Answer to MTP_Final_Syllabus 2012_Dec2013_Set 2

Paper 17 - Strategic Performance Management (SPM)

Section – A

[Answer any 4 from the following]

1 (a) Let the demand curve be $p = \frac{10}{q}$ and $C = 5 + 2q + 5q^2$ if the objective of the firm is profit maximization only, will the firm produce?

(b) The cost function of a competitive firm is $c = 200 + 10q + 2q^2$. Determine price level if the firm only earns normal profit.

(c) Does the Benchmarking tantamount to Industrial Espionage.

(d) List a few business applications of Activity Based Management. [3+3+3+6]

Answer of 1 :

(a) Here $P = \frac{10}{q}$ => TR = pq = 10 => MR = zero

Again, $C = 5 + 2q + 5q^2$ => MC = 2 + 10q.

At equilibrium, MR = MC => 0 = 2 + 10q

$$\Rightarrow q = -\frac{1}{5} < 0.$$

As output is negative, the firm should not produce anything.

(b) If a firm is earning just normal profits, we have P_o = min AC.

$$\frac{c}{q} = \frac{200}{q} + 10 + 2q$$

Now AC =

$$\frac{d(AC)}{dq} = \frac{-200}{q^2} + 2$$

For minimum AC, $\frac{d(AC)}{dq} = 0 \Rightarrow \frac{200}{q^2} + 2 = 0 \Rightarrow q = 10.$

$\therefore$ Min AC at q = 10 is $\frac{200}{10} + 10 + 2.(10) = 50.$

$\therefore P_o = 50.$

(c) The initiation of benchmarking study pre-supposes voluntary and willing co-operation between the benchmarking parties to open up their books on a reciprocal basis. It is implicitly understood that no information of proprietary or confidential nature will be parted and the sharing of information and experience is in total conformity with ethical conduct. In short, the benchmarking exercise should result in a win - win situation.

The APQC - IBC has drawn up a benchmarking code of conduct which sets forth the protocol of benchmarking - a set of conventions prescribing correct etiquette and procedures to be used in conducting benchmarking studies.

(d) **Business Applications of ABM**

(i) **Cost Reduction:** ABM helps the Firm to identify opportunities in order to streamline or reduce the costs or eliminate the entire activity, especially NVA activities. It is useful in identifying and quantifying process waste, leading to continuous process improvement through continuous cost reduction.

(ii) **Activity Based Budgeting:** Activity Based Budgeting analyses the resource input or cost for each activity. It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. Actual results can be compared with budgeted results to highlight (both in financial and non-financial terms) those activities with major discrepancies for potential reduction in supply of resources. It is a planning and control system, which supports continuous improvement.

(iii) **Business Process Re-Engineering (BPR):** BPR is the analysis and redesign of workflows and processes in a Firm, to achieve dramatic improvement in performance, and operational excellence. A business process consists of linked se[redacted] purchase of materials is a business process consisting of activities like Purchase Requisition, Identifying Suppliers, preparing Purchase Orders, mailing Purchase Orders and follow up. The process can be reengineered by sending the production schedule direct to the suppliers and entering into contractual agreement to deliver materials according to the production schedule.

(iv) **Benchmarking:** It involves comparing the Firm's products, services or activities with other best performing organizations, either internal or external to the Firm. The objective is to find out how the product, service or activity can be improved and ensure that the improvements are implemented.

(v) **Performance Measurement:** Activity performance measures consist of measures relating to costs, time quality and innovation. For achieving product quality, some illustrative performance measures are -

Area	Measures
• Quality of purchased component	• Zero Defects
• Quality of output	• Percentage yield
• Customer Awareness	• No. of orders, no. of complaints

2 (a) For the following pay – off matrix, find the value of the game and the strategies of players A and B using linear programming:

	Player B		
1	**2**	**3**	
3	**-1**	**4**	**Player A** **1**
6	**7**	**-2**	**2**

(b) List the steps of Business Process Re- Engineering. **[10+5]**

Answer of 2 :

Answer to MTP_Final_Syllabus 2012_Dec2013_Set 2

For the following pay – off matrix, find the value of the game and the strategies of players A and B using linear programming:

		Player B		
		1	2	3
Player A	**1**	3	-1	4
	2	6	7	-2

Since two of the entries in the pay – off matrix are negative, we shall add a constant, say 3, to each of the values, by which each one of them would become a positive value. The pay – off matrix then becomes as shown here:

		Player B		
		1	2	3
Player A	1	6	2	7
	2	9	10	1

Now, let x_1 and x_2 represent the probabilities with which A chooses strategies 1 and 2 respectively, while y_1, y_2 and y_3 be the probabilities in respect of B choosing strategies 1, 2 and 3.

From A's point of view, the problem is,

$$\frac{1}{U} = X_1 + X_2$$

Minimize

Subject to

$$6X_1 + 9X_2 \geq 1$$
$$2X_1 + 10X_2 \geq 1$$
$$7X_1 + X_2 \geq 1$$
$$X_1, X_2 \geq 0$$

Where $X_1 = x_1 / U$, and $X_2 = x_2/U$.

Similarly, form B's view point, the problem is,

$$\frac{1}{V} = Y_1 + Y_2 + Y_3$$

Maximize

Subject to

$$6Y_1 + 2Y_2 + 7Y_3 \leq 1$$
$$9Y_1 + 10Y_2 + Y_3 \leq 1$$
$$Y_1, Y_2, Y_3 \geq 0$$

WHERE $Y_i = y_i / V$.

Now we shall solve the problem from B's point of view. The problem can be augmented by introducing slack variables S_1 and S_2 as follows:

$$\frac{1}{V} = Y_1 + Y_2 + Y_3 + 0S_1 + 0S_2$$

Maximize

Subject to

$$6Y_1 + 2Y_2 + 7Y_3 + S_1 = 1$$
$$9Y_1 + 10Y_2 + Y_3 + S_2 = 1$$
$$Y_1, Y_2, Y_3, S_1, S_2 \geq 0$$

The solution is contained in table

TABLE: Simplex Tableau 1: Non – optimal Solution

Basis		Y_1	Y_2	Y_3	S_1	S_2	b_1	b_1/a_{ij}
S_1	0	6	2	7	1	0	1	1/6
S_2	0	9*	10	1	0	1	1	1/9 ← Outgoing variable
c_j		1	1	1	0	0		
Δ_j		1	1	1	0	0		
		↑ Incoming Variable						

TABLE: Simplex Tableau 2: Non – Optimal Solution

Basis		Y_1	Y_2	Y_3	S_1	S_2	b_1	b_1/a_{ij}
S_1	0	0	-14/3	19/3*	1	-2/3	1/3	1/19 ← Outgoing variable
Y_1	1	1	10/9	1/9	0	1/9	1/9	1
c_j		1	1	1	0	0		
Δ_j		0	-1/9	8/9	0	-1/9		
				↑ Incoming Variable				

TABLE: Simplex Tableau 3: Non – optimal Solution

Basis		Y_1	Y_2	Y_3	S_1	S_2	b_1	b_1/a_{ij}
Y_3	1	0	-14/19	1	3/19	-2/19	1/19	-
Y_1	1	1	68/57*	0	-1/57	7/57	2/19	3/34 ← Outgoing variable
c_j		1	1	1	0	0		
Δ_j		0	31/57	0	-8/57	-1/57		
			↑ Incoming Variable					

TABLE: Simplex Tableau 4: Optimal Solution

Basis		Y_1	Y_2	Y_3	S_1	S_2	b_1
Y_3	1	42/68	0	1	5/34	-1/34	2/17
Y_1	1	57/68	1	0	-1/68	7/68	3/34
c_j		1	1	1	0	0	
Δ_j		-31/68	0	0	-9/68	-5/68	

The optimal values for Y_1, Y_2 , and Y_3 are 0, 3/34 and 2/17, respectively, from these, we have

$$\frac{1}{V} = 0 + \frac{3}{34} + \frac{2}{17} = \frac{7}{34}$$

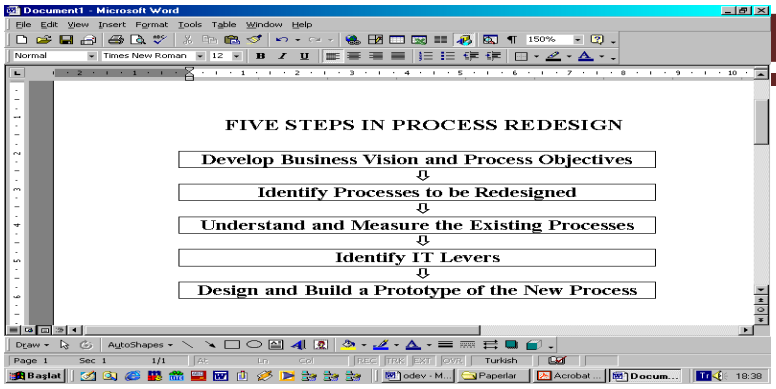
Therefore, V = 34/7. Since a value 3 was added to the original pay – off values, the game value is equal to (V – 3) or 34/7 – 3 = 13/7. Further, since $y_i = Y_iV$, we have $y_1 = 0 \times 34/7 = 0$, $y_2 = (3/34)\ (34/7) = 3/7$, and $y_3 = (2/17)\ (34/7) = 4/7$.

The values of the dual variables X1 and X2 can be read from the Δ_j row of the Simplex tableau 4. From this, $X_1 = 9/68$ and $X_2 = 5/68$. From these, 1/U = 9/68 + 5/68 = 7/34. Therefore, U = V = 34/7. Thus, $x_1 = (9/68)\ (34/7) = 9/14$ and $x_2 = (5/68)\ (34/7) = 5/14$.
The solution to the problem, therefore, is:

Player A		Player B		
Strategy	**Probability**	**Strategy**	**Probability**	**Value of Game**
1	9/14	1	0	13/7
2	5/14	2	3/7	
		3	4/7	

(b) Steps of Business process Re- Engineering:

Davenport & Short (1990) prescribe a five-step approach to BPR:



(i) **Develop Business Vision and Process Objectives:**

BPR is driven by a business vision which implies specific business objectives such as Cost Reduction, Time Reduction, Output Quality Improvement, Quality of Work life (QWL)/Learning/Empowerment.

(ii) **Identify Processes to be Redesigned:**

Most firms use the *High-Impact* approach which focuses on the most important processes or those that conflict most with the business vision. Lesser number of firms use the *Exhaustive* approach that attempts to identify all the processes within an organization and then prioritize them in order of redesign urgency.

(iii) **Understand and Measure the Existing Processes:**

Understanding and measuring the existing processes before redesigning them is especially important, because problems must be understood so that they are not repeated. On the other hand, accurate measurement can serve as a baseline for future improvements.

(i) **Identify IT Levers:**

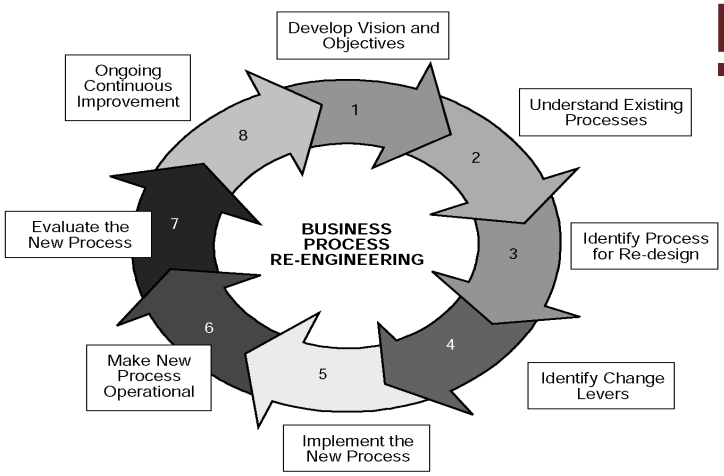
In the broadest sense, all of IT's capabilities involve improving coordination and information access across organizational units, thereby allowing for more effective

management of task interdependence. An awareness of IT capabilities can -and should influence process design. Therefore, the role of IT in a process should be considered in the early stages of its redesign.

(ii) **Design and Build a Prototype of the New Process:**
The actual design should not be viewed as the end of the BPR process. Rather, it should be viewed as a prototype, with successive iterations expected and managed. Key factors and tactics to consider in process design and prototype generation include using IT as a design tool, understanding generic design criteria, and creating organizational prototypes.

These prototypes of business process changes and organizational redesign initiatives, after agreement by owners and stakeholders, would be implemented on a pilot basis, examined regularly for problems and objective achievement, and modified as necessary. As the process approached final acceptance, it would be phased into full implementation.

Another view for BPR of pictorial description is given below:



Source: Vakola *et al.* (1998)

3 (a) Yonex India Ltd. is segmented into three divisions A, B, and C. All were formed in the same year and now all assets have left exactly one – half of their expected life. Top management is attempting to determine which of the division is the most profitable. The following data have been prepared for your analysis:

Particulars	Division A (`)	B (`)	C (`)
Net income before taxes	78,000	90,000	96,000
Investment base – gross book value	3,90,000	5,00,000	6,00,000
Investment base – net book value	1,95,000	2,50,000	3,00,000

Prepare rankings of the three divisions using ROI and RI with a capital charge of 12.5% that each division manager might use to assert that here is the most profitable division.

(b) For a monopolist p = 10 – 4q and TC = 8q

(i) **If tax rate of t is imposed find the optimal p & q.**

(ii) **Determine the tax rate that maximizes tax revenue.** **[6+9]**

Answer of 3:

(a) ROI = $\frac{\text{Net income}}{\text{net investment}}$

(i) ROI (gross book value)

$\frac{78,000}{3,90,000} \times 100 = 20\%$

Div A

$\frac{90,000}{5,00,000} \times 100 = 18\%$

Div B

$\frac{96,000}{6,00,000} \times 100 = 16\%$

Div C

(ii) ROI (Net book value)

$\frac{78,000}{1,95,000} \times 100 = 40\%$

Div A

$\frac{90,000}{2,95,000} \times 100 = 36\%$

Div B

$\frac{96,000}{3,00,000} \times 100 = 32\%$

Div C

Residual Income Basis

RI = Net income – (Interest charge x Investment employed)

Gross Book Value

RI Div A 78,000 - $\left(\frac{25}{200} \times 3,90,000\right)$ = `29,250

RI Div B 90,000 - $\left(\frac{25}{200} \times 5,00,000\right)$ = `27,500

RI Div C 96,000 - $\left(\frac{25}{200} \times 6,00,000\right)$ = `21,000

Net Book Value

RI Div A 78,000 - $\left(\frac{25}{200} \times 1,95,000\right)$ = ` 53,625

RI Div B 90,000 - $\left(\frac{25}{200} \times 2,50,000\right)$ = `58,750

RI Div C 96,000 - $\left(\frac{25}{200} \times 3,00,000\right)$ = ` 58,500

Ranking

Answer to MTP_Final_Syllabus 2012_Dec2013_Set 2

ROI	RI (Gross value)	RI (Net value)
A	A	B
B	B	C
C	C	A

(b) (i) As $p = 10 - 4q$ is the demand curve, $TR = pq = 10q - 4q^2$

$\therefore$ If T be the total tax yield, $T = tq$.

Profit (π) after the imposition of taxes is given by

$\pi = TR - TC - T = 10q - 4q^2 - 8q - tq$

$= -4q^2 + (2 - t)q$

$\frac{d\pi}{dq}$

Now profit are maximum if $= 0 \Rightarrow -8q + (2 - t) = 0$.

$\frac{2-t}{8}$

$\Rightarrow q =$

$\frac{d^2\pi}{dq^2}$ $\frac{d\left(\frac{d\pi}{dq}\right)}{dq}$ $\frac{2-t}{8}$

The 2nd order condition states < 0 i.e. $= -8 < 0$ putting $q =$ in the

$\left(\frac{2-t}{8}\right)$ $\frac{18+t}{2}$

demand function we get $p = 10 - 4$ $\Rightarrow p =$

$\left(\frac{2-t}{8}\right)$ $\frac{2t-t^2}{8}$

(ii) The tax revenue $T = t.\ q = t$ $=$

$\frac{dT}{dt}$ $\frac{d^2\pi}{dt^2} < 2$

Now t is maximum if $= 0$ and

$\frac{dT}{dt} = 0 \Rightarrow \frac{2-2t}{8} = 0 \Rightarrow t = 1$ and $\frac{d^2t}{dt^2} = \frac{-2}{8} < 0$

At t = 1, the tax revenue is maximum and maximum value

$\frac{2x1-1x1}{8} = \frac{1}{8}$

Of $T =$

4. (a)BLACK and BROWN are two Divisions in a group of Companies and both require intermediate products Alpha and Beta which are available from Divisions A and B respectively. Black and Brown Divisions convert the Intermediate products into products Blackalls and Brownalls respectively. The market demand for Blackalls and Brownalls considerably exceeds the production possible, because of the limited availability of Intermediate Products Alpha and Beta. No External market exists for Alpha and Beta and no other Intermediate Product is available to Black and Brown divisions.

Other data are as follows –

Division	Selling price per unit (`)	Processing cost per unit (`)	Intermediate Products required per unit	
			Alpha	Beta
Black: Blackalls	**45**	**12**	**3**	**2**
Brown: Brownalls	**54**	**14**	**2**	**4**

Division A: Alpha **Variable cost `6 per unit** **Max production capacity 1,200 units**
Division B: Beta **Variable cost ` 4 per unit** **Max production capacity 1,600 units**

The solution to a Linear programming Model of the situation shows that the imputed scarcity value (Shadow Price) of Alpha and Beta is `0.50 and `2.75 per unit respectively and indicates that the Intermediate products be transformed such that 200 units of Blackalls and 300 units of Brownalls are produced and sold.

(i) **Calculate the Contribution earned by the Group if the sales pattern indicated by the LPP Model is implemented.**
(ii) **Where Transfer Price are set on the basis of variable cost plus shadow Price, show detailed calculations for –**
  (a) **Contribution per unit of Intermediate Product earned by divisions A and B and**
  (b) **Contribution per unit of Final Product earned by Black and Brown Divisions.**
(iii) **Comment on the results derived in (2) and on the possible attitude of m[redacted] various divisions to the proposed Transfer Pricing and product deployment policy**

(b) Explain the objectives of transfer pricing. [10+5]

Answer of 4:

(i) **Computation of Contribution from Blackalls and Brownalls**

Particulars	Blackalls	Brownalls
Quantity	200 units	300 units
Selling Price per unit	`45	`54
Less: Variable costs per unit		
Raw Material Alpha	3 units x 6 = `18	2 units x 6 = `12
Raw Material Beta	2 units x 4 = `8	4 units x 4 = `16
Processing Costs	`12	`14
Contribution per unit	`7	`12
Total Contribution	**`1,400**	**`3,600**

Total company Contribution = `1,400 +`3,600 = **`5,000.**

(ii) **(a) Transfer price =** Variable costs + shadow Price (i.e. opportunity costs) For Alpha: TP = `6.00 + `0.50 = **`6.50 per unit**, For Beta: TP = `4.00 + `2.75 = **`6.75 per unit**

(b) Contribution earned by various division, per unit:

(i) The contribution per unit of Black and Brown are –

Particulars	Blackalls	Brownalls
Selling Price per unit	`45	`54
Less: Variable costs per unit		
Raw Material Alpha	3 units x 6.50 = `19.50	2 units x 6.50 = `13.00
Raw Material Beta	2 units x 6.75 = `13.50	4 units x 6.75 = `27.00
Processing Costs	`12	`14
Contribution per unit	**NIL**	**NIL**

(ii) **Division A**: contribution = Transfer Price – variable Costs = Shadow Price = `0.50 per unit.
(iii) **Division B**: contribution = Transfer price – variable costs = shadow Price = `2.75 per unit.

(iii) **Attitude of Division managers to the above Transfer Prices:**

(a) **Division A and B**: Since Shadow prices constitute the opportunity Costs, Managers of A and B will be satisfied with the Transfer price at variable Costs + shadow Prices. Their interests are well – protected, since there will not be any opportunity loss due to internal transfers.

(b) **Division Black and Brown**: There is no incentive for processing the Final product, since the internal Transfer prices result in Nil Contribution. These managers will not be interest in the policy of variable costs + Shadow prices, since there is no extra monetary benefit to these divisions out of further processing.

(b) The issue of transfer pricing acquires added significance when accounting is to be used for the purpose of divisional performance measurement. The major significance of transfer pricing is that it will be used to measure notional sales of one division, which uses the transferred output as its input. Thus transfer price used in the organization will have significant effect on the financial performance of, different divisions. This brings forth the need for establishing a transfer price free from all biases. It has to be equitable as possible as to the different divisions in the organization.

The determination of an appropriate transfer price is one of the major problems of responsibility centers. The implication of the transfer price is that for the selling division (the division goods/services are being transferred) it is a source of rev[redacted] for the buying division (the division which is receiving/acquiring the goo[redacted] element of cost. It will, therefore, have significant bearing on the revenues, costs, and profits of responsibility centers.

Any Transfer Pricing System Should Aim to

» Ensure that resources are allocated in an optimal manner

» Promote goal congruence

» Motivate divisional managers

» Facilitate the assessment of management performance

» Retain divisional autonomy.

There are varieties of transfer pricing methods but in order to assess the validity and acceptability of different transfer pricing methods, the criteria generally used are -

In the first place the transfer price should be objectively determinable.

Secondly, it should be equal to the value of the intermediate products being transferred that is the transfer price should compensate the transferring division and charge the buying acquiring division in keeping with the value of the functions performed and/or the value of the product exchanged.

Finally, it should be compatible with the policy that maximizes attainment of company goals and evaluation of segment performance.

5 (a) Started Ltd. provides the following details on its new product.

Years 1 and 2: R & D Costs: `2,40,000, Design Costs `1,60,000

Years 3 to 6: Other Functional costs:

Function	One – Time Costs	Cost per unit
Production	**`1,00,000**	**`25**
Marketing	**`70,000**	**`24**
Distribution	**`50,000**	**`16**
Customer Service	**`80,000**	**`30**

Answer to MTP_Final_Syllabus 2012_Dec2013_Set 2

The Sale quantities during the Product Life Cycle at various Selling Prices are:

Selling Price per unit (`)	**400**	**480**	**600**
Sale Quantity in units	**5,000**	**4,000**	**2,500**

Ignoring time value of money, compute the net Incomes generated over the Product Life Cycle at various prices. Which price should the Company select?

(b) Discuss the benefits of Branding.

(c) Discuss the different types of Benchmarking. **[5+4+6]**

Answer of 5:

(a)

Particulars	**Option I**	**Option II**	**Option III**
1. Life cycle Sales Quantity	5,000 units	4,000 units	2,500 units
2. Life cycle Selling Price p.u.	`400	`480	`600
3. Life cycle Sales Revenue (1 x 2)	`20,00,000	`19,20,000	`15,00,000
4. Life cycle Functional Costs:			
(a) Research and Development	`2,40,000	`2,40,000	`2,40,000
(b) Design	`1,60,000	`1,60,000	`1,60,000
(c) Production one Time	`1,00,000	`1,00,000	`1,00,000
Variable	5,000 x `25 = `1,25,000	4,000 x `25 = `1,00,000	2,500 x `25 = `62,500
(d) Marketing one Time	`70,000	`70,000	`70,000
Variable	5,000 x `24 = `1,20,000	4,000 x `24 = `96,000	2,500 x `24 = `60,000
(e) Distribution one Time	`50,000	`50,000	`50,000
Variable	5,000 x `16 = `80,000	4,000 x `16 = `64,000	2,500 x `16 = `40,000
(f) Customer service one Time	`80,000	`80,000	`80,000
Variable	5,000 x `30 = `1,50,000	4,000 x `30 = `1,20,000	2,500 x `30 = `75,000
Life Cycle Total Costs	`11,75,000	`10,80,000	`9,37,500
5. **Life Cycle Net Income**	**`8,25,000**	**`8,40,000**	**`5,62,500**

Conclusion: The Company may select price of `480 to maximize profits. Assumed that R & D Costs and design costs represent Total Costs incurred in 2 Years.

(b) Benefits of Branding:

Provides benefits to buyers and sellers

To Buyer:

- Help buyers identify the product that they like/dislike.
- Identify marketer
- Helps reduce the time needed for purchase.

- Helps buyers evaluate quality of products especially if unable to judge a products characteristics.
- Helps reduce buyers perceived risk of purchase.
- Buyer may derive a psychological reward from owning the brand, i.e. Rolex or Mercedes.

To Seller:

- Differentiate product offering from competitors
- Helps segment market by creating tailored images, i.e. **Contact lenses**
- Brand identifies the companies' products making repeat purchases easier for customers.
- Reduce price comparisons
- Brand helps firm introduce a new product that carries the name of one or more of its existing products half as much as using a new brand, lower co. designs, advertising and promotional costs.

(c) There are different types of benchmarking, each of which is targeted at a different part of a company's operations.

(i) Product Benchmarking

This type of benchmarking uses comparison between company's own products or services and those of other organizations. The focus of such studies tends to be on quality, reliability and features of comparable products. It does not mean that benchmarking comparisons are confined to products created by [redacted] same industry, since products can be broken down into their component parts, which may individually be more readily compared with components of products from other industries. Product benchmarking can be performed even without the approval of another company, since one can simply buy its products and directly review them through reverse engineering or feature comparisons.

When Ford Motor Company redesigned the Tauras in 1992, it benchmarked 209 features on the car against 7 competitors. The company then worked to match / excel the higher standard set by any of its rival, in each of these features with its own product.

(ii) Competitive Benchmarking

A Measure of organizational performance compared against competing organization; studies the target specific product designs, process capabilities or administrative methods used by a company's direct competitors.

Competitive Benchmarking moved beyond product oriented comparisons to include comparisons of process with those of competitors. In this benchmarking, the process studied may include marketing, finance, human resource, R & D etc. A typical example would be the classical study the Rank Xerox performed with those of Canon and other photo copier manufacturers when it faced heightened competition from US and Japanese companies. By benchmarking Rank Xerox achieved significant performance improvements as given below:

- Unit manufacturing cost reduced to half; comparable to 1980 product costs
- Machine defects have improved by over 90%
- Incoming parts acceptance has improved to 99.5%
- Inventory methods of supply reduced by at least two thirds.
- Engineering drawings per person year more than doubled
- Marketing Productivity improved by one third.
- Service labour cost reduced by 30%
- Distribution productivity increased from 5% to 10%

Management Accountants are familiar with the technique of inter firm comparison of financial performance of companies through ratios to draw meaningful inferences. For instance Hindalco's power cost is lowest in the world, due to the captive power plant set up by them long back. Other aluminum producers while endeavoring to move closer to this standard must improve in other areas to have competitive parity.

(iii) Process Benchmarking

It involves comparison of critical business processes and operations against best practices of market leaders.

The activity of measuring discrete performance and functionality against organizations through performance in excellent analogous business processes.

To gain leadership position it is essential to look at a paradigm-shifting jump to a new way of managing a process; for this you may have to go beyond your industry and look at the "best-inbreed" to bring about a fundamental change and not just an incremental improvement.

When Airlines wanted to improve their turnaround times they compared the performance with the Pit Crew of **Formula I races** since it is well known that they are best in class in that operation. Hospitals in U.S. compare their patient management systems with the guest management practice in hotels. American Express credit card division compares its document handling process with that of a cou

(iv) Internal Benchmarking

An application of process benchmarking performed, within an organization by comparing the Performance of similar business units or business processes. Examples of processes subject to benchmarking are the sale cycle, procurement cycle, which make up the primary ongoing operations needed to run a company. The sale cycle involves taking orders from customers, scheduling them for production, manufacturing them, shipping the products, issuing billings and processing cash receipts. The procurement cycle involves placing purchase requisition, searching for suppliers, negotiating with suppliers, placing purchase orders, accepting deliveries, processing rejected goods, processing billing paperwork and issuing payments to suppliers. These two processes comprise the bulk of most companies operations, though there are certainly many ancillary processes that can also be subject to benchmarking study. Comparisons can be made with companies from markedly different industries since processes are readily adaptable across many industries. When processes are the subject of benchmarking, the usual justification is that there will be immediate financial results. Benchmarking can also achieve shorter processing intervals, which are readily measured.

Hewlett Packard through an extensive internal benchmarking exercise on the Best Scheduling Practice amongst its several product groups was able to cut its "time-to-market" by half. For a company like HP introduction of new products in time was a crucial performance metric. McKinsy study has shown that hi-tech products that came on budget, but six months behind schedule, sacrificed 33% of their potential profit over the first five years in the market. It might interest Management Accountants to know that the same study showed that on time project that were 50% over budget lost only 4% of the profits over the same period.

(v) Strategic Benchmarking

The application of process benchmarking of the level of business strategy; a systematic process for evolving alternatives, implementing strategies, and improving performance by understanding and adapting successful strategy from external partners who participated in an on-going business alliance.

Under this type of benchmarking, the review team wishes to discern, if there are other ways to position the company within its industry, that have not been considered but which organizations are implementing with success. It may also require looking at other industries, since the industry, within which a company competes, may be full of organizations, that all have the same strategic mind-set and, therefore, are not a good source of information. This type of review leads to only short-term improvements, since strategic changes typically require several years of effort to implement. Only much forward looking management team tends to engage in this type of benchmarking.

In mid 1980's When Jack Welch of General Electric wanted to position his company for the coming decade, he asked his Strategic Planning Group to study how successful companies positioned themselves for continuous improvement. The results of the study provided operating definitions of a company that is World Class.

- It is one which knows it process better than its competitors knows their processes.
- Knows its industry competitors better than its competitors
- Knows its customers better than its competitors.
- Responds more rapidly to customer behavior than competitors do
- Competes for market share on a customer by customer basis.

The lessons learnt and successfully applied by G.E. resulted in its pole vaulting itself as the premier world organization.

GE applied benchmarking in the area of strategy which [redacted] contribution of macro level benchmarking for developing long range plans. When Hindustan Lever Ltd., planned to penetrate into rural areas, it benchmarked its rural market against manufacturer.

(vi) Global Benchmarking

Globalization and advances in information technology leads to use this type of benchmarking. It means understanding international culture, business processes and trade practices for business process improvement.

When Larsen & Toubro Ltd., the engineering and construction powerhouse wanted to enter the world market for projects, it deemed it fit to benchmark its project management skills with global rivals, Bechtel and Flour Daniel Corporation of US, assisted by McKinsy Co., Draughtsman were benchmarked for their CAD/CAM proficiency as well as their ability to handle bill of materials. Once gaps were identified, L & T used a combination of training and external recruitment to close them.

There are other types of Benchmarking:

(vii) Functional Benchmarking:

An application of process benchmarking that compares a particular business function at two or more organizations.

(viii) Generic Benchmarking:

An application of functional process benchmarking that compares a particular business function at two or more organizations, selected without regard to their industry.

SECTION - B

[Question no. 6 is compulsory and any one from the rest]

6. Employee Performance Appraisal Using Data Envelopment Analysis

A small company located in southern India, which is involved in the manufacturing of automobile parts. This company was established six years ago and is involved in manufacturing and supplying components of carburettors (for two and four wheelers) to a manufacturing firm. Its annual turnover is INR 1.2 millions. Sixteen different components for

various types of carburettors are manufactured. The company employs 23 people. There are two managers under the managing director. One is in charge of manufacturing and the other has responsibility for sales/purchases. Under the control of the manager (manufacturing), there are two supervisors, one each per shift of eight hours of duty. For each shift nine employees are working who are engaged in metal machining using lathes, and drilling machines. All these 18 employees underwent a Personal Appraisal (PA) within a framework of DEA that provided data for this study. The managers and supervisors are not included for PA.

The main focus of the study is how to improve the working efficiencies of the employees and to determine their training needs. Evaluating and ranking the employees working in organizations are challenging tasks involving several factors. Each employee achieves certain performance levels in various factors and the resulting information can be overwhelming. The Data Envelopment Analysis (DEA) can be applied as a fair evaluating and sorting tool to support the performance appraisal (PA) as well in the decision making process. DEA focuses on the best practices of efficient employees for the purpose of improving overall performance. Unlike traditional performance appraisals DEA searches for the efficient employees who will serve as peers. The DEA process identifies inefficient employees, magnitude of inefficiency and aids to eliminate inefficiencie[redacted] easy to employ framework. Rating formats need reexamination with a f[redacted] based models as an alternative to traditional rating methods. Earlier adopted methods have seldom identified and quantified the individual factors for inefficiency whereas DEA could overcome these shortfalls. Based on the results of DEA the improvement of employees' performance are possible by way of providing training, talent enhancement and further qualification wherever required.

Employee rankings will be used to decide the types of incentives and promotions during future expansion of the company. The factors (dataset) considered for the evaluation process are classified into input and output factors. One of the major advantages of the DEA is the inputs and outputs can be measured and used in their own units (Sami-Mahgary & Lahdelma 1995). No universally applicable rational template is available for the selection of factors. However, in general, the inputs must reflect the resources used and the outputs must reflect the service levels of the utility and the degree to which the utility is meeting its objective (Richards 2003, Thakur 2005).

The dataset is decided upon, by having discussions and brainstorming sessions with the managers, supervisors and representatives of employees. While considering input and output factors the isotonicity relations are assumed for DEA (i.e., an increase in any input should not result in a decrease in any output). Consequently, the values of some factors may have to be inverted before they are entered into the analysis. Another group of factors is the qualitative ones. These have to be assigned numerical values in order to participate in the mathematical evaluation of efficiency. Any number of input or output factors which are relevant and have an impact on the efficiency of employees could be considered for DEA. But the number of employees in the analysis should be at least twice the number of inputs and outputs considered (Golany & Roll 1989).

To evaluate efficiency scores of employees the following factors are used: job knowledge, customer relations, interpersonal relations, and work habits as input factors; and quality, and quantity of products produced as output factors. Among the input factors customer relations and interpersonal relations are qualitative. In a wide range of problem settings to which DEA can be applied qualitative factors are often present. Marketing's interest in consumer

perception and expectation, and human resources' desire to explore and describe employees' skills are two areas that routinely involve the quantification of qualitative concepts (Dyson, Allen, Camanho, Podinovski, Sarrico & Shale 2001). Only quantitative measures are used in DEA hence, qualitative factors need to be converted into quantitative scores. Such factors may be legitimately quantifiable, but very often such quantification is superficially forced, as a modelling convenience. Typically, a qualitative factor is captured either on a Likert scale, or is represented by some quantitative surrogate such as plant downtime or percentage sick days by employees (Cook, Kress & Seiford 1996). Many authors, Roman, Wigand and Wolfgang (2003), Wong, Yang and Greatbanks (2004), Biehl, Cook and Jonston, (2006), Cook and Zho (2006) utilised a five point Likert scale to convert qualitative data into quantitative used for the evaluations of performance using DEA.

A year of experience of employees is considered to represent the job knowledge (Ross & Droge 2002) and work habits are measured with a surrogate, percentage of employees' attendance. The qualitative input factors Customer Relations and Interpersonal Relations are assessed by using a five point Likert scale with high scores reflecting better relations. In the case of Customer Relations; 1 = school final, 2 = industrial training, 3 = diploma, 4 = degree, and 5 = post graduate; and Interpersonal Relations is measured using: 1 = fair, 2 = satisfactory, 3 = good, 4 = very good, and 5 = excellent.

Unlike traditional performance appraisals, DEA searches for the efficient employees who will serve as role models. The efficiency of a machine can be determined by comparing its actual output to its engineering specifications. However, when considering human service generally, the optimum efficiency is unknown, and, therefore, cannot be determine whether an employee is absolutely efficient (Sowlati & Paradi 2004). DEA can be used to identify employees, who are relatively inefficient, measure the magnitude of the inefficiency, and aids to select the alternative paths to eliminate inefficiencies. More efficient employees, who can act as trainers to the less efficient employees, can have a stake in the employee performance improvement process.

Required:

(a) Discuss the disadvantages and advantages of DEA.

(b) Considering the given information, suggest how can the performance of employee can improve and become more efficient? Which methodology can be implemented for the same? [5+10]

Answer of 6:

(a) Disadvantages of DEA:

- Results are sensitive to the selection of inputs and outputs (Berg 2010).
- You cannot test for the best specification (Berg 2010).
- The number of efficient firms on the frontier tends to increase with the number of inputs and output variables (Berg 2010).

Advantages of DEA:

- No need to explicitly specify a mathematical form for the production function.
- Proven to be useful in uncovering relationships that remain hidden for other methodologies.
- Capable of handling multiple inputs and outputs.
- Capable of being used with any input-output measurement.
- The sources of inefficiency can be analyzed and quantified for every evaluated unit.

(b) The main focus of the study is how to improve the working efficiencies of the employees and to determine their training needs. Evaluating and ranking the employees working in organizations are challenging tasks involving several factors. Each employee achieves certain performance levels in various factors and the resulting information can be overwhelming. The Data Envelopment Analysis (DEA) can be applied as a fair evaluating and sorting tool to support the performance appraisal (PA) as well in the decision making process. DEA focuses on the best practices of efficient employees for the purpose of improving overall performance. Unlike traditional performance appraisals DEA searches for the efficient employees who will serve as peers. The DEA process identifies inefficient employees, magnitude of inefficiency and aids to eliminate inefficiencies with a relatively easy to employ framework. Rating formats need reexamination with a focus on computer based models as an alternative to traditional rating methods. Earlier adopted methods have seldom identified and quantified the individual factors for inefficiency whereas DEA could overcome these shortfalls. Based on the results of DEA the improvement of employees' performance are possible by way of providing training, talent enhancement and further qualification wherever required.

Procedure

Employee rankings will be used to decide the types of incentives and promotions during future expansion of the company. The factors (dataset) considered [redacted] process are classified into input and output factors. One of the major advantages of the DEA is the inputs and outputs can be measured and used in their own units (Sami-Mahgary & Lahdelma 1995). No universally applicable rational template is available for the selection of factors. However, in general, the inputs must reflect the resources used and the outputs must reflect the service levels of the utility and the degree to which the utility is meeting its objective (Richards 2003, Thakur 2005).

The dataset is decided upon, by having discussions and brainstorming sessions with the managers, supervisors and representatives of employees. While considering input and output factors the isotonicity relations are assumed for DEA (i.e., an increase in any input should not result in a decrease in any output). Consequently, the values of some factors may have to be inverted before they are entered into the analysis. Another group of factors is the qualitative ones. These have to be assigned numerical values in order to participate in the mathematical evaluation of efficiency. Any number of input or output factors which are relevant and have an impact on the efficiency of employees could be considered for DEA. But the number of employees in the analysis should be at least twice the number of inputs and outputs considered (Golany & Roll 1989).

Measures

To evaluate efficiency scores of employees the following factors are used: job knowledge, customer relations, interpersonal relations, and work habits as input factors; and quality, and quantity of products produced as output factors. Among the input factors customer relations and interpersonal relations are qualitative. In a wide range of problem settings to which DEA can be applied qualitative factors are often present. Marketing's interest in consumer perception and expectation, and human resources' desire to explore and describe employees' skills are two areas that routinely involve the quantification of qualitative concepts (Dyson, Allen, Camanho, Podinovski, Sarrico & Shale 2001). Only quantitative measures are used in DEA hence, qualitative factors need to be converted into quantitative scores. Such factors may be legitimately quantifiable, but very often such quantification is superficially forced, as a modelling convenience. Typically, a qualitative factor is captured either on a Likert scale, or is represented by some quantitative surrogate such as plant downtime or percentage sick days by

employees (Cook, Kress & Seiford 1996). Many authors, Roman, Wigand and Wolfgang (2003), Wong, Yang and Greatbanks (2004), Biehl, Cook and Jonston, (2006), Cook and Zho (2006) utilised a five point Likert scale to convert qualitative data into quantitative used for the evaluations of performance using DEA.

A year of experience of employees is considered to represent the job knowledge (Ross & Droge 2002) and work habits are measured with a surrogate, percentage of employees' attendance. The qualitative input factors Customer Relations and Interpersonal Relations are assessed by using a five point Likert scale with high scores reflecting better relations. In the case of Customer Relations; 1 = school final, 2 = industrial training, 3 = diploma, 4 = degree, and 5 = post graduate; and Interpersonal Relations is measured using: 1 = fair, 2 = satisfactory, 3 = good, 4 = very good, and 5 = excellent.

7. Describe the doctrine demand of Six Sigma. [5]

Answer of 7:

Six Sigma:

Six Sigma at many organizations simply means a measure of quality th[redacted] perfection. Six Sigma is a disciplined, data-driven approach and [redacted] methodology for eliminating defects (driving toward six standard deviations between the mean and the nearest specification limit) in any process – from manufacturing to transactional and from product to service.

The fundamental objective of the Six Sigma methodology is the implementation of a measurement-based strategy that focuses on process improvement and variation reduction through the application of Six Sigma improvement projects. This is accomplished through the use of two Six Sigma sub-methodologies: DMAIC and DMADV. The Six Sigma DMAIC process (defines, measure, analyze, improve, control) is an improvement system for existing processes falling below specification and looking for incremental improvement. The Six Sigma DMADV process (define, measure, analyze, design, verify) is an improvement system used to develop new processes or products at Six Sigma quality levels. It can also be employed if a current process requires more than just incremental improvement. Both Six Sigma processes are executed by Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

Six Sigma doctrine demands the following conditions:

- Continuous efforts to achieve stable and predictable process results (i.e., reduce process variation) are of vital importance to business success.
- Manufacturing and business processes have characteristics that can be measured, analyzed, controlled and improved.
- Achieving sustained quality improvement requires commitment from the entire organization, particularly from top-level management.

8. Explain the Statistical Process Control (SPC) methods. [5]

Answer of 8:

Statistical process control (SPC) monitors specified quality characteristics of a product or service so as:

- To detect whether the process has changed in a way that will affect product quality and
- To measure the current quality of products or services.

- Control is maintained through the use of control charts. The charts have upper and lower control limits and the process is in control if sample measurements are between the limits.
- Control Charts for Attributes

P Charts - measures proportion defective.
C Charts - measures the number of defects/unit.

- Control Charts for Variables

X bar and R charts are used together - control a process by ensuring that the sample average and range remain within limits for both.

- Basic Procedure
  (i) An upper control limit (UCL) and a lower control limit (LCL) are set for the process.
  (ii) A random sample of the product or service is taken, and the specified quality characteristic is measured.
  (iii) If the average of the sample of the quality characteristic is higher than the upper control limit or lowers than the lower control limit, the process is considered to be "out of control".

Section- C
[Question no. 9 is compulsory]

9 BASEL II CREDIT RISK IMPLEMENTATION

The client is a major Irish Bank in the commercial and retail banking market.

The Irish Financial Regulator (the "Financial Regulator") required the client to implement a new credit risk capital calculation policy based on the European Capital Requirements Directive (CRD). The client's strategy was to implement the reporting of Risk Weighted Assets (RWA) under the CRD Foundation Internal Ratings Based Approach (FIRB). This required an application to and approval of this methodology from the Financial Regulator. The implementation represented significant change in the organization. A programme of change was needed to design and implement new systems, risk models, policies, procedures and processes to manage.
The Financial Regulator provided a detailed template as a basis of all material that was required in the application pack. The role involved gathering key documents (policy, procedures, processes) relating to the completion of the pack. Documentation was reviewed for compliance against CRD FIRB requirements and mapped against application pack sections. Some testing of processes and procedures under implementation was also carried out.
A key deliverable was the drafting and completion of the application pack for submission to the Financial Regulator with a library of supporting documentation providing evidence of compliance with CRD.
The project workstreams revolved around the objectives of designing, validating and implementing new credit risk models that would enable the client to achieve FIRB status.

Key workstreams included:

- Gap analysis and compliance gap closure relating to CRD,
- Credit Risk model development gaps, and
- Creation and management of a document library (policy, procedures FIRB supporting evidence).

Project management activities included engaging with senior programme executives to ensure the project work stream deliverables and objectives were met. This was achieved

through specialist knowledge of regulatory requirements. A key part of the role was to provide advice and guidance on engaging with the Financial Regulator throughout the life cycle of the project. This was critical in ensuring that the regulators were engaged continuously throughout the application process thus mitigating any objections or conditions to approval of the FIRB approach being granted.

In addition, the role called for guidance on a quantitative basis for the approach and validation of credit risk models under development.
The FIRB application pack was delivered to the Financial Regulator on time and after a period of review the FIRB approach was granted to the client.

The assets created during the project such as the documentation library were successfully transferred to Business as Usual and form a core part of the governance of the Credit Risk methodologies employed by the client.

Required:

(a) **Distinguish between Basel I and Basel II.**
(b) **Discuss the challenges faced by the Irish Financial Regulator.**
(c) **How did they face challenge and discuss the benefits.** **[5+5+5]**

Answer of 9:

(a) **Comparison between Basel I and Basel II**

Basel - 1(1988 and amended in 1996) Basel - 11 (to be in place by 2006 in G-10	**Basel- II (to be in place by 2006 in G-10 countries and in India in 2008)**
1. Basel 1 based on methodology for capital Adequacy.	1. Basel II based on 3 pillars.
2. Risk is not sensitive.	2. Risk is sensitive.
3. All credit exposures carried risk weight of 100 per cent - except for some sovereign exposures and mortgages.	3. Credit exposures carry risk weights based on credit qualities.
4. Risk Capital = Credit exposure * Risk Weights * 8 per cent can have lesser Capital than others	4. Risk capital: Similar to Basel I. But efficient Banks can have lesser capital than others
Implications were • Every bank had to maintain same 8 per cent capital. Thus Banks with good quality assets had no incentives. As a result credit quality had to be lowered to increase returns • Low rated exposures were subsidized by high rated exposures • No provision for economic pricing by	**Implications are** • Banks with good quality assets have incentives because they can manage with lower capital • Better quality assets requires lesser capital • Risk pricing can be done by banks based on credit risk perception • Provision exists for economic pricing by banks

(b) The Irish Financial Regulator (the "Financial Regulator")) required the client to implement a new credit risk capital calculation policy based on the European Capital Requirements Directive (CRD). The client's strategy was to implement the reporting of Risk Weighted Assets (RWA) under the CRD Foundation Internal Ratings Based Approach (FIRB). This required an application to and approval of this methodology from the Financial Regulator. The implementation represented significant

change in the organization. A programme of change was needed to design and implement new systems, risk models, policies, procedures and processes to manage.

(c) The Financial Regulator provided a detailed template as a basis of all material that was required in the application pack. The role involved gathering key documents (policy, procedures, processes) relating to the completion of the pack. Documentation was reviewed for compliance against CRD FIRB requirements and mapped against application pack sections. Some testing of processes and procedures under implementation was also carried out.

A key deliverable was the drafting and completion of the application pack for submission to the Financial Regulator with a library of supporting documentation providing evidence of compliance with CRD.

The project workstreams revolved around the objectives of designing, validating and implementing new credit risk models that would enable the client to achieve FIRB status. Key workstreams included:

- Gap analysis and compliance gap closure relating to CRD,
- Credit Risk model development gaps, and
- Creation and management of a document library (policy, procedures FIRB supporting evidence).

Project management activities included engaging with senior programme executives to ensure the project work stream deliverables and objectives were met. This was achieved through specialist knowledge of regulatory requirements. A key part of the role was to provide advice and guidance on engaging with the Financial Regulator throughout the life cycle of the project. This was critical in ensuring that the regulators were engaged continuously throughout the application process thus mitigating any objections or conditions to approval of the FIRB approach being granted.

In addition, the role called for guidance on a quantitative basis for the approach and validation of credit risk models under development.

The FIRB application pack was delivered to the Financial Regulator on time and after a period of review the FIRB approach was granted to the client.
The assets created during the project such as the documentation library were successfully transferred to Business as Usual and form a core part of the governance of the Credit Risk methodologies employed by the client.

10 Explain the objectives of Risk Management. [5]

Answer of 10:
Objectives of Risk Management
Risk management basically has the following objectives:

(i) Anticipating the uncertainty and the degree of uncertainty of the events not happening the way they are planned.
(ii) Channelizing events to happen the way they are planned.
(iii) Setting right, at the earliest opportunity, deviations from plans, whenever they occur.
(iv) Ensuring that the objective of the planned event is achieved by alternative means, when the means chosen proves wrong, and
(v) In case the expected event is frustrated, making the damage minimal.

OR

Explain the L. C. Gupta Model under the Predictions of Corporate Failure. [5]

Dr. L.C. Gupta's Sickness Prediction Model

Dr. L.C. Gupta made an attempt to distinguish between sick and non-sick companies on the basis of financial ratios. He used a simple non-parametric test for measuring the relative predicting power of different financial ratios. A mixed sample of sick and non-sick companies was made and the companies in the sample were arranged in a single ordered sequence from the smallest to the largest, according to the financial ratio that is tested for its predictive power. Let [profit after tax ÷ Net worth] is a financial ratio that is to be tested for its predictive power. The companies in the sample are arranged in increasing order of this particular ratio. Let the sick companies be denoted by the letter 'S' and the non-sick ones by the letter 'N'. Let us assume that 8 sick companies and 8 non-sick companies are taken for building up the sample. When arranged in a sequential order as stated above, the sequence may result in any pattern as shown below:

(A) S -N-S-N-S-S-N-S-N-N-S-N-S-N-S-N
(B) S -S-S-S-S-S-S-S-N-N-N-N-N-N-N-N
(C) S -S-S-S-N-N-N-N-N-N-N-N-S-S-S-S
(D) S -S-S-N-S-S-N-N-S-S-N-N-S-N-N-N

Observing the pattern of occurrence of 'S' and 'N' a cutoff point is chosen to separate the sick group from the non-sick group. Companies that fall to the left of the cutoff point lie in the sick group while companies that fall to the right of the cutoff p[redacted] sick group. The cutoff point is so chosen that the number of misclassifications is minimized. The ratio that showed the least percentage classification error at the earliest possible time is deemed to have the highest predicative power. Referring to the four patterns shown above, the pattern of sequence shown in (B) is the most accurate one since the cutoff point will be located exactly midway in the sample group and the percentage of classification error will be zero since there are no misclassifications. Pattern shown in (C) is bound to have a higher error since the sick companies are concentrated on both the extreme ends.

Dr. L.C. Gupta used Indian data on a sample of 41 textile companies of which 20 were sick companies and 21 were non-sick companies. He studied the predictive power of 63 financial ratios and observed that the following two ratios have comparatively better predictive power.

(i) (Earnings before Interest and Taxes) ÷ Sales

and

(ii) (Operating cash flow) ÷ Sales