PAPER – 17 - STRATEGIC PERFORMANCE MANAGEMENT

Answer to MTP_Final_Syllabus 2012_Dec 2015_Set 2

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 analyze the detail of what you have learned	Analyze	Examine in detail the structure of
		Categorize	Place into a defined class or division
		Compare and contrast	Show the similarities and/or differences between
		Construct	Build up or compile
		Prioritize	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

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 answers <u>any two questions</u> from Section A (out of three questions - Questions Nos. 2 to 4). From Section B, Answer <u>any two questions (</u>i.e. out of Question nos. 5 to 7). From Section C, Answer <u>any two questions (</u>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.

Full Marks: 100   Time allowed: 3 hours

Section –A

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

1. Read the case study and answer the following questions:

Taxmann Allied Services is a leading publisher specializing in books on Indian taxation and corporate laws, accounting and auditing, banking, finance and management. It also prints a vast array of journals, web-based products and legal databases on DVDs.

Until 2012, Taxmann did not have any solution to automate and manage sales or service processes. "Our sales, service and marketing teams managed customer information such as call and comments in a diary or at times in Excel worksheets, based on personal preferences," recalls Sumita Sharma, Head – Customer Care, Taxmann. The result was either duplication or data loss. Disorganized tracking and monitoring made the sales cycle longer than anticipated, thus resulting in a higher cost of sales and poor closure rate.

Taxmann also offers online subscription to journals and books and other content. Previously, if a customer contacted its call center, the representative did not have sufficient information to handle the calls effectively. Even simple issues such as activation, renewal and access, took time to resolve. In addition, there was no provision to log the customer and call details, or record the interaction. "Manual routing of calls, high wait time, and finding the right resources to resolve issues was a challenge. Resolution took 3-7 days, resulting in customer dissatisfaction," says Vishal Gambhir, Team Lead – Customer Care, Taxmann. Sometimes customers would abandon the call due to the long wait time and there was no way to identify repeat callers.

The company wanted a robust and centralized Customer Relationship Management (CRM) solution that would help optimize business processes, effectively plan and track sales activities to shorten the sales cycles, increase closure rates and provide quality services to its customers, thus leading to customer satisfaction.

Taxmann evaluated several CRM solutions available in the market, including Sage, Zoho, Salesforce.Com, Microsoft Dynamics CRM and Sugar CRM.

Taxmann approached Godrej Infotech, a Microsoft Gold Certified Partner to implement the solution because of its experience, expertise and on-time delivery record.

After much analysis, the team opted for the Microsoft Dynamics CRM 2011 solution. "It was imperative that the solution proposed consolidate all of the customer data into a single system and reduces overheads, duplication and rework," says Hemant Savla, Delivery Manager, Godrej Infotech."At the same time, integration with other existing applications was a must." Out-of-the-box features of Microsoft Dynamics CRM and integration abilities met all Taxman's requirements.

The deployment started in October 2012 and the solution went live in less than five months with all the three modules, Sales, Service and Marketing for 50 concurrent users. In March 2013, Taxmann started using its CRM solution at the head office and its two customer call centers in Delhi. It purchased 50 concurrent user licenses.

Taxmann now defines marketing campaigns, and assigns employees to specific customers. All employees add updates to the CRM solution, for example, sales persons will update leads and opportunities in Dynamics CRM. This generates a 360-degree view of the customers. A salesperson can also track a customer's preferences, such as the preferred mode of communication, and the type of information and offers he/she would like to receive. This information helps the marketing team to deliver the right information via the right touch point to the customer. Taxmann develops new strategies based on the information available in Dynamics CRM to cross-sell and up-sell its products and services, thus increasing revenue.

Godrej Infotech also customized and integrated Dynamics CRM with third-party applications to fulfill unique business requirements. "Integration with SMS and email helps us to stay connected with our customers on their mobile phones," says Vishal. Computer Telephony Integration (CTI) routes calls immediately to the technical team to resolve queries. If required, agents escalate the queries from one office to another, thus giving immediate response to customers and ensuring satisfaction. Call wrap-up capability for managing post-call operations in Dynamics CRM, such as adding notes, activity and case management helps the Taxmann management to understand its customers better.

Godrej Infotech configured the master data management, that set the policies, governance and management of the master data. In addition, it integrated Microsoft Dynamics NAV, the ERP solution at Taxmann with Dynamics CRM.

"All the requisition orders and sales orders from Dynamics CRM automatically flow into Dynamics NAV and are added to the master data," states Sunita Singh, ERP Head, Taxmann. For example, an employee can use the customer information that is in Microsoft Dynamics NAV, which is synchronized with Dynamics CRM, to fill in an order form that a salesperson creates in Microsoft Dynamics CRM. "It automatically synchronizes a customer's account, contact, product, sales order and invoice information in both the applications, thus eliminating duplication of data."

The solution also provides meaningful charts and dashboards, culling out useful reports using tools such as SQL Server Reporting Services (SSRS) and SQL Server Integration Services (SSIS – for CTI reports) and creating customized forms for individual customers. Additionally, it offers tools to improve its ability to predict market trends and requirements.

Taxmann plans to integrate its website with the solution in the near future. This will assist in capturing leads and opportunities from the website as well as service requests.

Benefits

Microsoft Dynamics CRM consolidated information in a centralized system giving a precise 360-degree view of every customer. It has effectively mitigated business challenges faced earlier. "We have improved the visibility of information and processes for more predictable and manageable business operations," says Sumita.

(i)   Improves Collaboration
(ii)   Enhances Customer Service
(iii)   Increase in Revenue
(iv)   Increases Efficiency

Required:

(a) Define the Customer Relationship Management.

(b) Describe the objectives of the using of CRM applications.

(c) Explain the problem faces by the Taxmann before implementing the Customer Relationship.

(d) Discuss the steps are taken by the Taxmann to solve the problem.

(e) Describe the facilities getting from implementation of Customer Relationship Management. **[3+3+5+5+4]**

Answer:

(a) There are as many definitions for CRM as there are opinions as to what is going to happen in the stock market on the next day. At its basic core, CRM entails initiatives that surround the customer side of the business. An example is initiatives wrapped around the customers in an effort to increase sales, improve customer service, add market share, enhance customer loyalty and reduce operating costs of sales and service. At its more formal definition, CRM is a business strategy comprised of process, organizational and technical change whereby a company seeks to better manage its enterprise around its customer behaviors. It entails acquiring and deploying knowledge about customers and using this information across the various customers touch points to increase revenue and achieve cost reduction through operational efficiencies.

(b) Objectives for using CRM applications

Objectives of using CRM applications, defined in the following line:

(i) To support the customer services

(ii) To increase the effectiveness of direct sales force.

(iii) To support of business to business activities.

(c) Until 2012, Taxmann did not have any solution to automate and manage sales or service processes. They managed customer information such as call and comments in a diary or at times in Excel worksheets, based on personal preferences. The result was either duplication or data loss. Disorganized tracking and monitoring made the sales cycle longer than anticipated, thus resulting in a higher cost of sales and poor closure rate.

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(d) The company wanted a robust and centralized Customer Relationship Management (CRM) solution that would help optimize business processes, effectively plan and track sales activities to shorten the sales cycles, increase closure rates and provide quality services to its customers, thus leading to customer satisfaction.

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single system and reduces overheads, duplication and rework. Out-of-the-box features of Microsoft Dynamics CRM and integration abilities met all Taxman's requirements.

(e) Microsoft Dynamics CRM consolidated information in a centralized system giving a precise 360-degree view of every customer. It has effectively mitigated business challenges faced earlier.
- Improves Collaboration
- Enhances Customer Service
- Increase in Revenue
- Increases Efficiency

2 (a) The following information is available of a concern, calculate E.V.A.

Debt Capital 12%	₹ 2,000 crores
Equity Capital	₹ 500 crores
Reserve and Surplus	₹ 7,500 crores
Risk - free rate	9%
Beta factor	1.05
Market rate of return	19%
Equity(market) risk premium	10%
Net operating profit after tax	₹ 2,100 crores
Tax rate (say)	30%

[10]

Answer:

Calculation of NOPAT

Particulars	₹ in Crores
EBIT (2,100/70%)	3,000
Add: Interest [2,000 × 12%]	240
	3,240
Less: Tax 30%	972
NOPAT	**2,268**

Calculation of Operating Capital

Particulars	₹ in Crores
Debts	2,000
Equity Share Capital	500
Reserve and Surplus	7,500
Operating Capital	**10,000**

Calculation of WACC

$$K_d = \frac{12\% \ (1 - 0.30) \times 2,000}{10,000} = 1.68\%$$

$$K_e = \frac{[9\% + \ 1.05(10\%)] \times 8,000}{10,000} = 15.60\%$$

WACC = [15.60% + 1.68%] = 17.28%

EVA = NOPAT - (WACC × Operating Capital)
= 2,268 - (17.28% × 10,000)
= 2,268 - 1,728
= ₹ 540 crores

(b) Explain the Limitations of value chain Analysis. [5]

Answer:

Limitations of Value Chain Analysis

- **Non availability of Data :**
  Internal data on costs, revenues and assets used for Value Chain Analysis are derived from financial report of a single period. For long term strategic decision- making , changes in cost structures, market prices and capital investments etc. may not readily available.

- **Identification of Stages:**
  Identifying stages in an industry's value chain is limited by the ability to locate at least one firm that participates in a specific stage. Breaking a value stage into two or more stages when an outside firm does not compete in these stages is strictly judgmental.

- **Ascertainment of costs , Revenues and Assets :**
  Finding the Costs, Revenues and Assets for each value chain activity poses/gives rise to serious difficulties. There is no specific approach and much depends upon trial and error and experiments methods.

- **Identification of Cost Drivers**
  Isolating Cost Drivers for each value creating activity, identifying Value Chain Linkages across activities and computing supplier and customer profit margins present serious challenges.

- **Resistance from Employees:**
  Value Chain Analysis is not easily understandable to all employees and hence may face resistance from employees as well as managers.

(c) Explain about the Dual (two ways) prices in the context of the Transfer pricing. [5]

Answer:

Under this method of transfer pricing for segment performance evaluation, the transferring division is credited with one price but the acquiring division is charged at different price. The merit of this method is that it eliminates the possibility of conflict caused by a single transfer price in which case one segment receives relatively less contribution of profit because the price setting process entitles the segment to receive relatively more.

The price to be charged to the acquiring division should be based on what it costs the firm as a whole to produce and distribute the intermediate product internally under normal conditions, the appropriate incremental costs in nonrecurring situations, and full standard costs for long-run continuous situations. These prices reflect the effective cost of the resources consumed by the firm and by the segment.

For this reason, this is an appropriate basis for evaluating the performance of the user of those resources. The transferring division, on the other hand, should receive the market price for the intermediate products and if no market price exists, a negotiated price based on the market price of the final product should be used approximate the net realizable value of intermediate product. This price represents the best possible assessment of the exchange value of the intermediate product.

3 (a) State the steps for applying the VCA (Value Chain Analysis) approach to core competencies for competitive advantages. **[4]**

Answer:

(i) Validate core competencies in current businesses:

Core Competencies should tie together the portfolio of end products and help a Firm excel in dominating its industry. Core Competencies need to be continually validated, due to continuous technological developments taking place over a period of time.

(ii) Export or leverage core competencies to the Value Chains of other existing businesses:

The same set of Core Competencies can be exploited in multiple businesses by **exporting** Core Competencies to the Value Chains of other existing businesses.

(iii) Use Core Competencies to reconfigure the Value Chains of existing businesses: While Firms may manage their existing Value Chains better than their competitors, sophisticated Firms work harder on using their Core Competencies to reconfigure the Value Chain to improve payoffs. Otherwise, competitors may exploit opportunities.

(iv) Use core competencies to create new Value Chains: With strong Core Competencies in its existing businesses, a Firm can seek new customers by developing new Value Chains.

(b) Two firms are competing for business under the conditions so that one firm's gain is another firm's loss. Firm A's pay-off matrix is given below:

		Firm B		
		No advertising	**Medium advertising**	**Heavy advertising**
	No advertising	10	5	- 2
Firm A	Medium advertising	13	12	15
	Heavy advertising	16	14	10

Suggested optimum strategies for the two firms and the net outcome thereof. **[10]**

Answer:

Clearly, the first column is dominated by the second column as all the elements of the first column are greater than elements of second column. Thus eliminating first column. We get

			Firm B	
			Medium Advertising, B_2	Heavy Advertising, B_3
	No Advertising	A_1	5	-2
Firm A	Medium advertising	A_2	12	15
	Heavy advertising	A_3	14	10

Again, first row is dominated by second and third row as all the elements of first row are less than the respective elements of second, and their row. Hence eliminating first row, we obtain the following 2 x 2 pay-off matrix.

		Firm B	
		Medium Advertising, B_2	Heavy Advertising, B_3
Firm A	Medium advertising, A_2	12	15
	Heavy advertisin, A_3	14	10

The reduced 2 x 2 payoff matrix also does not have the saddle point. Thus, both the Firms A and B use mixed strategies.

For Firm A. Let p_2 and p_3 be probabilities of selecting strategy A_2 (Medium advertising) respectively. Then the expected gain to Firm A when Firm B uses its B_2 and B_3 strategies is given by:

$12p_2 + 14p_3$ and $15p_2 + 10p_3$; $p_2 + p_3 = 1$

For Firm A, the probability p_2 and p_3 should be such that expected gains under both conditions are equal, i.e.,

$12p_2 + 14p_3 = 15p_2 + 10p_3 => 12p_2 + 14 (1 - p_2) = 15 p_2 + 10 (1 - p_2)$

$$7p_2 = 4 => p_2 = \frac{4}{6} \text{ and } p_3 = 1 - p_2 = \frac{3}{7}.$$

For Firm B. Let q_2 and q_3 be probabilities of selecting strategies B_2 (Medium advertising) and strategy B_3 (Heavy advertising) respectively. Then the expected loss to Firm B when Firm A uses its B_2 and B_3 strategies should be:

$12q_2 + 15q_3 = 14q_2 + 10q_3$; $q_2 + q_3 = 1$

$=> 12q_2 + 15(1 - q_3) = 14q_2 + 10 (1 - q_2)$

$\therefore 7q_2 = 5 => q_2 = \frac{5}{7} \text{ and } q_3 = 1 - q_2 = \frac{2}{7}$

The expected gain and loss to Firm A and Firm B can be computed as shown below:

Expected gain to Firm A: $12p_2 + 14p_3 = 12 \text{ x } \frac{4}{7} + 14 \text{ x } \frac{3}{7} = \frac{90}{7}$

Expected gain to Firm B: $12q_2 + 15q_3 = 12 \text{ x } \frac{5}{7} + 15 \text{ x } \frac{2}{7} = \frac{90}{7}$

Hence the optimum strategies for the two firms are:

	No advertising	Medium advertising	Heavy advertising
$S_A =$	0	$\frac{4}{7}$	$\frac{3}{7}$

	No advertising	Medium advertising	Heavy advertising

$$S_B = \begin{bmatrix} 0 & \dfrac{5}{7} & \dfrac{2}{7} \end{bmatrix}$$

And the value of the game is $V = \dfrac{90}{7}$.

<p align="center">Firm B</p>

		Medium Advertising, B_2	Heavy Advertising, B_3
Firm A	A_2	12	15
	A_3	14	10

$14 - 10 = 4, \ P(A_2) = \dfrac{4}{4+3} = \dfrac{4}{7}$

$15 - 12 = 3, \ P(A_3) = \dfrac{3}{4+3} = \dfrac{3}{7}$

$15 - 10 = 5 \qquad\qquad 14 - 12 = 2$

$P(B_2) = \dfrac{5}{5+2} = \dfrac{5}{7} \qquad P(B_3) = \dfrac{2}{5+2} = \dfrac{2}{7}$

Hence, Firm, A should adopt strategies A_2 and A_3 with 57% of time and 43% of time respectively, (or with 57% and 43% probability on any one play of the game respectively). Similarly, Firm B should adopt strategies B_2 and B_3 with 71% of time and 29% of time respectively (or with 71% and 29% probability on any one play of the game respectively).

Expected gain of Firm A	Expected gain of Firm B
(i) $\quad 12 \times \dfrac{4}{7} + 14 \times \dfrac{3}{7} = \dfrac{90}{7}$ Firm B adopts B_2	(i) $\quad 12 \times \dfrac{5}{7} + 15 \times \dfrac{2}{7} = \dfrac{90}{7}$ Firm A adopts A_2
(ii) $\quad 15 \times \dfrac{4}{7} + 10 \times \dfrac{3}{7} = \dfrac{90}{7}$ Firm B adopts B_3	(ii) $\quad 14 \times \dfrac{5}{7} + 15 \times \dfrac{2}{7} = \dfrac{90}{7}$ Firm A adopts A_3

(c) List the steps in Strategic Benchtrading. [6]

Answer:

- Firstly the market is defined by determining its size, customer preferences, competitors and relative business position of the company within the market.

- The industry direction, technology shifts, geopolitical changes, customer changes and potential threats from outside sources are assessed.

- The strongest current and potential competitors are then determined by evaluating the trends in industry.

- Data on performance of competitors is gathered and the current and future performance of the unit is compared with that of its competitor.

- A performance baseline for the business units is then established and the relative performance of current and projected competition is estimated.

- A set of initiatives which form the basis of an improvement plan are identified to maintain strengths while reducing projected gaps.

For instance Indian Auto companies must plan to design their products to meet Euro III standards which will become the order of the day. Even a company like Microsoft was late in spotting the emergence of the Internet, though it woke up in time to change gear and adapt to the requirements of the new technology.

4 (a) A radio manufacturer produces 'x' sets per week at total cost of ₹ x^2 + 78x + 2500. He is a monopolist and the demand function for his product is x = (600 – P) /8, when the price is 'p' per set. Show that maximum net revenue is obtained when 29 sets are produced per week. What is the monopoly price? [6]

Answer:

Cost (C) = x^2 + 78x + 2500

Demand (D) X = (600 – P) / 8

8x = 600 – P

∴P = 600 – 8x

Total Revenue for 'x' sets

Price x Quantity i.e., 600x – $8x^2$

Maximum revenue is obtains at MC = MR

Marginal Cost = dc/ dx = 2x + 78 – (i)

Marginal Revenue = dr/ dx = 600 – 16x – (ii)

Equity (i) & (ii)

2x +78 = 600 – 16x

Or, 18x = 522

∴ x = 522/ 18 = 29

Monopoly price 600 – 8x

600 – 8 × 29

= 600 – 232 = 368

(b) The total revenue from sale of 'x' units is given by the equation R = 100x – $2x^2$, calculate the point price elasticity of demand, when marginal revenue is 20. [5]

Answer:

R = 100x – $2x^2$

Price = 100 – 2x

MR = dR /dx = 100 – 4x

$\dfrac{p}{x} = \dfrac{100}{x} - 2$

$\dfrac{dp}{dx} = -2 = \dfrac{dx}{dp} = \dfrac{1}{2}$

$E_p = 1/2 \times (100 /x - 2)$

= 50 /x −1

= 50 /20 –1

= 5/2 –1

$= \dfrac{5-2}{2} = 3/2$

100 – 4x = 20

4x = 80

x = 20

(c) Discuss the factors influencing price of a product. **[9]**

Answer:
Factors Influencing Price of a Product
Generally, marketers consider the following factors in setting price:

• **Target customers:** Price of product depends on the capacity of buyers to buy at various prices, in other words, influence of price elasticity of demand will be examined.

• **Cost of the product:** Pricing is primarily based on, how much it costs to produce and market the product, i.e., both the production and distribution cost.

• **Competition:** Severe competition may indicate a lower price than when there is monopoly or little competition.

• **The law:** Government authorities place numerous restrictions on pricing activities.

• **Social responsibility:** Pricing affects many parties, including employees, shareholders and the public at large. These should be considered in pricing.

• **Market position of the firm:** The position of the market may also influence the pricing decision of the firm. It is only why the different producers of identical products sell their products at different prices.

• **Distribution channel policy:** The prices of products will also depend upon the policy regarding distribution channel. The longer the channel, the higher would be the distribution costs and consequently higher the prices.

• **Price elasticity of Demand:** Price elasticity refers to consequential change in demand due to change in price of the commodity. It is the relative responsiveness to the changes in price. As there an inverse relationship between price and demand for product, the demand will increase with fall in price.

• **Economic environment:** In recession, prices are reduced to a sizeable extent to maintain the level of turnover. On the other hand, prices are charged higher in boom period to cover the increasing cost of production and distribution.

Section B
[Answers any 2 Questions]

5 (a) Explain the 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.

(b) "Artificial neuron is a basic building block of every artificial neural network. Its design and functionalities are derived from observation of a biological neuron" –Explain the Statement. **[5]**

Answer:

This statement describe about the Artificial Neuron. Artificial neuron is a basic building block of every artificial neural network. Its design and functionalities are derived from observation of a biological neuron that is basic building block of biological neural networks (systems) which includes the brain, spinal cord and peripheral ganglia. Similarities in design and functionalities can be seen in the figure below, where the left side of a figure represents a biological neuron with its soma, dendrites and axon and where the right side of a figure represents an artificial neuron with its inputs, weights, transfer function, bias and outputs.
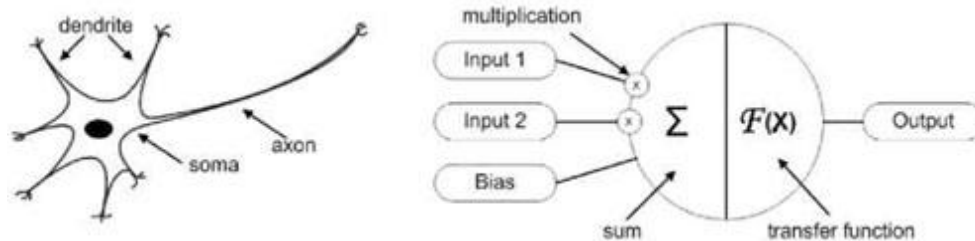
Biological and Artificial Neuron Design

In case of biological neuron information comes into the neuron via dendrite, soma processes the information and passes it on via axon. In case of artificial neuron the information comes into the body of an artificial neuron via inputs that are weighted (each input can be individually multiplied with a weight). The body of an artificial neuron then sums the weighted inputs, bias and "processes" the sum with a transfer function. At the end an artificial neuron passes the processed information via output(s). Benefit of artificial neuron model simplicity can be seen in its mathematical description below:

$$Y(k) = F\left(\sum_{i=0}^{m} w_i(k)\, x_i(k) + b\right)$$

Where:
- ❖ X_i (k) is input value in discrete time k where i goes from 0 to m,
- ❖ W_i (k) is weight value in discrete time k where i goes from 0 to m,
- ❖ b is bias,
- ❖ F is a transfer function,
- ❖ y_i (k) is output value in discrete time k.

As seen from a model of an artificial neuron and its above equation the major unknown variable of our model is its transfer function. Transfer function defines the properties of artificial neuron and can be any mathematical function. We choose it on the basis of problem that artificial neuron (artificial neural network) needs to solve and in most cases we choose it from the following set of functions: Step function, Linear function and Non-linear (Sigmoid) function.

Step function is binary function that has only two possible output values (e.g. zero and one). That means if input value meets specific threshold the output value results in one value and if specific threshold is not meet that results in different output value.

When this type of transfer function is used in artificial neuron we call this artificial neuron perceptron. Perceptron is used for solving classification problems and as such it can be most commonly found in the last layer of artificial neural networks. In case of linear transfer function artificial neuron is doing simple linear transformation over the sum of weighted inputs and bias. Such an artificial neuron is in contrast to perceptron most commonly used in the input layer of artificial neural networks. When we use non-linear function the sigmoid function is the most commonly used. Sigmoid function has easily calculated derivate, which can be important when calculating weight updates in the artificial neural network.

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 (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.

(b) Mention the characteristics of Data warehouses. **[5]**

Answer:

The Data Warehouse is a collection of integrated, subject-oriented databases designed to support the Decision-Support Functions (DSF), where each unit of data is relevant to some moment in time. A Data Warehouse includes the following categories of data, where the classification is accommodated to the time-dependent data sources:

    (i) Old detail data

    (ii) Current (new) detail data

    (iii) Lightly summarized data

    (iv) Highly summarized data

    (v) Metadata (the data directory or guide).

To prepare these five types of elementary or derived data in a Data Warehouse, the fundamental types of data transformation are standardized. There are four main types of transformations, and each has its own characteristics:

(i) Simple Transformations - These transformations are the building blocks of all other more complex transformations. This category includes manipulation of data that is focused on one field at a time, without taking into account its values in related fields. Examples include changing the data type of a field or replacing an encoded field value with a decoded value.

(ii) Cleansing and Scrubbing - These transformations ensure consistent formatting and usage of a field, or of related groups of fields. This can include a proper formatting of address information, for example. This class of transformations also includes checks for valid values in a particular field, usually checking the range or choosing from an enumerated list.

(iii) Integration - This is a process of taking operational data from one or more sources and mapping it, field by field, onto a new data structure in the data warehouse. The common identifier problem is one of the most difficult integration issues in building a data warehouse. Essentially, this situation occurs when there are multiple system sources for the same entities and there is no clear way to identify those entities as the same. This is a challenging problem, and in many cases it cannot be solved in an automated fashion. It frequently requires sophisticated algorithms to pair up probable matches. Another complex data-integration scenario occurs when there are multiple sources for the same data element. In reality, it is common that some of these values are contradictory, and resolving a conflict is not a straightforward process. Just as difficult as having conflicting values is having no value for a data element in a warehouse. All these problems and corresponding automatic or semiautomatic solutions are always domain-dependent.

(iv) Aggregation and Summarization - These are methods of condensing instances of data found in the operational environment into fewer instances in the warehouse environment. Although the terms aggregation and summarization are often used interchangeably in the literature, we believe that they do have slightly different meanings in the data-warehouse context. Summarization is a simple addition of values along one or more data dimensions; e.g., adding up daily sales to produce monthly sales. Aggregation refers to the addition of different business elements into a common total; it is highly domain-dependent. For example, aggregation is adding daily product sales and monthly consulting sales to get the combined, monthly total.

7. Define the following terms in the context of Supply Chain Management:
(i) Capacity Management, (ii) Customer Relationship Management , (iii) Customer Value,(iv) Information Sharing , (v) Lean Manufacturing.   [2×5]

Answer:

(i) 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.

(ii) 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.

(iii) 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.

(iv) 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.

(v) Lean Manufacturing

A philosophy of production that emphasizes the minimization of the amount of all the resources (including time) used in the various activities of the enterprise. It involves identifying and eliminating non-value-adding activities in design, production, supply chain management, and dealing with the customers. Lean producers employ teams of multi skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in potentially enormous variety. It contains a set of principles and practices to reduce cost through the relentless removal of waste and through the simplification of all manufacturing and support processes.

Section C
[Answers any 2 Questions]

8 (a) Explain the Logit model in the context of corporate Bankruptcy Prediction Model.   [4]

Answer:

Under logit, the dichotomous dependent variable is simply the logarithm of the odds that a particular event (fail/non-fail) will occur. That is, here modelling of the 'log odds' of belonging to a group is pursued, rather than modelling the group membership itself.

Although it would be possible to model the odds, it is simpler to model the log (natural log, ln) of the odds [ln (odd) = ln (P / 1-P)]. This transformation into natural log, allows the dependent variable to take any value between negative infinity and positive infinity. In this way, the dependent variable becomes continuous too, rather than discrete. Now, [B] can be written in the logistic regression functional form as:

$\ln(P/1-P) = \beta_1 + \beta_2 X_i + \mu_i$ .... [C]

Hence, the probability that an event may occur, failure of firm in this case, is given by:

$$P = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_1)}}$$ ....[D]

[D] is estimated using Maximum Likelihood method. Assuming that 0 indicates bankruptcy, the greater the resulting decimal fraction is above 0.5 (which implies an equal chance of a company being a failure or non-failure), the less chance there is of the subject firm going bankrupt.

(b) Define the term "Enterprise Risk Management". Why "Enterprise Risk Management" is needed?   [3+3]

Answer:

Enterprise Risk Management:

The Enterprise Risk Management (ERM) is defined as "a process, affected by an entity's Board of Directors, management and other personnel, applied in strategy setting across the enterprise". It is designed to identify potential events that may affect the entity and manage risk to be within its risk appetite.

ERM provides reasonable assurance regarding the achievement of entity objectives. Thus, ERM is:

(a) A process, ongoing and following through an entity.
(b) Effected by people at every level of an organization.
(c) Is applied in Strategy-setting
(d) Designed to identify potential events affecting the entity and manage risk within its risk appetite.

ERM is about designing and implementing capabilities for managing the risks that matter. It deals with risk and opportunities affecting value creation or preservation.

ERM is about establishing the oversight, control and discipline to drive continuous improvement of an entity's risk management capabilities in a changing operating environment.

Need for ERM:

ERM needs to be implemented for the following reasons:

(i)   Reduce unacceptable performance variability
(ii) Align and integrate varying views of risk management.
(iii) Build confidence of investment community and stake-holders.
(iv) Enhances corporate governance.
(v)   Successfully respond to a changing business environment
(vi) Align strategy and corporate culture.

9. (a) Discuss the leading indicators for sickness of a company. **[5]**

Answer:

Leading Indicators for Sickness of a Company:

➢ Just as diseases are identified by certain symptoms, industrial sickness can be identified by the following symptoms:
➢ Continuous reduction in turn-over.
➢ Piling up of inventory
➢ Continuous reduction of net profit to sales ratio.
➢ Continuous cash losses, leading to erosion of tangible net worth.
➢ Default in payment of interest on borrowings and default in repayment of term loan installments.
➢ The 'sundry debtors' as well as the 'sundry creditors' keep growing and reaching a disproportionately high level
➢ Approaching the banker for temporary overdraft at frequent intervals.
➢ High turnover of personnel, especially at senior levels.
➢ Change in accounting procedure with a view to window dressing.
➢ Delay in finalization of accounts

(b) Mention the objectives of GACAP. **[5]**

Answer:

The objectives of this document are;

(i) to codify the GACAP as applied in the Indian industry;
(ii) to narrow down diversities in cost accounting practices facilitating the process   of development of cost accounting standards;
(iii) to provide a reference source to industry and practitioners in preparation and attestation of Cost Statements, where specific cost accounting standards are yet to be issued;
(iv) to provide a reference source to all the stakeholders in the understanding and interpreting the cost statement; to provide a base for monitoring the evolution of new concepts and practices in cost accounting and to codify them as and when they become generally accepted;

10. State the different Strategic Decision for Risk Management. **[10]**

Answer:

Strategic Decision for Risk Management:

The following are the different Strategic decisions for Risk Management:

➢ **Risk Handling**: In ideal risk management, a prioritization process is followed, whereby risks with the greatest loss and the greatest probability of occurring are handled first and risks with lower probability loss are handled later.

➢ **Risk Reduction**: This strategy is attempted to decrease the quantum of losses arising out of a risky happening e.g., earthquake, storm, flood etc.,

➢ **Risk Avoidance**: This strategy results in complete elimination of exposure to loss due to a specific risk. It may involve avoidance of an activity, which is risky.

➢ **Risk Retention**: This strategy is adopted when risk cannot be avoided, reduced or transferred. It involves accepting the loss when it occurs by taking risky proposal or risky assignment where there are no other alternatives to avoid risk.

➢ **Risk Transfer:** It means causing another party to accept the risk. It involves a process of

shifting risk responsibility on others. Insurance is one type of Risk Transfer

- ➢ **Risk Hedging**: It is a systematic process of reducing risk associated with an investment proposal or in some other assignments, where risk is inevitable.

- ➢ **Risk Diversification**: It involves identifying both systematic and unsystematic risks.

- ➢ **Risk Sharing**: Taking an insurance coverage for the exposure is the common method of sharing risk

- ➢ **Risk pooling**: It is the process of identification of separate risks and put them all together in a single blanket, so that the monitoring, integrating or diversifying risk can be implemented.