

Managing disruptive Technologies

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Bass Diffusion Model

The bass diffusion model describes how new products are adopted in the market. It is widely used for sales forecasting and is based on how current adopters and new adopters of a product interact. The bass diffusion curve describes the number of adopters over time.

A bass diffusion model can be written as:

$$D(t) = D(t-1) + (\beta + \gamma D(t-1)/N)(N - D(t-1))$$

(a) The role and impact of parameter β in the diffusion of a product

A diffusion model for a total market size of N will have: $D(t)$ adopters and $N - D(t)$ non-adopters at a given time t . There is always a central source (for instance, marketing) that aims to convert non-adopters to adopters. This central source is written as β in the above equation. β is also referred to as the coefficient of innovation, external influence, or advertising effect.

This central source β forms the basis of spreading the news of the product to a large number of people. It plays an important role in the adoption of the product because the stronger the central source, the faster the adoption of a product. It transmits positive information about a product to $\beta\%$ of the entire population of consumers every time period.

In a broadcast diffusion model with only a central source and no information sharing (as discussed in part b), the diffusion curve is not S-shaped (as seen for the sale of most products).

(b) The role and impact of parameter γ in the diffusion of a product

Continuing, our discussion in part (a), the central source is not the only source for people to adopt a new product. Information sharing among people through the word of mouth or social media influence also brings new adopters for a product. This is also called the coefficient of imitation and is written as γ in the above equation. It is important in the diffusion model because information sharing increases the probability of adoption by γ .

In a diffusion model with both the central source and information sharing as parameters, the diffusion curve is S-shaped (as seen for the sale of most products). Thus, we can say that γ is very important in the diffusion of a product to have a realistic estimate of sales or adoption.

(c) The role and impact of parameter $r = \beta / (\beta + \gamma)$ in the diffusion of a product

So far, we have studied that there are two channels of adoption, central source and information sharing. r is the relative channel strength and helps to determine the better channel. It helps the company determine if the central source or information sharing is more powerful and in turn helps them decide the better channel of marketing, thus increasing their sales.

With the use of $\beta + \gamma$, we calculate the relative channel strength using the formula: $r = \beta / (\beta + \gamma)$. This helps us to determine if the central source or information sharing is the more powerful channel for adoption.

If r is nearly 0 or very small, the company should consider information sharing as its primary channel of adoption. However, if r is nearly one, the company should consider a central source as their primary channel of adoption. Thus, we can say that r is important to determine the correct channel through which a company can increase its sales.