PAPER – 17 - STRATEGIC PERFORMANCE MANAGEMENT

The following table lists the learning objectives and the verbs that appear in the syllabus learning aims and examination questions:

	Learning objectives	Verbs used	Definition
LEVEL C	KNOWLEDGE What you are expected to know	List	Make a list of
		State	Express, fully or clearly, the details/facts
		Define	Give the exact meaning of
	COMPREHENSION What you are expected to understand	Describe	Communicate the key features of
		Distinguish	Highlight the differences between
		Explain	Make clear or intelligible/ state the meaning or purpose of
		Identity	Recognize, establish or select after consideration
		Illustrate	Use an example to describe or explain something
	APPLICATION How you are expected to apply your knowledge	Apply	Put to practical use
		Calculate	Ascertain or reckon mathematically
		Demonstrate	Prove with certainty or exhibit by practical means
		Prepare	Make or get ready for use
		Reconcile	Make or prove consistent/ compatible
		Solve	Find an answer to
		Tabulate	Arrange in a table
	ANALYSIS How you are expected to analyse the detail of what you have learned	Analyse	Examine in detail the structure of
		Categorise	Place into a defined class or division
		Compare and contrast	Show the similarities and/or differences between
		Construct	Build up or compile
		Prioritise	Place in order of priority or sequence for action
		Produce	Create or bring into existence
	SYNTHESIS How you are expected to utilize the information gathered to reach an optimum conclusion by a process of reasoning	Discuss	Examine in detail by argument
		Interpret	Translate into intelligible or familiar terms
		Decide	To solve or conclude
	EVALUATION How you are expected to use your learning to evaluate, make decisions or recommendations	Advise	Counsel, inform or notify
		Evaluate	Appraise or asses the value of
		Recommend	Propose a course of action

Paper – 17 - Strategic Performance Management

Full Marks: 100 **Time Allowed: 3 hours**

This paper contains 10 questions, divided in three sections Section A, Section B and Section C. In total 7 questions are to be answered.

From Section A, Question No.1 is compulsory and answer any two questions from Section A (out of three questions - Questions Nos. 2 to 4). From Section B, Answer any two questions (i.e. out of Question nos. 5 to 7). From Section C, Answer any two questions (i.e. out of Question nos. 8 to 10).

Students are requested to read the instructions against each individual question also. All workings must form part of your answer. Assumptions, if any, must be clearly indicated.

Section –A

[Question 1 is compulsory and answers any 2 from the rest]

1. In late 2002 the Healthy Province Health Department convened a wide range of organizations and entities in order to develop a community health improvement plan. This collaboration included community representatives from local hospitals, clinics, community-based organizations, schools, churches as well as the province public health agency. A Healthy Province Community Health Council (the "Council") was established; its goal was to improve the overall health of the province's population through a community-wide health improvement plan that would prevent disease, promote physical and mental health, and better the quality of life within the community. The Council identified common community health values and a health vision for the large metropolitan population it served. In addition, a mission statement was drafted for the local public health system.

In order for the Council to obtain the necessary information for the community health improvement plan, strategies and tools from NACCHO's MAPP (Mobilizing for Action through Planning and Partnerships) process were used. MAPP includes four assessment activities:

- **(i) Community Health Status Assessment, which attempts to answer the question, "How healthy are our residents?" The compilation of local health data and the examination of changes over time were assessed in comparison with local, state and national level data and with national health objectives established for the year 2010 through the Healthy People 2010 process.**
- **(ii) Forces of Change Assessment. During this assessment a randomly selected group of participants from the community provided input as to "What is occurring or might occur that affects the health of our community or the local public health system?" As a result of this assessment, the important forces of change affecting the community as well as the potential impacts of those forces.**
- **(iii) Local Public Health System Assessment, which attempts to answer the question, "How well are essential public health services being provided to our community?" was conducted. The collaborative used tools, consisting of standards and indicators, developed by Public Health Practice Program Office of the Centers for Disease Control and Prevention to perform this assessment.**
- **(iv) Community Themes and Strengths Assessment, which seeks to identify "What health and health-related issues are important to our community?" Both a survey and a focus group were conducted to examine perceptions of community health and the quality of life within the community.**

The Council established a subcommittee that was charged with developing an ordered list of the most important health problems and issues facing the community. The subcommittee was provided with data and information derived from the four assessments. After the compilation and analysis stages were completed, the collaborative refined the vision and mission statements for the community health improvement plan. Health problems and issues were

then prioritized, and goals, objectives and work plans were formulated for the priority health needs. The end result was a community health improvement plan that identified priority community health problems and issues, and delineated plans to achieve targets identified in the plan.

Required:

(a) Describe the four components of performance management are evident in this case study.

(b) Does this case study demonstrate the use of performance standards?

(c) This case study demonstrate the use of performance measurement Justify

(d) Does this case study demonstrate the use of reporting performance?

(e) Discuss the specific performance management components in this case study could be enhanced? [3+4+3+4+6]

Answer:

(a) A performance management system is the continuous use of the components so that they are integrated into an agency's core operations. Performance management can be carried out at multiple levels, including the program, organization, community, and state levels. However it is applied, the performance management cycle is a tool to improve health, increase efficiency, and create other benefits and value for society.

(b) Performance standards include identifying relevant standards, selecting indicators, setting goals and targets and communicating expectations. Performance standards are objective standards or guidelines that are used to assess an organization's performance. They may be based on national, state or scientific guidelines or be based on the public's or leaders' expectations.

The case study addresses the beginning stages of gathering all stakeholders and representatives from the community. The collaboration resulted in the formation of a Community Health Council which communicated its expectations and identified the mission, vision and goals of this effort.

The Council needs to identify relevant standards or indicators that will be used to assess the performance of the collaborative community health improvement plan. Standards or indicators may be set based on national, state, or scientific guidelines; by benchmarking against similar organization; based on the public's or leaders' expectations (e.g., 100% access, zero disparities); or other methods.

(c) Performance measurement is the refining of indicators and defining measure. Performance measures are quantitative measures of capacities, processes, or outcomes relevant to the assessment of a performance indicator. It also includes developing a data system which can collect the data based on the measures.

The four MAPP assessments are used as the major source of performance measures. After targets are established, data or information, often called indicators, related to those standards are identified and collected standard. The various indicators collected through the MAPP assessments provide the Council with a means of measuring performance relative to the targets it has identified.

(d) The reporting of performance component includes analyzing data, feeding data back to managers, staff, policy makers, and constituent, and developing a regular reporting cycle.

The data and information derived from the four assessments were collected and analyzed by the subcommittee appointed by the Council. The data was fed back to the Council and to the various stakeholders in the community, including the organizations collaborating through the Council. There was no mention of a regular reporting cycle or determination if targets were met, goals achieved, or when to re-assess.

(e) Performance standards: Public health agencies and their partners can benefit from using national standards, state specific standards, benchmarks from other jurisdictions, or agency specific targets to define performance expectations. Standards for health outcomes could be developed from Healthy People 2010 national health objectives tailored to the unique circumstances and assets of this community. Standards for public health processes and capacity could be derived from The National Public Health Performance Standards Program (NPHPSP) which defines performance in each of the 10 Essential Public Health Services for state and local public health systems and governing bodies. The NPHPSP supports users of the national standards with a variety of technical assistance products including online data submission and an analytic report back to the user jurisdiction.

Reporting of Progress: It would be beneficial to create a regular reporting cycle. After the program has developed its new objectives, these too then should be reviewed to see if targets and goals have been achieved and the entire process be re-assessed.

Quality Improvement:

i. The community health improvement plan prioritized health problems and issues, identified goals and objectives and established clear work plans that assigned responsibility, redeployed resources, assured accountability for results, and an established timetable.

ii. Including a process to use performance information to decide areas for more evaluation.

2. (a) A company is organised into two large Divisions. Division 'A' produces a component which is used by Division 'B' in making a final product. The final product is sold for ₹400 each. Division A has a capacity to produce 2000 units and the entire quantity can be purchased by Division B.

Division A informed that due to installation of new machines, its depreciation cost had gone up and hence wanted to increase the price of the component to be supplied to Division B to ₹220. Division B, however can buy the component from the outside market at ₹200 each. The variable costs of Division A is ₹190 and fixed costs ₹20 per component. The variable costs of Division B in manufacturing the final product by using the component is ₹150 (excluding the component cost).

Present statement indicating the position of each Division and the company as a whole taking each of the following situations separately.

(i) If there are no alternative used for the production facilities of A, will the company benefit if Division B buys from outside suppliers at ₹200 per component?

(ii) If internal facilities of A are not otherwise idle and the alternative use of the facilities will give an annual cash operating saving of ₹30,000 to Division A, should Division B purchase the component from outside suppliers?

(iii) If there are no alternative used for the production facilities of Division A and the selling price for the component in the outside market drops by ₹15, should Division B purchase from outside suppliers?

(iv) What transfer price would you fix for the component in each of the above circumstances? [5+3+2+2]

Answer 2. (a)

(i) Statement of contribution

(a) When component is purchased by Division B from outside

Particulars	Computation	Amount (₹)	Amount (₹)	Amount (₹)
Division A				Nil
Division B Sales	(2,000 × 400)		8,00,000	
Less: Cost of purchase	(2,000 × 200)	4,00,000		
Variable costs	(2,000 × 150)	3,00,000	7,00,000	1,00,000
Company's total contribution				1,00,000

(b) When component is purchased from Division A by Division B

Particulars	Computation	Amount (₹)	Amount (₹)	Amount (₹)
Division A				
Sales	(2,000 × 220)		4,40,000	
Less: Variable costs	(2,000 × 190)		3,80,000	60,000
Division B				
Sales	(2,000 × 400)		8,00,000	
Less: Variable costs:				
Purchase cost from Division A	(2,000 × 220)	4,40,000		
Variable cost in Division B	(2,000 × 150)	3,00,000	7,40,000	60,000
Company's total contribution				1,20,000

Thus, it will be beneficial for the company as a whole to ask Division B to buy the component from Division A.

(ii) Statement of total contribution if Division A could be put to alternativeuse:

Particulars	Computation	Amount (₹)	Amount (₹)	Amount (₹)
Division A:				
Contribution from alternative use of facilities				30,000
Division B:				
Sales	(2,000 × 400)		8,00,000	
Less: Variable costs :				
Cost of purchase	(2,000 × 400)	4,00,000		
Variable Cost	(2,000 × 150)	3,00,000	7,00,000	
				1,00,000
Company's total contribution				1,30,000

Since, the company's contribution when component is purchased from outside, shows an increase of ₹30,000 as compared to when there is inter departmental transfer. Hence, it will be beneficial to purchase the component from outside.

(iii) Statement of total contribution when component is available from outside at ₹185

Particulars	Computation	Amount (₹)	Amount (₹)	Amount (₹)
Division A				Nil
Division B				
Sales	(2,000 × 400)		8,00,000	
Less: Variable costs				
Cost of purchase	(2,000 × 185)	3,70,000		
Division B				
Company's total contribution	(2,000 × 150)	3,00,000	6,70,000	1,30,000
				1,30,000

If the component is purchased by Division B from Division A, the contribution is only ₹1,20,000 as calculated under (i) above. Hence it will be beneficial to buy the component from outside.

(iv) Fixation of transfer price

(a) When there are no alternative uses of production facilities of Dept. A:
In such a case the variable cost i.e., ₹190 per component will be charged.

(b) If facilities of Division A can be put to alternative uses:

Variable cost	190
Opportunity cost (₹ 30,000 / 2,000)	15
Transfer price	205

(c) If market price gets reduced to ₹185 and there is no alternative use of facilities of Division A. The variable cost of ₹190 per component should be charged.

2. (b) "Does Benchmarking tantamount to Industrial Espionag" – Discuss it. [3]
Answer:

Benchmarking, it must be categorically stated is by no means synonymous with industrial espionage. 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.

2. (c) Describe the characteristics of Product Life-Cycle [5]
Answer:
The major characteristics of product life-cycle concept are as follows:

- The products have **finite lives** and pass through the cycle of development, introduction, growth, maturity, decline and deletion at **varying speeds.**
- Product cost, revenue and profit patterns tend to **follow predictable courses** through the product life-cycle. Profits first appear during the growth phase and after stabilizing during the maturity phase, decline thereafter to the point of deletion.
- **Profit per unit** varies as products move through their life-cycles.
- Each phase of the product life-cycle poses **different threats and opportunities** that give rise to different strategic actions.

- Products require **different functional emphasis** in each phase-such as an R &D emphasis in the development phase and a cost control emphasis in the decline.

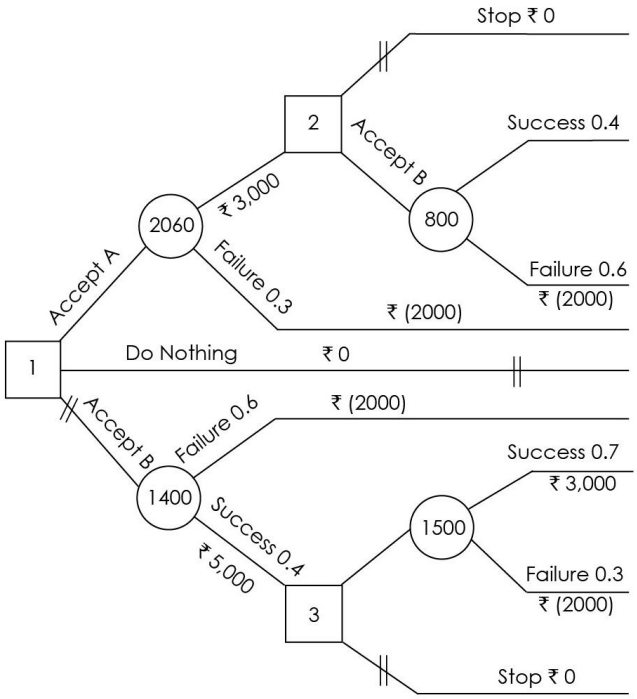
3. (a) List the advantages and disadvantages of Return on capital Employed. [4]
Answer:

Advantages	Disadvantages
• Easy to calculate.	• Research shows a poor correlation between ROCE and shareholder value.
• Figures are readily available.	• Care must be taken to ensure that is compared with like, when comparing with different companies – e.g. inclusion of intangibles in capital employed.
• Measures how well a business is utilizing the funds invested in it.	• Can be distorted by accounting policies.
• Often used by external analysts/investors.	• ROCE can be improved by cutting back investment – this may not be in the company's long-term best interest.

3. (b) A businessman has two independent investments A and B available to him, but he lacks the capital to undertake both of them simultaneously. He can choose to take A first and then stop, or if A is successful then take B, or vice versa. The probability of success on A is 0.7, while for B it is 0.4. Both investments require an initial capital outlay of ₹ 2,000, and both return nothing if the venture is unsuccessful. Successful completion of A will return ₹ 3,000 (over cost), successful completion of B will return ₹ 5,000 (over cost). Draw the decision tree and determine the best strategy. [10]

Answer:

The decision tree corresponding to the given information is depicted in Figure in below.



According to this, there are five strategies: (a) do nothing, (b) accept A and then stop, (c) accept B and then stop, (d) accept A and, if successful, then accept B, and (e) accept B and, if successful, accept A. The expected pay-off values are indicated in the circles

representing chance nodes. There are three decision points marked 1, 2 and 3. The evaluation of decision points by calculating expected values is contained in Table below. The optional decision is to accept A and, if successful, then accept B.

Decision Point	Outcome	Probability	Conditional Value	Expected Value
3 Accpet A	Success Failure	0.7 0.3	₹ 3,000 ₹ (2,000)	2,100 (600)
				1,500
Stop				0
2 Accpet B	Success Failure	0.4 0.6	₹ 5,000 ₹ (2,000)	2,000 (1,200)
				800
Stop				0
1 Accpet A	Success Failure	0.7 0.3	₹ 3,000 + 800 ₹ (2,000)	2,660 (600)
				2,060
Accpet B	Success Failure	0.4 0.6	₹ 5,000 + 1,500 ₹ (2,000)	2,600 (1,200)
				1,400
Do nothing				0

3. (c) Discuss the Competitive Intelligence and its objectives [6]

Answer:

Competitive Intelligence (C.I.)

Business information gathered that improves organization's competitive ability, data gathered to improve an organization's competitive capacity. Competitive intelligence may include, for example, information about competitors' plans, activities, or products, and may sometimes be gained through **Industrial Espionage**. Such information can have a significant impact on a company's own plans: it could limit the effectiveness of a new product launch, or identify growing threats to important accounts, for example. Unless organizations monitor competitor activity and take appropriate action, their business faces risk.

A broad definition of **competitive intelligence** is the action of defining, gathering, analyzing, and distributing **intelligence** about products, customers, competitors and any aspect of the environment needed to support executives and managers in making strategic decisions for an organization.

Key points of this definition:

1. Competitive intelligence is an ethical and legal business practice, as opposed to **industrial espionage** which is illegal.
2. The focus is on the external business environment.
3. There is a process involved in gathering information, converting it into intelligence and then utilizing this in business decision making. Some CI professionals erroneously emphasize that if the intelligence gathered is not usable (or actionable) then it is not intelligence.

Objectives of Competitive Intelligence

Organizations continually seek new ways to achieve sustainable competitive advantage and to counter aggressive competition. Proactive organizations recognize the advantage to be gained from an organized competitive intelligence program. In the Japanese semiconductor industry, for example, large organizations such as Mitsubishi, Mitsui, Sumitomo and Marubeni maintain intelligence departments that rival the U.S. Central Intelligence Agency in ability and accuracy. In the U.S., competitive intelligence programs are a popular tool among companies such as IBM Corp., Texas Instruments, Inc., Citi Corp, AT&T Inc., U.S. Sprint, McDonnell Douglas Corp., and 3M.

Organizations develop competitive intelligence programs with the following objectives in mind:

(i) To provide an early warning of opportunities and threats, such as new acquisitions or alliances and future competitive products and services;

(ii) To ensure greater management awareness of changes among competitors, making the organization better able to adapt and respond appropriately;

(iii) To ensure that the strategic planning decisions are based on relevant and timely competitive intelligence; and

(iv) To provide a systematic audit of the organization's competitiveness that gives the CEO an unfiltered and unbiased assessment of the firm's relative position.

4. (a) (i) A manufacturer can sell 'x' items per month, at price P = 300 – 2x. Manufacturer's cost of production ₹ Y of 'x' items is given by Y = 2x + 1000. Find no. of items to be produced to yield maximum profit per month.

(ii) The price (P) per unit at which company can sell all that it produces is given by the function P(x) = 300 – 4x. The cost function is 500 + 28x, where 'x' is the number of units, find x, so that profit is maximum. [5+4]

Answer:

(i) Units = x

Price = 300 – 2x

Revenue (R) = Px = $300x - 2x^2$

Cost (C) = 2x + 1000

Profit (z) = $300x - 2x^2 - 2x - 1000$

= $-2x^2 + 298x - 1000$ (Say 'z')

$\frac{dz}{dx} = -4x + 298 = 0$

$-4x = -298$

$x = \frac{298}{4} = 74.5$

$\frac{d^2z}{dx^2} = -4$ which is negative

$\frac{d^2z}{dx^2} < 0$

$\therefore$ Profit is maximum at x = 74.5 units

(ii) P = 300 – 4X

$R = P(x) = 300x - 4x^2$

$C = 500 + 28x$

$P = R - C$

Profit $= 300x - 4x^2 - 500 - 28x$

$= -4x^2 + 272x - 500$ (Say 'z')

$\frac{dz}{dx} = -8x + 272 = 0$

$-8x = -272$

$X = \frac{272}{8} = 34$

$\frac{d^2z}{dx^2} = -8$, which is Negative

Profit is maximum at x = 34 units.

4. (b) Describe the steps of BPR Tools and Techniques. [5]

Answer:

BPR Tools and Techniques

The various definitions of BPR suggest that the radical improvement of processes is the goal of BPR. They do not, however, refer specifically to the tools and techniques used in reengineering business processes.

(i) Process visualization:

While many authors refer to the need to develop an ideal "end state" for processes to be reengineered, some suggest that the key to successful reengineering lies in the development of a vision of the process.

(ii) Process mapping /operational method study:

Process mapping and operational method studies have been incorporated into tools such as IDEF0 (Integrated Definition Method), DFD (Data Flow Diagrams), OOA (Object Oriented Analysis), and Prince2 (Process Based Project Management).

(iii) Change management:

Since management of change is the largest task in reengineering, the human side of reengineering, in particular the management of organizational change should not be neglected.

(iv) Benchmarking:

Benchmarking forms an integral part of reengineering, since it allows the visualization and development of processes which are known to be in operation in other organizations.

(v) Process and customer focus:

The primary aim of BPR, is to redesign processes with regard to improving performance from the customer's perspective.

4. (c) Explain the cost Accountant's role in Target Costing. [6]
Answer:

The role of a Cost Accountant in a Target Costing Team consists of the following activities -

(i) **Cost Estimation:** To provide other members of the design team a running series of cost estimates based on initial designs sketch, activity-based costing reviews of production processes, and "best guess" costing information from suppliers based on estimated production volumes.

(ii) **Permissible Cost Ranges:** To provide estimates within a high-low range cost, since preliminary data may be vague. But, the estimated cost range should be modified as more information becomes available.

(iii) **Capital Budgeting Analysis:** To cater to capital budgeting requests generated by the Design Team, based on types of equipment needed for the anticipated product design, product revenues and costs, rates of return, etc. and to answer questions regarding uncertainties and risk analysis.

(iv) **Cost Principles Explanation:** To work with the Design Team to help it understand the nature of various costs (such as cost allocations based on an Activity-Based Costing system), as well as the cost-benefit trade-offs of using different design or cost operations in the new product.

(v) **Review of Cost Reduction Targets:** To track the gap between the Current Cost and the Target Cost (i.e. the Design Team's goal), providing an itemization of where cost savings have already been achieved, and where there has not been a sufficient degree of progress.

6. **Final Review and Feedback:** To compare a product's Actual Cost to the Target Cost after the design is completed, and for as long as the Company sells the product. This is necessary since Management must know immediately if costs are increasing beyond budgeted levels and why these increases are occurring.

Section – B

5. (a) Describe about the Elman and Jordon Artificial Neural Networks. [5]

Answer:

Elman and Jordan Artificial Neural Networks

Elman network also referred as Simple Recurrent Network is special case of recurrent artificial neural networks. It differs from conventional two-layer networks in that the first layer has a recurrent connection. It is a simple three-layer artificial neural network that has back-loop from hidden layer to input layer trough so called context unit. This type of artificial neural network has memory that allowing it to both detect and generate time-varying patterns.

The Elman artificial neural network has typically sigmoid artificial neurons in its hidden layer, and linear artificial neurons in its output layer. This combination of artificial neurons transfer functions can approximate any function with arbitrary accuracy if only there is enough artificial neurons in hidden layer. Being able to store information Elman artificial neural network is capable of generating temporal patterns as well as spatial patterns and responding on them. Jordan network is similar to Elman network. The only difference is that context units are fed from the output layer instead of the hidden layer.

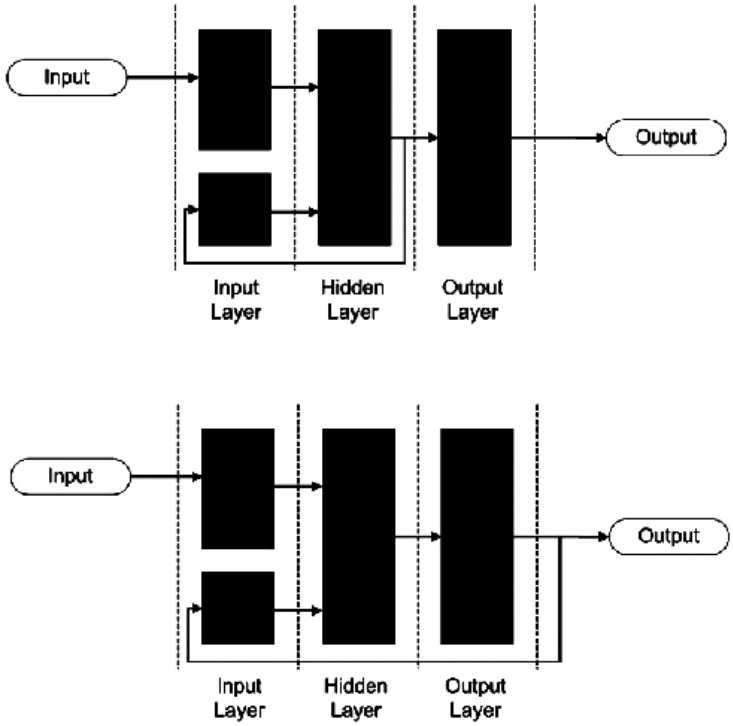


Fig. Jordan artificial neural network

5. (b) Discuss the importance of Decision Support Systems for gaining the Competitive Advantage. [5]

Answer:

Decision Support Systems

In a world of constant flux, informed and thoughtful decision-making is the cornerstone of business success. As a manager, you must make decisions that affect your business every day, some critical and some not so important. Decision Support Systems allow faster decision making, identification of negative trends, and better allocation of business resources all to the benefit of you and your organization.

Decision Support Systems (DSS) - are a specific class of computer-based information systems that support your decision-making activities. A decision support system analyzes business data and provide interactive information support to managers and business professionals during the decision-making process, from problem recognition to implementing your decision. Decision Support Systems use (1) Analytical models, (2) specialized databases, (3) a decision maker's own insights and judgments, and (4) an interactive, computer-based modeling process to support semi-structured business decisions.

A key component to any DSS is Business Intelligence reporting tools, processes, and methodologies. These provide you with rich reporting, monitoring, and data analysis, which are necessary for effective and fast decision-making.

Gain competitive advantage with Decision Support Systems: In today's competitive business environment, what you need for maximum performance is to achieve competitive advantage. Without competitive advantage, your company will not be able to operate and will eventually cease to exist.

One way of gaining competitive advantage is through the use of computerized Decision Support Systems. The simplest and most tangible benefit of a Decision Support System is the ability to help you toward making better decisions. Your decisions are better in the sense that, once they are implemented, they have such effect as reducing costs, using assets more efficiently, increasing revenue, reducing risks, improving customer service, and so on.

However, Decision Support Systems can provide your company with many other benefits including:

- Speeding up process of decision making
- Increasing organizational control
- Speeding up problem solving in an organization
- Helping automate managerial processes
- Improving personal efficiency
- Eliminating value chain activities

6. (a) "The MI is based on the concept of the Production function. This is a function of maximum possible production, with respect to a set of inputs pertaining to capital and labour" – Discuss it. [5]

Answer:

The **Malmquist Index** (MI) is a bilateral index that can be used to compare the production technology of two economies. It is named after Professor Sten Malmquist, on whose ideas it is based. It is also called the Malmquist Productivity Index.

The MI is based on the concept of the Production function. This is a function of maximum possible production, with respect to a set of inputs pertaining to capital and labour. So, if S_a is the set of labour and capital inputs to the production function of Economy A, and Q is the production function of Economy A, we could write $Q = f_a (S_a)$.

While the production function would normally apply to an enterprise, it is possible to calculate it for an entire region or nation. This would be called the aggregate production function.

To calculate the Malmquist Index of economy A with respect to economy B, we must substitute the labour and capital inputs of economy A into the production function of B, and vice versa. The formula for MI is given below.

$$MI = \sqrt{(Q_1 Q_2) / (Q_3 Q_4)}$$

where

$Q_1 = f_a (S_a)$

$Q_2 = f_a (S_b)$

$Q_3 = f_b (S_a)$

$Q_4 = f_b (S_b)$

Note that the MI of A with respect to B is the reciprocal of the MI of B with respect to A. If the MI of A with respect to B is greater than 1, the aggregate production technology of economy A is superior to that of economy B.

6. (b) Explain Technical and operational factors of E-commerce. [5]

Answer:

Technical and Operational Factors of E-commerce

(i) **Protocol (Standards) Making Process**

A well-established telecommunications and Internet infrastructure provides many of the necessary building blocks for development of a successful and vibrant e-commerce marketplace.

(ii) **Delivery Infrastructure**

Successful e-commerce requires a reliable system to deliver goods to the business or private customer.

(iii) **Availability of Payment Mechanisms**

Secure forms of payment in e-commerce transactions include credit cards, checks, debit cards, wire transfer and cash on delivery.

(iv) **General Business Laws**

The application of general business laws to the Internet will serve to promote consumer protection by insuring the average consumer that the Internet is not a place where the consumer is a helpless victim.

(v) **Public Attitude to E-commerce**

The public attitude toward using e-commerce in daily life is a significant factor in the success of ecommerce.

(vi) **Business Attitude to E-commerce**

The willingness of companies to move away from traditional ways of doing business and develop methods and models that include e-commerce is essential.

7. (a) Define the following terms in the context of Supply Chain Management: [2 x 5]
(i) Activity Based Management
(ii) Capacity Management
(iii) Customer Relationship Management
(iv) Customer Value
(v) Information Sharing

Answer:

Terms & Definitions of Supply Chain Management:

(i) Activity-Based Management (ABM)
The use of activity-based costing information about cost pools and drivers, activity analysis, and business processes to identify business strategies; improve product design, manufacturing, and distribution; and remove waste from operations.

(ii) Capacity Management

The function of establishing, measuring, monitoring, and adjusting limits or levels of capacity in order to execute all manufacturing schedules; i.e., the production plan, master production schedule, material requirements plan, and dispatch list. Capacity management is executed at four levels: resource requirements planning, rough-cut capacity planning, capacity requirements planning, and input/output control.

(iii) Customer Relationship Management (CRM)

A marketing philosophy based on putting the customer first. It involves the collection and analysis of information designed for sales and marketing decision support to understand and support existing and potential customer needs. It includes account

management, catalog and order entry, payment processing, credits and adjustments, and other functions.

(iv) Customer Value

The customer value approach focuses on how people choose among competing suppliers, customer attraction and retention, and market-share gains.

By highlighting the best performer on each key buying factor, marketers obtain a market derived, empirical aggregate of each supplier's customer value proposition. Often the view from the marketplace differs from the organization's internally developed customer value proposition.

(v) Information Sharing

A strategic partnering relationship between suppliers and buyers is characterized by a willingness to be open, and to share forecasted demand and cost data as well as the benefits resulting from the information sharing. Both parties in the relationship generally follow a continuous improvement philosophy towards total cost of material acquisition and ownership along with quality and service. Cost, quality and schedule information that is confidential is shared both ways between firms during the early and ongoing stages of design and during the production life-cycle of the supplying relationship. This openness exists because of the high degree of trust earned through multiple successful interactions between the two organizations.

Section – C

8. (a) Describe the benefits of Risk Mapping. [4]

Answer:

Benefits of risk mapping

- Promotes awareness of significant risks through priority ranking, facilitating the efficient planning of resources.
- Enables the delivery of solutions and services across the entire risk management value chain.
- Serves as a powerful aid to strategic business planning.
- Aids the development of an action plan for the effective management of significant risks.
- Assigns clear responsibilities to individuals for the management of particular risk areas.
- Provides an opportunity to leverage risk management as a competitive advantage.
- Facilitates the development of a strategic approach to insurance programme design.
- Supports the design of the client's risk financing and insurance programmes, through the development of effective/optimal retention levels and scope of coverage etc.

8. (b) "It is a fact that some companies perform well and that some underperform and some fails. In many, if not most cases, these companies are led by executives that are quite experienced." – Justify the statements. [6]

Answer:

PREVENTING CORPORATE FAILURES:

Below are some recommendations that can help to reduce the risk of failures of organizations:

1. **Appointment of non-executive directors**

   The non-executive directors will bring their special expertise and knowledge on strategies, innovative ideas and business planning of the organization. They will monitor the work of the executive management and will help to resolve situations where conflict of interest arises. Overall, the non-executive directors will act as a Cross Check.

2. **Audit committees**

   Very often, there is occurrence of fraud in management and financial reporting. The presence of the audit committees will help to resolve this problem. Audit committees have the potential to reduce the occurrence of fraud by creating an environment where there is both discipline and control.

3. **Development of environment learning mechanism**

   Some organizations fail because they lose touch with their environment. Therefore, to counter this problem, there is a need to develop the environmental learning mechanism. Through it, new information can be brought on continuous basis. This is mainly done by carrying customer-feedback surveys. In this way, the organisation can realign itself with the new needs and challenges.

4. **Focus on research and development**

   Organizations can generate new knowledge by investing and focusing more on research and development. Thus, there will be more ideas how to make the products much better than that of their competitors.

   It can be deducted that a director has a big responsibility that he has to assume there commendations mentioned above can help directors to reduce corporate failure, provided that the directors abide. Proper planning also is critical to the success of a business.

9. (a) Describe about the Linear Probability Model (LPM) [6]

Answer:

Linear Probability Model (LPM)

To fix the idea, let us start by considering the following model:

$Y_i = \beta_1\beta + {}_2X_i + \mu_i$……[B]

Where,

X_i= the explanatory variable (s)

$Y_i = 1$ if the event occurs (say firm fails)

$Y_i = 0$ if the event does not occur (say the firm does not fail)

Models like [B], which express the dichotomous Y_i as a linear function of the explanatory variable (s) X_i , are called LPM because the conditional expectation of Y_i given X_i , can be interpreted as the conditional probability that the event will occur given X_i ; that is, P ($Y_i = 1$ | X_i). Such a model can be estimated by using OLS technique, whereas variable Y_i follows a probability distribution in which probability must lie between 0 (when event does not occurs) and 1 (when event occurs). So, LPM models require that the conditional probability must lie between 0 and 1.

In application of LPM to bankruptcy prediction, a boundary value has to be found that will distinguish between those failing and non-failing firms in the population. Minimising the classification errors does this. LPM coefficients are used to construct performance scores for firms. Alternatively, the LPM scores may be interpreted as probabilities of failure.

9. (b) Explain about the Probability of Ruin. **[4]**

Answer:

Probability of Ruin

Ruin theory also known as collective risk theory, was actually developed by the insurance industry for studying the insurers vulnerability to insolvency using mathematical modeling. It is based on the derivation of many ruin-related measures and quantities and specifically includes the probability of ultimate ruin. This can be also related to the sphere of applied probability as the techniques used in the ruin theory as fundamentally arising out of stochastic processes. Many problems in ruin theory relate to real-life actuarial studies but the mathematical aspects of ruin theory have really been of interest to actuarial scientists and other business research people.

Normally an insurers' surplus has been computed as the net of two opposing cash flows, namely, cash inflow of premium income collected continuously at the rate of c and the cash outflow due to a series of insurance claims that are mutually independent and identically distributed with a common distribution function P(y). The path of the series of claims is assumed to respond to a Poisson process with intensity rate which would mean that the number of claims received N(t) at a time frame of t is controlled by a Poisson distribution with a mean . Therefore, the insurer's surplus at any time t is represented by the following-formula:

$$X(t) = X + Ct - \sum_{i=10}^{N(t)} Y_i$$

where, the business of the insurer starts with an initial level of surplus capital.

X(0) = x under probability measure as explained in the previous paragraph.

Towards the end of the 20th century, Garbur and Shiu introduced the concept of the expected discounted penalty function derived from the probability of ultimate ruin. This concept was utilized to gauge the behaviour of insurer's surplus using the following formula:

$$m(x)E^x\left[e^{-\delta T}K_T\right]$$

where, ∂ is the discounting force of interest, K_T is a general penalty function representing the economic costs of the insurer at the time of ruin and the expectation relates to the probability measure. Quite a few ruin-related quantities fall into the category of the expected discounted penalty function.

In short, this theory of the probability of ruin is applied in the case of risk of insolvency of a company with diversified business activity. For the purpose of study, resources between diversified activities are allowed to be transferred and are limited by costs of transaction. Terminal insolvency happens when capital transfers between the business lines are not able to compensate the negative positions. Actuarial calculations are involved in the determination of ultimate ruin as discussed.

10. Using Altman's Model, compute the value of Z from the provided data: **[10]**

Equity & Liabilities	₹	Assets	₹
(1) Shareholder Fund:		**(1) Non – Current Assets**	
(a)Share Capital (@ ₹ 10 each)		**(a) Fixed Assets**	**4,20,000**
- Equity Share Capital	**2,00,000**		
(b)Reserves & Surplus	**60,000**	**(2) Current Assets**	
		(a) Inventory	**1,80,000**
(2) Non – Current Liabilities:	**3,00,000**	**(b) Book Debts**	**70,000**
- 10% Debentures			

(3) Current Liabilities	**80,000**	**(c) Loans & Advances**	**20,000**
(a)Trade Payable - Sundry Creditors			
(b) Outstanding Expenses	**60,000**		
		(d) Cash at Bank	**10,000**
Total	**7,00,000**	**Total**	**7,00,000**

Additional Information

(i) Market value per share ₹ 12.50.

(ii) Operating Profit (20% on sales) ₹ 1,40,000.

Answer:

As per Altman's Model (1968) of Corporate Distress Prediction

Z-score = $1.2\ X_1 + 1.4\ X_2 + 3.3\ X_3 + 0.6\ X_4 + 1.0\ X_5$

Here, the five variables are as follows:

X_1 = Working Capital to Total Assets = $\frac{1,40,000^{1}}{7,00,000^{2}} = 0.20.$

X_2 = Retained Earnings to Total Assets = $\frac{60,000^{3}}{7,00,000^{2}} = 0.0857$

X_3 = EBIT to Total Assets = $\frac{1,40,000^{4}}{7,00,000^{2}} = 0.20.$

X_4 = Market Value of Equity to Book Value of Total Debt = $\frac{2,50,000^{5}}{4,40,000^{6}} = 0.568$

X_5 = Sales to Total Assets = $\frac{7,00,000^{7}}{7,00,000^{2}} = 1$

Hence, Z-score = (1.2 × 0.20) + (1.4 × 0.0857) + (3.3 × 0.20) + (0.6 × 0.568) + (1 × 1)

= 0.24 + 0.11998 + 0.66 + 0.3408 + 1 = 2.36078

Working Notes:

(i) Calculation of Working Capital

Working Capital = Current Assets – Current Liabilities

Here, Working Capital = (Inventory + Book Debts + Loans & Advances + Cash at Bank) – (Sundry Creditors + Outstanding Expenses)

= (1,80,000 + 70,000 + 20,000 + 10,000) – 80,000 + 60,000)

= ₹ 1,40,000

(ii) Calculation of Total Assets

Total Assets = Fixed Assets + Current Assets

Here, Total Assets = 4,20,000 + (1,80,000 + 70,000 + 20,000 + 10,000) = ₹ 7,00,000.

(iii) Calculation of Retained Earnings

Retained Earnings = Reserves & Surplus = ₹ 60,000.

(iv) Calculation of Earnings before Interest & Tax (EBIT)

EBIT = Operating Profit = ₹ 1,40,000

(v) Calculation of market Value of Equity

Market Value of Equity Shares = 20,000 Shares × ₹ 12.50 = ₹ 2,50,000.

(vi) Calculation of Book Value of Total Debts

Book Value of Total Debts = Long – term Debts + Current Liabilities

Here, Book Value of Total Debts =10% Debentures + (Sundry Creditors + Outstanding Expenses)

= 3,00,000 + (80,000 + 60,000) = ₹ 4,40,000

(vii) Calculation of Sales

Here, Operating Profit = 20% on Sales = ₹ 1,40,000.

Hence, Sales = $\frac{100}{20}$ × ₹ 1,40,000 = ₹ 7,00,000.

Comments:

As the calculated value of Z-score lies between 1.81 and 2.99, which is marked as Grey Area, it is predicted that the company consists of both bankrupt elements (i.e., a mixture of failed & non-failed elements) and, therefore, required further investigation to determine its conclusive solvency status.