

A Study of Application of Mathematics in Commerce And Business Management

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ABSTRACT

Mathematics is the queen of science, as its name suggest it is used everywhere. In electronic games, automatic teller machines weather forecasting opinion polls, analysis of statistical data and many more .Both Mathematics and statistics have a very important role in many fields like economics, Chemistry, Commerce, Physics, Astronomy, Psychology, Biology. So it is application is extended to large fields. It is useful in the field of business management and commerce.

This work shows to pay attention to the some of the important topics, Algebra, Operational research, Matrices, Linear algebra, Calculus, Probability and Statistics that plays important role in commerce and business management.

KEYWORDS: Mathematics, Business and commerce.

1. INTRODUCTION

In every part of the studies commerce, business management, medical, engineering, Astronomy, Physics, Biology and chemistry. Mathematics is the most important subjects which increase ability of someone in problem solving, reasoning and logical thinking. Mathematics is the primary element and it is proved to be very useful in the field of business, in today's era of globalisation. Business organisation use mathematics in accounting[*cost, corporate, financial*][*karatzas and Shreve,1998*].It is difficult and helpless in business and commerce without mathematics.

APPLICATION OF MATHEMATICS IN BUSINESS AND COMMERCE

Mathematics is used in every field of our day to day life. In business , to obtain profit it involves buying and selling of goods. Business organization use mathematics to summarise, classify, analyse and record the transactions in business. So the business organization use simple mathematics such as percentages, decimals, probability etc. Advanced mathematics such as algebra, calculus, linear programming, are used by the business organization now a days. Some of its practical application include mark ups, markdowns, simple and compound interest , payroll calculations forecasting the prices, discounts and sales, reducing wastage of resources(*Shukla and Veer, 2009*[2]).

Some of the mathematical application in commerce and business management are listed below.

ALGEBRA

We need mathematical principles, to study accounting. To compare income, cost, profit, expenses, we need mathematical formulas. For percentages, equations and ratios various formulae are derived. Derivations of ratios include debt equity ratio, debtor turnover ratio, inventory turnover ratio profitability ratios. In deriving accounting equations we use mathematics.

In accounting the basic concept is the assets which is the total wealth of business.

The two claims that are possible on assets (A) are called the capital (C) and the liabilities (L). The mathematical relation $A=L+C$ is used by the accountants to take decisions regarding , buying the products and manufacturing.

In business, the formula for the total cost is $T=a+bx$; where a is the fixed cost , x is the number of produced units, b is the per unit produced cost and T is the total cost. By subtracting the total cost from the total revenue we obtain the profits.

Accountants use percentage and addition for the prices of the product to be determined.

OPERATIONAL RESEARCH

OR deals with determination of maximum (yields, performances, profit) minimum(cost, Risk, loss). It involves linear programming problems, PERT, CPM, formulation techniques, problems in transportations, to achieve best outcomes. The industries which use Lp model include energy, transportation, manufacturing and telecommunication.

CALCULUS

Integral calculus and differential calculus are also branches of mathematics.

To calculate minimum cost and maximum profit we use differential calculus .

The mathematical relation given by,

$$C(x)=F+V(x)$$

Where cost function is the $C(x)$, $V(x)$ is the variable cost and f is fixed cost; which is used to calculate total production cost and management. Another relation, $R(x)=xP(x)$, where $R(x)$ is the revenue function , $P(x)$ is the rate per unit and 'x' is number of units.

To make important production decisions we use derivatives, also called marginal function. For making decisions in production in business and management it is very useful (eg. Supply of raw materials, wage rates and taxes).

In calculus, the case when y is the function of x or we can say one variable (y) is dependent on other variable (x) and the derivative of ' y ' with respect to x that is dy/dx measures the change of variable ' y ' with respect to change in variable ' x '.

To calculate the total revenue when marginal revenues are given we use integral operator. So calculus plays a very important role in business which deals with taxes, profit and revenues collections.

MATRIX AND LINEAR ALGEBRA

To deal with various sectors of industry knowledge of matrix is needed. It provides opportunities to finance and logistics management and customer relationship. Cramer rule and determinants are used to solve problems in business and economy. It also helps in obtaining optimal solution to minimize cost or maximize the profit. Another powerful tool in application in business is the linear algebra.

The supply, revenues, population, demands, total cost, are all related with linear equations. Leontief (1987) [3] derived a production equation in input and output analysis and got noble prize for his contribution. The model given by him, was $X=cx+d$, where c is the consumption matrix, d is the demand vector and x is the production factor.

If matrix $I-C$ is invertible then appropriate production for a given final demand can be computed directly $X=(I-C)^{-1}d$. This is basic input-output analysis is a powerful tool (Miller and Blair 2009)[4]. It is used to predict what happens to an economy when final demand changes.

STATISTICS AND PROBABILITY

Statistics formulates various policies and plans. It also forecasts trends of future like market fluctuations, change in demand. There is uncertainty in future events so to predict uncertainties we use probabilities. Probability is an important tool in order to forecast sales scenario, future returns and evaluation for the risks in business world. Probability theory is a very useful tool for decision making, expected sales, and policies in business.

By the use of techniques in statistics (regression), the fashion industry applies probability theory since their line of business was more prone to chance occurrence (Orga and Ogbo, 2012)[6]. Levine and Zervos (1998) [5] tried to find empirical relationship between various measures.

Probability is unavoidable in the era of information overload because of ICT. Finally both statistics and probability are very useful in taking decisions, related to finance, production and marketing in an industry.

2. CONCLUSION

Thus we find from the above, how mathematical methods and its tools play a very important role in business organisations.

The estimation of future returns and profitability is done by probability. Formulas in mathematics is helpful in business to perform financial analysis which uses percentages, ratios as well as equations. Minimizing cost and maximizing profit is achieved by calculus and linear programming.

Statistics help in collection presentation and analysis of data to arrive at the conclusions. (Chiang and Storey, 2012)[7].

Matrices play important role in variety of solutions for logistics management and consumer relationship.

From the above, we come to a conclusion that knowledge of mathematics is very important and compulsory for students of commerce and management.

3. REFERENCES

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