Demand Pattern

- Amount of stock, which is to be maintained, depends upon the consumption or use of a commodity. It is of two types.
- **Deterministic Demand Pattern:** In this type of demand pattern, the quantity needed over successive periods of time is known with certainty.
- **Probabilistic or Non-deterministic or stochastic Demand Pattern:** In this type of demand pattern, the demand needed over certain period of time is not known with certainty. It may be described by the probability distribution.
- Most of the inventory models have been formulated in a **static** environment considering demand rates as **constant**.
- Demand rate can be **dynamic** and it can depend upon single or several factors, like, time, stock, selling price etc.

Dynamic demand pattern can be classified in several ways

Time dependent demand pattern

- It is very obvious a fact that given some time, every item can create a niche for itself in the customer's mind, hence increasing its demand with the passage of time.
- Many items of inventory such as electronic products, fashionable clothes, food products and domestic goods generate increasing sales after gaining consumer's acceptance.
- The sales for the other products may **decline** drastically due to the introduction of more competitive products or due to the change of consumer's preferences.

- Therefore the demand of the product during its growth and decline phases can be well approximated by time-dependent function.
- Time dependent demand pattern can be taken such as **linear, quadratic, cubic, exponential or some other suitable function of time**. It can be increasing or decreasing with respect to time.
- The main limitations in linear-time varying demand rate is that it implies a uniform change in the demand rate per unit time.
- For some newly introduced popular inventory product a demand rate that changes exponentially with time can be taken for some period. For seasonal products like clothes, Air conditions etc. at the end of their seasons the demand of these items is observed to be exponentially decreasing for some initial period.
- EOQ and EOQ model can be extended the time varying demand patterns.

Ramp type demand pattern

- For newly launched fashionable products in the market the demand is observed to be exponentially increasing for some initial period if the customers are satisfied with its quality and price. Afterwards, the demand for the product becomes steady rather than increasing exponentially. Such kind of demand pattern is known as **ramp type** function of time.
- In real life, when a product is launched in the market, initially demand is increased rapidly as time progresses. After a certain time the rate of progress diminishes but the effect of rate of change in demand continues for a while before assuming steadiness. Demand for chips of high configure computers, spare parts of new airplanes, electronic goods, fashionable products, etc, initially, when comes in the market, increases rapidly with time never

continued indefinitely rather follows the demand pattern cited above. The demand would be illustrated by three successive time period classified time dependent function, in which in the first phase the demand increases with time and after that it becomes steady and towards the end in the final fase it decreases. Such a demand pattern is known as **trapezoidal type demand pattern.**

Stock dependent demand pattern

- With the advent of supermarkets, it was commonly acknowledged that vast displays of **stocks** induce the customer into buying more.
- It is commonly believe that large piles of goods displayed in the super market will lead the customer to buy more. In the present business scenario, a product becomes widely popular in the society, when it is antagonistically promoted through the mass media and/or by the attractive display of items in the showroom at market place.
- Normally customers are motivated to buy more units of items due to glamorous display of those items in large numbers with the help of modern light and electronic arrangements. Observing this tactic, many researchers have been attracted to investigate its modeling aspects.
- Also it was noted that a decline in the level of displayed stock witnessed a decline in the customer's demand for that item. This gave birth to the concept of **stock dependent demand**.

Selling price dependent demand

- The dependence of the sale of any item on its **selling price** is not a new concept, but a common sense conclusion.

- It is a general observation that an increase in the selling price of the commodity will deter its customer's from opting that item in future.
- However, a dip in the selling price, in whatever form it may come, always notices a sudden increase in the demand rate, as a reduction in prices encourages the customers to buy more.

Demand as a combination of two or more factors

- Changing market conditions have rendered the dependence of demand rate on a single factor is some time not suitable.
- Since in some real life situation, a demand rate cannot depend exclusively on a single parameter. It is sometime observed that a surge or decline in the demand is attributed to a combination of **two or more factors**.
- Such a combination of two or more factors grants more authenticity to the formulation of the model and makes it more close to reality.