440	1,280	160	358,400
450	1,240	160	359,600
460	1,200	160	360,000
470	1,160	160	359,600

- (c) The following actions might be considered in order to further increase the profitability from the staging of the Robyn Cup:
- (i) Management could offer potential guests a further price reduction for staying additional nights at the hotel both prior to and immediately after the five days of the golf tournament
 - (ii) Management could attempt to negotiate fees receivable from granting rights to television coverage or media publicity
 - (iii) Management could negotiate fees receivable from traders who wish to hold food and drink stalls on the golf course during the five days of the tournament
 - (iv) Management could sell a range of souvenirs/memorabilia to visitors to the golf tournament.

Note: (Alternative relevant discussion points and illustrations would be acceptable).

- 5 (a) The Six Sigma approach to making improvements in existing processes involves a five stage process represented by the acronym DMAIC. The five stages are as follows:

Define an opportunity

A problem with quality is identified and then a problem statement is prepared. This statement will describe the nature of the problem, which must be defined in specific, quantifiable terms.

A 'mission statement' is then prepared. This is a statement of what will be done in order to address the problem. Like the problem statement the mission statement should also be expressed in specific quantifiable terms using the same units of measurement that are used in the problem statement.

A project team is set up and given the required resources in order to address the problem and make an improvement. The team should comprise personnel from each of the areas within the organisation that will be affected by the Six Sigma project.

Measure performance

At this stage in the project, the project team should undertake a preliminary analysis in order to measure how the process is working and obtain data that can be analysed in order to identify what seems to be causing the problem. Where there are a number of factors causing the problem the project team should focus their attention on what appear to be the main causes of the quality problem.

Analyse the opportunity

At this stage the project team will investigate the preliminary concerns about what might be causing the quality problem in greater detail. The project team will test different theories in an attempt to discover the main cause (or causes) of the problem. Each theory is then tested in order to establish whether it might be correct. Theories are rejected when it is decided that they cannot be correct.

The 'root' cause (or causes) of the problem is identified when all of the theories has been completed.

Improve performance

The cause (or causes) of the problem will be removed as a consequence of re-designing the process that is causing the problem. Alternative methods of improving the process should be evaluated in order to determine which will be the most effective method to achieve the 'mission statement' for the project. The chosen improvement is then designed in detail and implemented after being tested to prove its effectiveness.

Control performance

New controls are designed and implemented to prevent the re-occurrence of the problem and to make sure that the improvements to the process are sustained. Controls will include regular measurements of output from the process, and a comparison of actual performance with targeted performance. The controls should be audited periodically in order to confirm their effectiveness.

- (b) The DMAIC framework can be applied to T4UC as follows:

1. Define

The apparent problems are:

- (i) A decrease in the number of contracted clients
- (ii) An increase in the number of visits per clients
- (iii) Very few clients being gained via recommendation
- (iv) An increasing number of unanswered telephone calls for product support
- (v) A lower percentage of issues resolved by telephone
- (vi) A lower customer satisfaction rating than the industry average and much lower than that of Appliances R Us.

2. Measure

The primary source of information available to measure the issues is the customer survey undertaken by Ken which could then be added to by other information. Other measures which could be undertaken include:

- Measuring the response times of T4UC staff to telephone calls made by clients
- Measuring the reliability of the website, e.g. Downtime, establishment of appointments
- Identification of the reasons why service engineers failed to arrive at customers' premises
- Identification of the reasons why service engineers don't have appropriate spare parts available.

Other measures which could be undertaken include:

- Measuring the rate of problem resolution via telephone
- Measuring the incidence of remedial visits to clients

3. Analyse

Analysis should assist in providing an explanation for the following problems:

- Why is it difficult to contact T4UC at weekends?
- Why are remedial visits necessary?
- Why are there significant variations in the time taken by different service engineers to service central heating systems?

4. Improve

Suggesting solutions to the problems identified measured and analysed

Issues:

Remedial visits

Problem resolution by telephone

Weekend access

Availability of parts

Remedy:

Staff training

Specialisation of staff in certain products i.e. central heating systems

Staff training to increase the knowledge levels of those staff who receive telephone calls on behalf of T4UC

Staff contactability at weekends

Stock management of delivery vehicles

The project team within T4UC should analyse each possible solution paying particular attention to the costs and benefits that would result from their selection.

5. Control

The Final phase would involve further monitoring of the relevant problem variables, in particular the number of clients, client recommendations, weekend accessibility, staff training, stock availability, and finally overall customer satisfaction with a view to exceeding the industry average as soon as possible and aspiring to similar results achieved by Appliances R Us.

**Professional Level – Options Module, Paper P5
Advanced Performance Management**

June 2009 Marking Scheme

	<i>Marks</i>	<i>Marks</i>
1 (a) Access to services focus	8	
Clinical focus	6	
Efficiency focus	5	
Financial management focus	3	Maximum 20
(b) Evaluation	6	
Recommendations	7	Maximum 11
Professional marks		4
		<u>35</u>
2 (a) Margin after tax	2	
Discount rate	2	
NPV	1	
Decision	1	6
(b) Elements	4	
Issues	4	Maximum 6
(c) Comments (on merit)		6
(d) Maximax	2	
Maximin	2	
Minimax regret criterion	3	7
		<u>25</u>
3 (a) (i) Agency theory	2	
Observability of outcomes	2	
Observability of effort	2	6
(ii) Strength of motivation to do (X)	2	
Strength of preference for outcome (Y)	2	
Expectation that doing (X) will result in (Y).	2	6
(b) (i) Comments (on merit)	3	
(ii) Comments (on merit)	3	
(iii) Comments (on merit).	3	Maximum 8
		<u>20</u>
4 (a) (i) Demand equation	2	
Calculation of optimal price and demand	4	6
(ii) Number of rooms	1	
Revenue	1	
Variable costs	1	
Fixed costs/profit	1	4
(b) Recalculation of optimal price	2	
Revised number of rooms	0.5	
Revised revenue	1	
Revised variable costs	1	
Revised fixed costs	0.5	
Recommendation	1	6
(c) Comments (on merit):	4	4
		<u>20</u>

		<i>Marks</i>	<i>Marks</i>
5	(a) Comments (on merit): Explanation of process – DMAIC	8	8
	(b) Application of DMAIC	12	<u>12</u>
			<u>20</u>