



**III Semester M.B.A. (Day & Eve.) Examination, June/July 2024
(CBCS) (2022 – 23)**

MANAGEMENT

**Paper – 3.11.2 : Advanced Statistical Methods for
Business Decision Making**

Time : 3 Hours

Max. Marks : 70

SECTION – A

Answer **any five** out of the following questions. **Each** question carries **5** marks.

(5×5=25)

1. How do you calculate measures of central tendency ? And what do they indicate about a dataset ?
2. How does the Chi-square distribution differ from other probability distributions and what are its applications ?
3. What is the purpose of regression analysis in business decision making ? Provide examples of its applications.
4. Discuss some real-world scenarios where logistic regression is commonly used for decision making.
5. What are some challenges or limitations associated with dimension reduction techniques and how can they be addressed ?
6. A company is interested in understanding the average satisfaction level of its customers. It collects feedback scores from a sample of 100 customers and finds a mean satisfaction score of 4.5 with a standard deviation of 0.8. Test whether this mean satisfaction score is significantly different from 4.0 using a hypothesis testing approach.
7. Explain the concept of Confirmatory Factor Analysis (CFA) and its role in validating measurement models.



SECTION – B

Answer **any three** out of the following questions. **Each** question carries **10** marks.

(3×10=30)

8. Discuss the various methods of data collection and presentation. Which method would you choose for a business survey and why ?
9. What is out-of-sample testing and why is it important in evaluating the predictive accuracy of a regression model ?
10. A bank wants to predict whether a loan applicant will default on their loan based on their credit score, income and debt-to-income ratio. Using historical data, they build a logistic regression model and obtain the following coefficients: Credit Score (0.02), Income (– 0.005), Debt-to-Income Ratio (0.08). Interpret the coefficients and predict the probability of default for an applicant with a credit score of 700, income of 50,000 and debt-to-income ratio of 0.4.
11. Discuss the steps involved in conducting a structural equation modeling analysis from model specification to interpretation of results.

SECTION – C

12. Case study (**Compulsory** Question).

(1×15=15)

In a rapidly evolving market landscape, a multinational retail corporation found itself grappling with fluctuating sales figures across its various store locations. Seeking to uncover the underlying factors driving these fluctuations, the company embarked on a comprehensive analysis of cross-sectional data using regression techniques. Their dataset encompassed a wide array of variables, including store size, geographical location, promotional activities, competitor presence and economic indicators. Leveraging linear regression analysis, the company aimed to discern the extent to which these factors influenced sales performance. As the analysis unfolded, it became evident that store size exerted a significant impact on sales, with larger stores consistently outperforming their smaller counterparts. Moreover, the proximity to competitors emerged as a crucial determinant, with stores situated in close proximity to competitors experiencing a notable decline in sales. However, the influence of promotional activities proved to be more nuanced, with certain campaigns yielding substantial sales uplift while others failed to resonate with customers. Armed with these insights, the company



devised tailored strategies for optimizing store performance, including targeted expansion plans, localized marketing initiatives and refined promotional tactics. Yet, amidst the data-driven decision-making process, challenges arose in the form of multicollinearity, necessitating careful consideration and remediation to ensure the reliability of regression estimates. Despite these challenges, the company's commitment to harnessing the power of regression analysis proved instrumental in driving strategic growth and enhancing competitiveness in the dynamic retail landscape.

Questions :

- a) How did the multinational retail corporation utilize regression analysis to address its challenges with fluctuating sales figures ?
 - b) What were the key findings from the regression analysis regarding the factors influencing sales performance ?
 - c) How did the company overcome challenges such as multicollinearity during the regression analysis process and what strategies did they employ to ensure the reliability of their findings ?
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