

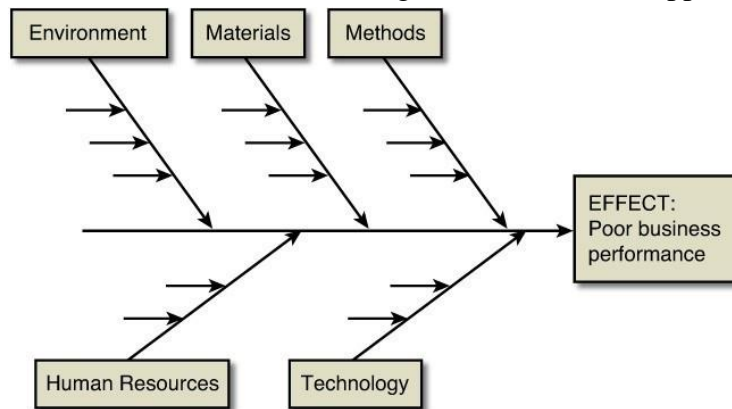
Logic and Data Driven Models

Logic-Driven Models

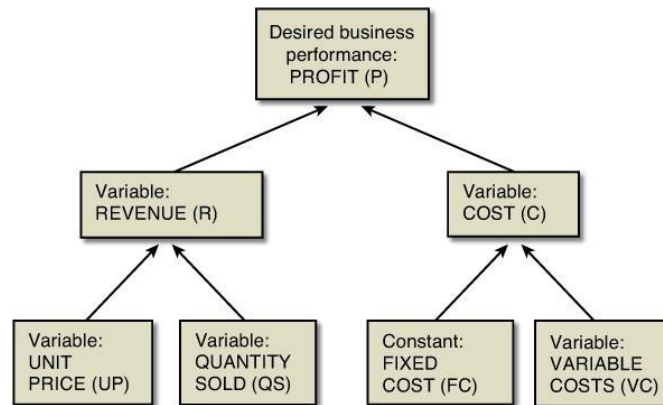
Logic driven models are created on the basis of inferences and postulations which the sample space and existing conditions provide. Creating logical models require solid understanding of business functional areas, logical skills to evaluate the propositions better and knowledge of business practices and research.

To understand better, let us take an example of a customer who visits a restaurant around six times in a year and spends around ₹5000 per visit. The restaurant gets around 40% margin on per visit billing amount. The annual gross profit on that customer turns out to be $5000 \times 6 \times 0.40 = ₹12000$. 30% of the customers do not return each year, while 70% do return to provide more business to the restaurant.

A logic-driven model is one based on experience, knowledge, and logical relationships of variables and constants connected to the desired business performance outcome situation. The question here is how to put variables and constants together to create a model that can predict the future. Doing this requires business experience. Model building requires an understanding of business systems and the relationships of variables and constants that seek to generate a desirable business performance outcome. To help conceptualize the relationships inherent in a business system, diagramming methods can be helpful. For example, the cause-and-effect diagram is a visual aid diagram that permits a user to hypothesize relationships between potential causes of an outcome. This diagram lists potential causes in terms of human, technology, policy, and process resources in an effort to establish some basic relationships that impact business performance. The diagram is used by tracing contributing and relational factors from the desired business performance goal back to possible causes, thus allowing the user to better picture sources of potential causes that could affect the performance. This diagram is sometimes referred to as a fishbone diagram because of its appearance.



Another useful diagram to conceptualize potential relationships with business performance variables is called the influence diagram. According to Evans, influence diagrams can be useful to conceptualize the relationships of variables in the development of models. It maps the relationship of variables and a constant to the desired business performance outcome of profit. From such a diagram, it is easy to convert the information into a quantitative model with constants and variables that define profit in this situation:



Profit = Revenue – Cost, or

Profit = (Unit Price × Quantity Sold) - [(Fixed Cost) + (Variable Cost × Quantity Sold)], or

$$P = (UP \times QS) - [FC + (VC \times QS)]$$

Data-Driven Models

Logic-driven modeling is often used as a first step to establish relationships through data-driven models (using data collected from many sources to quantitatively establish model relationships). Types

Sampling & Estimation

Sampling is the selection of a subset or a statistical sample (termed sample for short) of individuals from within a statistical population to estimate characteristics of the whole population. The subset is meant to reflect the whole population and statisticians attempt to collect samples that are representative of the population. Sampling has lower costs and faster data collection compared to recording data from the entire population, and thus, it can provide insights in cases where it is infeasible to measure an entire population.

Estimation in statistics are any procedures used to calculate the value of a population drawn from observations within a sample size drawn from that population.

Regression Analysis

Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables. It can be utilized to assess the strength of the relationship between variables and for modeling the future relationship between them.

Correlation Analysis

Correlation Analysis is statistical method that is used to discover if there is a relationship between two variables/datasets, and how strong that relationship may be.

Probability Distribution

The probability distribution gives the possibility of each outcome of a random experiment or event. It provides the probabilities of different possible occurrences.