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# Introduction

The world of internet is progressing towards making individuals’ life easier to live. It does it by means of various appliances, gadgets and online services by which an individual can either take his products to the world or get benefitted by the ones provided online by others. In the shopping world too, the benefits are realized by society, where not only customers are happy buying their needs online at competitive prices but merchants also are able to reach to very large volume of customers and hence able to register large profits through big volume turnover.

Retail shopping portals provide customers an ability to choose their products from among thousands of options available and make them buy these online with hassle free home deliveries. They also provide ability to return some goods if not found suitable to one’s choice. Retail giants are offering lucrative discounts and cash back options in order to be ahead of their competitors. Merchants can do that because they have reached to the remotest customer in the region who carries a smartphone, which makes them deal with huge volume of goods. So gaining even a smallest profit per unit of sale enables them to earn huge profit figures. Sharing some portion of their gains with customers helps increasing the customer base as well as customer affinity further and this cycle continues.

Along with these “e” initiatives there are parallel initiatives such as “curbside” are also picking up well. A person can place an order to the third party agency through their mobile app/website, mentioning the name of the retail outlet/mall(s) of choice and, can receive his/her package on the way home by roadside “curbside” outlet. He saves significant time in finding closer parking for his car, spending few hours together in the mall as well as in the billing line every day/week/month and still have control on what is he buying and from where he wishes to buy.

The most important benefit of both these initiatives is, “lot of valuable time” that a person can save which he can spend on “better things”.

Growth of such initiatives clearly indicates that customer’s convenience is playing major role in growth of e initiative as well as hybrid initiative. The notion of “Time is money” for a customer is really playing very well for the merchants. Any innovations which will add value to the customer convenience are going to be the key to the profound success in retail business.

It is giving rise to tougher competitions. Though competitions are posing bigger challenges in front of merchants, they are benefitting the customers as they are getting more options to choose from. They can carefully compare the prices being offered by different competitors and choose their supplier based on the lowest price offers for the desired brands.

Merchants are making all efforts, to get their existing customers remain associated with them for any of their shopping needs. But due to price wars and competitive quality of service customers may not be in a position to appreciate the affinity with a single merchant.

## Product Categories.

Since the business is revolving around buying needs of customers, it would be wise to categorize various products as per the buying needs they generate among their customers. Following broad categories of products determine the needs that products in each category can generate and also indicate how much a merchant needs to position himself/herself for each product category so as to maximize gains.

### Essential vs. Optional products

Depending on region of sale, few products can be categorized as essential (mandatorily needed) products whereas few others may be considered as optional (occasionally/optionally needed) products. This categorization cannot be universal and needs to be fine-tuned as per geographic needs.

Example: In India Tea can be considered as an essential product, as drinking tea is an inevitable part of Indian culture in most areas. But the same is not true in case of European countries. Here Corn Flakes may fall into essential category.

### High/Low demand products

Among the range of products being sold, some of them are well established brands, whereas others are relatively less popular and trying to establish themselves.

The high demand products ensure a sustainable sale as well as steady state growth. Their sale volume is also relatively higher than their low demand counterparts.

The popular brands usually offer lesser profit margins for the merchants (due to their monopoly) as compared to their less popular competitors.

So a merchant needs to balance the sales targets as well as sale prices for both types of brands, so as to ensure repeatable and consistent profit margins on the reliable brands whereas putting extra efforts on enhancing the sale of less popular brands, thereby making more money on them. For enhancing the sale of medium/low demand brands typical ways to maximize sale is by offering them at discounted prices or provide some offers/schemes (example: one free on the other) on them etc.

Example: Colgate is a more popular brand than Pepsodent, Nescafe is a higher demand product brand than its competitor Bru, Dove is getting more popular than Rexona etc.

### High/Low velocity /frequency products:

Some products are needed in daily life and hence their consumption is faster. It results into more frequent demands for them.

Example: Toothpaste, washing powder, deodorants and corn flakes are more needed than cosmetics, biscuits, tooth brushes.

High frequency products are those which are ordered at low periodicity (2 per month or 4 per quarter) than the low frequency products (tooth brushes (once per half year per person), lipstick (one per quarter) etc.

Even if some of the high frequency items are getting consumed with low demands (than their competitors) they may yield better revenues due to higher frequency nature.

### Generation influencing products

Some product brands influence specific generations. Example: Pampers and Huggies are inevitable brands for children in the range of 0 – 24 months, Axe/Old Spice/Fogg deodorants attract young generation, whereas kiwi shoe polish is more used among middle aged members.

Companies promote their brands through various innovative ways of sales promotion due to which even if a product is not an essential commodity item, but still attracts handsome demand among people under specific age/income classes.

### Seasonal products

Some products do business in specific seasons.

Example: Fruit squashes and Sharabats are sold mainly during summer season. Demand for Food mixes (Git sweet mixes), chocolates increases mainly in festive seasons (Diwali, Christmas).

In some cases some brands are capable of recovering their dues in merely few months, which is their peak season. Setting targets for them is not as uniform per month as the other categories, but higher targets are set for their peak seasons and negligible targets are set for other months.

### Substitutes and Complements

Some products invite sale of their peers, and this behaviour can be understood by analysing historical data.

Example: Does a customer ordering schezwan sauce always order noodles? Does a customer ordering condensed milk mostly orders dry fruits? Does a customer always order sugar when he/she orders coffee?

Based on the territory the sale is intended, historical data analysis can reveal such facts. In which the product which creates need for a peer product can be considered as a sale promoter for the peer product and should deserve a due credit while setting the price for it. These are the Complements.

On the contrary, some products are competitors of each other. Think of apple juice and orange juice. If a customer has ordered apple juice there is a less likelihood that he will order orange juice. These are called substitutes. Typically brands of same product type are always substitutes. Example: Maggy Tomato Sauce and Heinz Tomato Sauce.

If demand for a product decreases, there is a more likelihood that demand of few of its substitutes may increase. Thus it will not just impact the price decisions for that product itself but also impacts price decisions of its substitutes.

### Regional products

Some products are sold more in some region than the others. Example: Sambar Masala may be less popular/regular in southern states(because people prefer to use homemade masala) but will sale more in metro cities as well as in northern regions, Condensed milk is more sought in Northern states due to more frequent sweets making.

For an online portal it is very challenging to offer regional prices at an item level but this categorization may help us in determining basket level offers based on number of regional products contained in it.

## Online selling Trends

Shopping portals are primarily of two kinds: the ones which are launched by merchants themselves and responsible for attracting and retaining customer base in order to remain in the market. In this case the extent to which benefits can be provided are based on how well the merchant is financially doing, how is he/ she managing his overheads and what is his appetite to face the brutal price competition.

The second category of portals is the ones which are launched by some third party organizations (example: Amazon, Alibaba) and provide online platform for merchants across the region to promote the sale of their goods using it. In this case the benefits to customers are provided by the merchants who are hosting their products on the online platform and the owner of hosting platform earn their money by charging some commission from merchants for enabling their business on the hosted platform.

The self-hosted portals, incur considerable additional expenses as they have to manage the IT services behind the online portal, in addition to their actual business. But they have a better opportunity to create their brand proposition, as they are known by their portal name. Also they are free to apply/change their shopping/pricing/discounting rules.

Third party portals on the other hand enable even smaller merchants to take their products to the masses and thus help upcoming businesses/product/services to grow faster using their infrastructure. These merchants, on the other hand are restricted on the pricing/discounting rules. Also their own brand name may get shadowed by the brand name of the third party portal on which they are running the business. They can run only those shopping schemes which are provided by hosting platform.

Materialization of a customer to a merchant is the result of

* Lot of advertisements/brand building efforts/promotional campaigns to establish themselves in the market as a brand
* Continuous efforts of attracting new customers and engaging them by offering competitive prices
* Assured quality of products/services being offered.
* Collaboration with secured payment instruments( credit card providers, PayPal, apple pay etc.) to provide attractive payment options
* Customer’s earlier buying experience with the same merchant.

Among the above mentioned contributors of successful business, the last contributor is a result of all earlier contributors.; i.e. Unless customer gets good quality service from a ‘well known’ merchant ,at a discounted price he may not be fully satisfied with the merchant.

In order to get a customer into habit of buying products always form same merchant, gathering of his multiple experiences with same merchant is the key to the success. Merchants are spending hell lot of money just for this purpose.

A concrete step towards building multiple good experiences with a merchant is to sell good quality products/services so as to enable customer consider same merchant when same products/services are needed. Consider a portal selling vegetables and fruits (bigbasket.com). If customer gets good quality fresh vegetables and fruits from a merchant he would surely go back to same merchant next time. This is how long term affiliation can be built between merchant and his customers.

But selling good quality products alone may not ensure customers’ long term association as

* Multiple merchants may be selling good quality products.
* Branded products have established quality standards. So customer may not see any advantage of buying them from a specific merchant instead of other.

## Buying Patterns

When we consider patterns in customer buying of their needs, primarily two buying trends emerge out based on their need patterns.

### Instantaneous Buying

Few products are required by the customers on need basis and nature of need may be spontaneous, triggered by some incident or occasion. Customer buys a product as a response to this trigger. Example: Customer buying a new headphone when his earlier one breaks down OR he wishes to upgrade to a latest one OR he/she wishes to gift it to someone.

Customer buys a new mobile handset as a result of breakdown of earlier one OR he/she wishes to upgrade to a newer version with more speed and capabilities.

Customer buys furniture when he is fed up of using the existing one OR it is broken OR it does not match the new colour scheme/theme which he/she has adopted for his house OR when he buys a new house.

Due to spontaneity of need and its trigger/event based nature, periodicity of buying such products is not fixed. Usually products purchased in instantaneous buying patterns last longer/used for relatively longer period. Next time when buying the product under same category, customer’s choice may have changed due to changing trends. Example: A customer who had bought a Nokia Lumia phone (Windows based) may want to opt for an Android phone, as it is currently more popular and then try for some other brand. Similar behaviour may be observed while buying fashion apparels (Jeans, trousers etc.).

Similar to periodicity and choice customer’s association with merchant may also change. Customer may not buy the product from the same merchant every time. He/she will first surf available product catalogues provided by different merchants, compare prices and then decide from which merchant the product should be purchased. For non-branded/trivial products where price variations are huge, lowest offered price is usually most significant determination factor. Even for branded ones relatively lower prices does make a significant difference.

Thus customer’s association with merchant for buying a product is more “instantaneous” in nature. Customer approaches desired merchant, makes his purchase and walks away. There is no commitment from either side that purchase of same/related/similar product next time will be done by that customer from the same merchant.

As customer’s affinity cannot be ensured in sale of these type of products, the main revenue/profit determination factor is the volume of sale of these items. Once a customer purchases a product from the merchant, instead of tracking the same customer for probability of him/her coming back to same merchant next time, the merchant focuses on acquiring more and more (old/new) customers so that overall volume turnover of sale will increase(at least remains constant). Though by offering lucrative discounts/cash back offers as well as ensuring sale of good quality products, merchants try to create an opportunity for gaining more and more customers including the same customers back repeatedly, there is no science by which the same can be assured and predicted.

#### Challenges

Such an “Instantaneous” nature of business poses multiple challenges in front of merchants.

The first and foremost challenge is to keep the business in a predictable state. Merely increasing customer base for some period does not suffice the need as such as growth may be unpredictable/short lived. A merchant would be considered to be doing bad if an average customer who has purchased some products from him in past does not turn up again to the same merchant. So even if merchant’s business is growing due to acquisition of new customers, its stability will always be a question mark, if some percent of earlier customer do not come back to him.

Second challenge is associated with keeping control on offered prices by controlling expenses and waste. Merely making efforts to gain new customers does not enable merchant build precise business forecasts, because probable new customers are in thin air and it is impossible to predict if they will really materialize. There may be even tougher challenges associated with demand per product due to varying customer density as well as varying needs from new coming customers for each product across geographies, periods and demography. For example customer base in cities prefer different product brands than those in small towns. Moreover due to difference in usage patterns the consumption is different.

Unpredictable demands for each of the product adversely impact procurement of goods, inventory management, operating expenses and may lead to either customer dissatisfaction due to “out of stock” kind of situations OR lot of wastage due to demand decay resulting into expiries of batches of goods. Discounted prices for each of these products are determined based on certain demand predictions and assuming assured revenue/profits. Such an unpredictability shatters these assumptions and ultimately may result into vast underperforming of business on revenue and profit fronts. Unpredictable demand also significantly impacts operating expense per unit of goods, as utilization of resources such storage space, electricity charges, expenses on operating staff, expenses related to delivery of goods as part of supply chain etc. are impossible to optimize in case of unpredictable demands.

Different merchants try different options to circumvent around this problem of variable/unpredictable demand. Some may prefer to manage their own stock of inventory using some statistical analysis of historical demand information. Some try out “Just In Time” strategy where they collaborate with regional/local/on site retailers and fulfil local orders through them. In turn the local retailers pay them commission for awarding business.

In first approach the ‘per item’ net profit is inefficient due to inability to control wastages, operating expenses and product pricing.

In second approach merchants rely on the local retailers for inventories being managed by them, quality of the goods as well as services provided by them. They in turn gain much less gain as compared to first approach because they themselves are not dealing with suppliers in wholesale but rather selling items which are purchased by their regional counterparts. As the regional purchases are negligible in volume (as volume is sufficient just to take care of regional needs), the purchase price per unit of goods is much higher as compared to first approach. Benefit of this approach is saving of inventory cost, transportation as well as zero accountability of wastages.

These challenges are much bigger due to their wider reach. They use sophisticated analytics tools to predict the consumption based on historical trends. Though these predictions may provide higher probability of getting closer to the reality but there is no assurance of them meeting the reality because nature of business is instantaneous and there is no guarantee that a customer once made purchase from a merchant will come back again to the same merchant.

Another challenge is to determine the right price of every product being sold in order to ensure predictable gain. Due to turnover of huge volume of goods, even if a single penny is earned on a unit as profit, it yields millions at the end of a day. The same is inversely true if single penny per unit is lost.

#### Pricing

Price of any product is mainly driven by its demand (against all its substitutes) as well as many other factors such as

* Cost incurred (in addition to purchase price of a product) to sell product in market (fixed + variable cost)
* Price offered by competitor merchants.
* Price/Demand of substitute products
* Price/Demand of its complimentary products
* Geographic +demographic aspect determining purchasing power and perceptions of buyer population

Considering “demand” as the primary factor driving offer price, see the following problem for illustration.

If product X has breakeven price (purchase price +costs per unit) of 50 Rs. and MRP as 110 Rs., in order to ensure profit of 100,000 Rs. On sale of X, at what price it should be sold?

In order to solve one should know the “demand forecast” for product X. If expected demand is 2000 units, then offered price should be 100 Rs. so that.

2000\*100 – 2000\*50 = 2000\*50 = 100000 Rs.

Whereas if expected demand is 4000 then price should be reduced to 75 Rs.

4000\*75 – 4000\*50=4000\*25=100000 Rs.

Now if the prediction system predicts a demand of 4000, based on which unit price is determined as 75 Rs. and actual sale is 3000 units then profit is reduced to 75000 Rs (which is 25% less than forecasted profit)

3000\*75 -3000\*50=3000\*25=75000 Rs.

If market is very volatile, and merchants are unable to predict demand, they face real challenges in determining prices. The price per unit that they have offered(with some discounts) , anticipating certain sales growth in coming months may turn loss making as the predicated growth did not happen but the cost being constant.

In case of shopping malls they offer the prices based on the geography where they are located. In areas having majority of wealthy people, charging too low price may negatively impact sale as buyers can start suspecting on the quality of products, which are sold at cheaper prices. On the contrary if prices with heavy discounts are not offered in the areas where blue collared people are living, it may negatively impact the sale.

Online shopping sites may not have this luxury of charging different prices in different geographies because the same site is accessible from all locations. Some of them provide the option of selecting the state/city before initiating any purchase just for this purpose.

When a competitor merchant drops price of a product, others have to introspect offer price of the same product, else there is a likelihood of lowest price offering merchant will pull away customers from all.

When price of substitute of a product (competitor products) goes up it may positively impact its demand. This is because price hike of a substitute reduces its demand, and with the assumption of constant customer base for a product, the reduction in substitute’s demand may turn as increase in the demand of that product. Thus price of substitutes also plays a major role in price determination.

Similarly when price of its compliment of a product goes up it may result into reduction in demand of a product. This is because if people are into habits of buying a pair/group of compliment products, increase in price of one of it may cause customer think of not buying the whole group/pair. For example: Increase in price of a cereal/corn flakes may reduce demand of milk too.

All factors discussed above contribute to determination of price being offered to customers. As and when these factors keep changing the offered price keep moving between breakeven price and MRP.

In reality it is extremely difficult to predict customer behaviour in volatile market situation. His buying decisions are impacted by inflation, change of taste, offers by competitors, branding/performance of substitute products etc. In instantaneous world it is extremely difficult to keep offering prices which can keep customers bound to the same merchants.

### Periodic Buying

If one categorizes the range of products being consumed by an average customer for his routine use it can be realized that large range of products is repeatedly required by customers and their usage frequency is predictable. Example: toothpaste is required every month (numbers depending on family size), milk is required daily, washing and body soaps are required in some quantity every month, medicines are required at a prescribed time periods, Protein supplements are required in a prescribed quantity every month, tea/coffee, spices, food items, shaving blades, diapers, mouthwash, dry fruits, biscuits/cookies, corn flakes etc. etc. The list is very long in retail world.

Needless to say, their consumption pattern and hence buying pattern is almost predictable. Each product may have its own consumption frequency.

Example: In my family I consume two Miswak toothpastes, one 200 gm Taj Mahal tea pack,3 packs(10 in each) of Huggies diapers for my baby,4 lux soaps, half kg of rice, half kg of lentil, two body sprays,2 bottles of Dove shampoo,1 Kg sugar,…. Etc.

Other characteristic of periodically needed products is that brand preferences per person/family are usually fixed and rarely change OR they change over a relatively longer duration. Typically people do less experiments with items related to their daily consumption and health and hence their preferences vary rarely.

If you apply the same rule for health associated products such as protein drinks/health supplements, medicines, medicated oils, skin creams, hair dye and certain range of health related products such as diapers you will see that it follows exact same behaviour as described above.

In retail/medicine world there is more probability and likelihood of buying a package of periodic needs from the same merchant and at fixed intervals. Variations is each of their prices across competitors have negligible impact on buyer’s pocket (but can cause impact at package level) and hence people do less scrutiny while choosing a merchant for buying these type of products. Of course It should not make merchant take his/her customers granted for an assured business. They should have policies in place which should influence customers to buy more and more items from them and for longer duration.

Hence there is a more likelihood of retaining customer affinity in case of products exhibiting periodic buying patterns. So in addition to increasing volume of sale by acquiring new customers merchant can concentrate on efforts to retain existing customers in such category of products.

If you introspect range of all products that you are using in your daily life and categorize them down you will realize that it has a significant proportion of the products which have been periodically bought by you.

If a merchant compares the impact of demand predictions in managing inventory, operating expense decisions thereby determining right offer price per unit in products exhibiting periodic buying pattern, he will realize that the percentage of precision is way higher as compared to products exhibiting random/instantaneous buying pattern and random selection of merchants. This is because a customer buying two Colgate toothpaste a month will continue buying the same volume every month and probably buy them from same merchant. Also for all such FMCG needs he will probably buy the whole package of periodically needed goods from the same merchant (if he sees considerable advantage in buying the same from a specific merchant).

In other words you can say that existing periodic buyer may remain associated with same products and with same merchants for much longer duration. Hence their future demand of those products from the same merchant is not just a prediction but it is real.

The scope of this analysis is to focus on the trading of products which exhibit periodic buying pattern and study how their business by means of subscription not only benefits the merchants but also helps maximize gains of the customers.

# Subscription space

As we have seen above, in case of periodic buying needs opportunities of building a sustained and retained (not just increasing) customer base by establishment of long term relationship between merchant and customers is possible in a large segment of products.

The opportunities are not obvious just because these products are periodically needed by customers with a relatively fixed periodicity. Since customer has so many options to buy his periodic needs from, if he does not have any specific incentive(s) to buy them from the same merchant he may not commit a long term as well as long lasting relationship with a merchant.

Merchant needs a business model by which he/she can exhibit respect towards loyal customers by maximizing their gains along with maximizing his own gains. A systematic engagement with every customer where customer gets more & more benefitted by buying more volume of goods and by buying for longer duration from the same merchant, is essential in ensuring predictable and sustainable business for the merchant.

The “Subscription” concept tries to complement the expectations of customers to obtain their “periodic” needs with maximum benefits, with merchants who wish to retain their existing customer base for as long duration as possible (in addition to gaining new customers) in order to ensure a predictable, sustainable and thereby prospering business.

Concept of subscription is not new. It has been popular in publications business since long time. In IT world it has been practiced for SAAS (Software as a Service) business too. There are good evaluation metrics developed for SAAS to measure the effectiveness of the SAAS model. In telecom business, too different tariff plans are based on subscription model.

In simple understanding a ‘subscriber’ is the one who subscribes (registers for periodic receipts) for a set of products (example: articles and/or magazines in case of publications) or services (example: software licenses in case of SAAS or mobile plans in case of telecom business) by getting into long term agreement with supplier and keep on receiving these products/services periodically at a predefined interval. Periodic deliveries of desired goods/services save subscriber’s efforts on procuring them every time by new agreements with different suppliers or renewed agreements with existing suppliers.

In publications as well as SAAS business models the market and cost vulnerabilities are limited and predictable as compared to retail business.

Subscription to products in other periodic selling business (such as retail, health products and medicines etc.) is not yet so popular/ practiced. It may be because in volatile market situations and due to instability of product prices there is no business model available which can ensure sustainable business along with assured(and growing) gains for both stakeholders (subscriber and merchant).

In our attempt to standardize the subscription business model we should first start with identifying expectations from all stakeholders who are keen to deal in subscription business approach. We can then transform these expectations as business objectives for laying out subscription business model.

Next we will work on each of these objectives, group the related ones together and form domains which serve the related objective. Domains are further elicited to define each of their business elements, rules and processes by each of them for the business to fulfil these objectives. If all of these rules and processes are strictly adhered to by the practitioners they will ensure a sustainable and prosperous business proposition for them.

Let’s start with expectations.

## Expectations from stakeholders

### Long term association

The basis and intent of subscription concept itself is to establish a long term association of customer with a merchant, where he/she agrees to receive a fixed set of selected products repeatedly at desired intervals. That is where a customer is termed as ‘Subscriber’.

The first obvious advantage for a subscriber of ‘subscribing’ is ‘saving of lot of time and energy on buying his periodic repeatable needs’. An order needs to be placed by customer just once for a fixed length of period, mentioning the number and periodicity of every item being subscribed. Packages with appropriate product contents are delivered to his doorsteps on completion of every delivery period. No periodic visits to malls, no standing in long billing queues, not even periodic ordering online thereby paying different prices for the same product at different times; Order once and you are done for subscription period. Let’s term it as the “Convenience” aspect of subscription model. It is one of the attracting force for a customer to turn into a subscriber. A Merchant who offers a subscription business is expected to enable a subscriber to register for set of products at respective delivery frequencies for a finite subscription period and deliver branded as well as good quality products precisely at the defined frequencies to the customer’s doorsteps.

But merely “convenience” may not ensure long stream of subscribers getting associated with same merchant for longer term. A subscriber may wish to get into a longer term agreement with a merchant also because he/she would expect extra benefits for his/her ‘loyalty’ with same merchant, in addition to the his own “Convenience” aspect described above. Merchant should have proposition to answer “What’s there in it for me?” question from the customers who are intended to get into long term associations with him/her.

### Multidimensional Benefits model

As indicated above merchant needs to answer “What’s there in it for me?” when a customer is intending to turn into a subscriber.

When a customer wants to buy set of products, he may choose products based on two criterions.

* Brand preference: Out of various brands available which brand he/she would like to buy.
* Quality of non-branded products
* Prices and benefits being offered per quantity/duration of subscription.
* Quality of service by the merchant (on time delivery, flexibility to change the agreement ( change of subscribed goods/periodicity/volume etc., delivering products form latest batch etc.).

In case of packaged buying, if a subscriber is buying 10 different products, he may be firm about his brand choice for 7 of them, but may be flexible about the brands for remaining 3. These numbers are just for illustration purpose and may vary from subscriber to subscriber. But this behaviour is mostly common across all type of subscribers. Example: As a customer I would not like to use any toothpaste other than Colgate Total, but in case of biscuits I may be flexible. Rather I may wish to try some new brand of biscuits.

Cost sensitive customers are more flexible on brand preference as they may tend to choose the products which provide them more cost saving or some added benefits. The choices (and quantity) are also influenced by the ‘added’ tangible/intangible benefits being offered by merchants. The duration and quantity of subscription gets positively impacted by these added offerings.

The above description may not be applicable to buying of medicines, as they will be mostly bought based on doctor’s prescription (though there too, is a flexibility to buy reputed brands or generic medicines)

Now when the customer wishes to turn into a ‘subscriber’, he will obviously expect some added benefits for getting into long term relationship with merchant.

So what are the benefits that he can expect vs. merchant can offer?

The first benefit that he would expect is to get every item at maximum discounted price. This is how he/she may feel respected for his/her long term association with a merchant.

There is another scenario related to volume of buying. When a subscriber is buying package of goods, containing items fulfilling his periodic needs, he may buy more volume of them if it is yielding him/her more cost savings. One variant of it is the “Costco” business model where the merchant operate on low margins but sells goods in volume to its registered customers. It ensures two main things

1. Its customers are buying their needs in high volume and in turn gain significant price benefits.
2. Its membership which assures customers of good quality high volume goods in lucrative price propositions, ensure customer loyalty.

In subscription world a parallel variant of this loyalty assurance business model should be present to compete with the “Costco: model. It should ensure that a subscriber should be rewarded in proportion to the total volume/price of his/her subscription. The volume can be assured by buying Rs.5000 per month of goods for six months, OR by buying Rs. 3000 per month of goods for one year. Here the subscriber is not buying volume of goods in one turn but because he/she has subscribed for number of months the total equivalent volume of goods should be rewarded in similar manner. This will tempt the subscribers to subscribe for more volume of goods per period, or more volume of goods for more number of periods in a subscription, as his savings/earnings are increasing in equivalent proportion.

Let’s see what are those few “toppings” (on top of this basic advantage), those can be offered so as motivate customers turn into subscribers.

#### Topping 1: Discounted Price

Since success of subscription business lies in

1. Achieving large subscriber base
2. Ensuring prolonged relationship with each of them
3. Attracting them to buy maximum volume of goods
4. Minimizing churning of existing subscribers

The total benefits to be awarded to subscribers should be determined according to each of these attributes.

A Merchant should be able to offer products at discounted prices (prices lesser than their MRP) as an offering to subscribers for registering subscriptions with that merchant. This discount is to reward his association with merchant. Merchant should have mechanism to calculate the instantaneous discounted price per product that can be offered based on performance of that product.

But how will this be different than those in instantaneous business? Even merchants into instantaneous business are also offering products at discounted prices in order to attract customers.

Also if two merchants are providing different discounts on the same product on a given day, should a subscriber choose to subscribe to the merchant offering lesser price? Well, the answer is not so straightforward like it is in instantaneous business.

This is because the total benefits that a subscriber is going to gain is not just limited to discounted product prices. As described above the benefit a subscriber is getting will depend upon his duration of subscription, volume of products subscribed, his affinity to the same merchant for the whole agreed duration and his affinity to the same merchant beyond a given subscription but through recurring subscriptions. Let’s see other aspects below.

#### Topping 2: Committed Price/Discount

When a subscriber subscribes to a product for a six monthly/yearly subscription, he/she is registering to receive that product multiple times throughout the subscription period. He/she is doing it because the discounted price offered by the merchant is appearing a good deal to him. The challenge is on the merchant side. Can merchant keep the same price for him throughout the whole subscription period, by which he has initially attracted that subscriber?

Subscription business model should make provisions for some sort of price commitment at least for some products, if not all. A merchant may identify products for different types of price commitments, based on experience related to their ‘price elasticity’. But eventually the subscription system should be capable for analysing the price variations among different products in history and “recommend” few products where some sort of commitments can be made. Based on the historical data a committed product for last year may turn non-committed in current year and vice versa.

Subscription business model should assume three types of product pricing categories which will be offered to subscribers for appropriate products based on how these products react to the changing business demands.

1. Price committed products: many branded products such as tooth pastes or shampoos do not fluctuate greatly on price fronts. Their price gradually increases as response to inflation or increasing demands but the overall rise in a year is either negligible or within acceptable limits. Also as the price fluctuations are dependent on inflation, they are may be regional in nature. For example: In USA prices of most of the products are more or less stable as compared to India for the same set of products. So the merchant may find it safer to commit prices of such products to subscriber for his/her entire subscription period.

In case of price committed products, price of a product **committed to a subscriber** should remain same until end of his current subscription period. This should hold true even if the product/merchant is incurring losses on that product with the offered price OR price of that product gets changed one/many times during that subscription period.

The idea here is not to commit same price to all the subscribers subscribing for a product at all the time. Every hour/day/week, based on certain supply vs demand dynamics a new offered price is published for every subscriptionable product. At/after that instance whosoever is subscribing for that product will get the recently published offered price. Thus subscribers subscribing to the same product but on a different day may subscribe at different offered price. Thus every subscriber may have his/her own committed price for a product, which is different for a different subscriber subscribing to the same product. Thus after committing an offer price, even if the purchase price/break-even price of that product goes higher than its committed offer price, resulting into loss, the impact of loss is limited only from those subscribers who are affiliated to the specific offer price(s) lesser than recent break-even price.

Since the maximum “allowed” subscription period should be restricted to a reasonable period (say one year) the committed price is expected to be served only during that period. After exhausting of current subscription period if subscriber wishes to continue with his/her order he/she will need to renew the subscription (contract) where new/latest price for each product will be committed to him/her.

Also after publishing a product price on a day to which multiple subscribers have subscribed, if price undergoes change due to increased demand or due to change in purchase price due to inflation, the newly registered subscribers will get new offered price. But earlier committed subscribers (with old price) should be served with the older price until the end of their current subscription contract period.

1. Percentage discount committed products: Some products may fluctuate more frequently and considerably but they provide relatively constant margin (difference between MRP and breakeven price). Committing absolute price for entire subscription period may be risky but instead it is relatively safer to commit percentage discount on their latest price.

In case of percentage discount committed product the subscriber should get a constant committed percentage discount on the latest MRP at the time of every delivery. In this case the actual price to be paid by subscriber will vary if its MRP changes, as the percentage discount is calculated on latest MRP at the time of every delivery.

1. No commitment products: Many products mostly categorized under primary needs such as food grains, edible oil, sugar vary so unpredictably on price front that it is impossible to either commit price or percentage discount for them for entire subscription period.

In case of no commitment products the subscriber has to pay latest offered price on the product at every delivery. Some time it can be much lesser than the one shown at the time of subscription and sometimes it may be considerably more.

Why to Commit???

Few words on the notion of committed price. No product is inflation proof and in most cases after committing a price/percent discount on a product, the purchase/breakeven price of that product may increase, resulting into loss of profit or even loss to the merchant. Then why does merchant need to commit anything to subscribers?

Establishment of Trust:

Products are not just being sold once but they are subscribed for a repetitive sale. In such case showing them one offer price for the sake of subscription and later changing it every now and then ruin the subscriber benefits and it may ruin the intent behind subscribing to the product. Moreover it may generate a feeling, of being cheated among subscribers.

Instead it would be appropriate to publish an offer price for a product with its commitment category, and provide a disclaimer associated with each category.

Example: For Product X having MRP of 50 Rs., merchant may publish an offer price of 43 Rs. and also publish its commitment category as “Price Committed”. Somewhere in the disclaimer for “Price Committed Category, a rule is published which says that “once committed a price for a current subscription will remain constant until the end of that subscription”

Similarly for some other product “Y” having an MRP of 60Rs, merchant may have published an offer price of 49 Rs. and also published its category as “Price Non-committed”. Somewhere in disclaimer of “Price Non-committed” category, a rule is published which says that “current published price is just applicable for products getting delivered at the current time, and it may change even at every delivery.”

Such categorization related to price commitment and related disclaimers exhibit merchant’s intent to provide best prices to the subscribers and possible variations in its price due to demand/supply dynamics are clearly conveyed to prospective subscribers at/before subscriptions.

Limiting of loss due to finite subscription period limit:

When some subscribers are receiving delivery of a product at an offered price relatively lesser than its latest offer price (or even lesser than its latest purchase/breakeven price) resulting into loss to the merchant, the loss is only limited to those few subscribers (who subscribed earlier at lesser offer price). Also this loss will only last only until end of their current subscription period. Since merchant has put a caveat on maximum subscription period to say, one year, it means that the price/discount commitment (and hence probable loss) is going to last only up to maximum one year. At renewal of subscription new price/discount will be committed for the same product, resulting into overcoming the loss from now onwards.

Price Corrections for compensating limited losses:

It is not enough to limit the loss due to correction in price, to a finite limit. Because loss is a loss. Hence some compensating mechanism to recover from that will be required to be embedded in the business model.

In case of loss (or loss of profit) like situation, the offer price should be able to correct itself by use of appropriate pricing algorithm. In the detail description on pricing policies and algorithms we will see this in detail. But just fo illustration of one scenario, in the situation where demand is increasing but profit is diminishing (because product is being offered at price much lower than its current worth), the newly calculated offer price is expected to be more than earlier offered price so as to bring the product up to its current worth. Such an upward price revision should automatically compensate for the loss due to lower price quoted earlier and bring product business into profit figures.

The same product may be categorized differently in different countries in either of the above three categories, depending upon goods producing percentage and demand pattern. So merchant need to mark them accordingly, depending upon country in which products are getting sold.

As a rule of thumb, subscription business model proposes that the current offered price or discount in committed or non-committed form should be offered to all ‘current’ subscribers and there is no discrimination made while offering a price at the same time to different subscribers based on any other criteria such as volume of purchase, duration of purchase or loyalty.

This is because in multi-layered model discounted offer price and price/discount commitment/non commitment is assumed to be the right of every subscriber and this is the first value proposition by which subscribers may wish to get/remain associated with the same merchant for long duration.

#### Topping 3: Volume based /Duration based benefits

Though the discounted pricing model offers gains to subscribers, it does not distinguish subscribers who are subscribing for larger volume of items against those who opt for much lesser volume. Similarly it does not distinguish between subscribers having much longer subscription period as against the others. Thus product offerings at a discounted prices would be necessary but not sufficient to attract people for subscriptions.

A subscriber who is subscribing to longer term association with merchant as compared with other subscribers should be rewarded with something in proportion to his/her duration of association with merchant.

A subscriber who is subscribing to more volume of good per subscription period should be rewarded benefits in proportion the volume of subscription.

A subscriber who has completed agreed subscription duration and adhered to agreed subscription content should be getting all above benefits. A subscriber who may be revoking his/her subscription before end of subscription period should get benefits in proportion to active subscription period. Similarly a subscriber changing his subscription content during subscription period should be rewarded benefits in proportion to revenue that he/she is contributing to the merchant.

Subscription business model should have the capability to calculate the above mentioned proportional benefits in advance, when a subscriber is registering his/her subscription and inform him/her that he will get these benefits on account of subscription of specific volume/duration and it may increase if either of volume/subscription is increased. The idea is to attract the customer to subscribe for more volume of goods and for longer subscription period.

The benefits awarded may be directly proportional to volume/duration of subscription or there may be “slabs” (ranges) according to which benefits for a subscription is calculated. For example: If a benefits policy is set where a subscriber subscribing in the range of 40,00 Rs to 50,000 Rs will get X value of benefits whereas those subscribed for 51,000 Rs to 60,000 will gain 1.5X value of benefits.

The subscription system should be supportive of multiple of such policies and let merchant decide how he/she wishes to frame the rules for different benefits.

#### Topping 4: Loyalty based benefits

All above benefits are limited to an active subscription contract. What if a subscriber who completed his current subscription and renewed it again. His loyalties towards the merchant shown be recurring renewals of subscriptions should be rewarded in terms of some benefits associated with loyalty.

Example: A subscriber who has subscribed for 6 months, later renewed it for 6 months thrice, the loyalty benefit should be calculated based on his period of one subscription and number of renewals. In this case it will be 6\*(1+1+1+1). The other subscriber who has subscribed for 6 months, renewed it for an year and renewed again for 8 months will be determined proportional to 6\*(1+2+1.33) and so on.

Just like volume/duration based benefits, loyalty based benefit definitions should also be flexible and merchant should be able to configure the one of their own choice.

The above multi-layered benefits model which greatly benefits not only to subscribers but also to merchants is only possible in subscription business mode. Those subscribers who are contributing to more assured business for merchant as well as to maximizing his/her gain will be in turn maximize their own savings in form of multilevel benefits as described above.

Another intangible benefit of this multilevel benefits model is that, as the total gain to the subscriber is determined at multiple levels/with multiple factors, it is not possible to do an ‘apple to apple’ comparison between the gains by two subscribers. Thus though the price war among competitors is still very much there, merchants have various level where they can fight it effectively.

For example: Some merchant may not provide any discount on offer price (offer price same as MRP) but provide opportunity of maximizing gains on duration/volume/number of renewals of subscription, by providing exponential increase after crossing each slab/threshold of benefit rule. Others may opt to provide heavy discounts on offer prices but no products are price committed, thus providing benefits to subscriber without the risk of incurring the loss. Third category of merchants may make all products price/discount committed with lucrative price discounts but no providing any other layer of benefits. Thus there are enormous combination of benefit schemes which will enhance overall savings of subscribers but make them difficult to compare the one provide by merchant with the other.

This is where one can answer to the question asked earlier, “Should the subscriber subscribe to a merchant for a product merely based on lowered offered price than others”.

### Metrics to track/measure performance

A successful merchant who arranges a business proposition so as to attract such longer term agreements with his customers then have stable and predictable business as he almost precisely knows the demand of each of the products being sold and then can focus his efforts on minimizing wastage as well as negotiating better rates from his suppliers.

Conventional Instantaneous business measures growth in terms of volume of sale. Since it does not offer a facility to remember existing customer base, it does not track the duration and volume of association with each customer. So it merely measures /predicts growth based on actual volume of sale against predicted demand and per unit gain aggregated into total gain.

Subscription business is association centric. And hence health of customer-merchant association is an important metric in measuring its success. Hence overall performance of subscription business should be measured in terms of volume of incoming (new) customers, duration of merchants association (subscription) with each of them, their purchase volumes (basket sizes), rate of customers churning, and thereby overall revenue, gross and net profit. It means different business tracking is needed here as the intent is to attract new subscribers, retain existing subscriber as long as you can, attract them to buy higher volume of goods per period, reduce churning (as it indicates subscriber dissatisfaction) and measure the success of business not only in terms of attracting high volume of subscribers but also in terms of longer average retention rate and minimum possible churning rate.

If large volume of new subscribers are getting added to merchant’s portfolio, but large volume of subscribers are continuously getting churned out in during their subscription period, then something is going wrong in the business and merchant needs to introspect and correct wherever required.

Since an average customer in subscription agreement typically subscribes for more than one product as well as for more than one time, it is appropriate to forecast and measure the business in terms of subscriptions instead of subscribers. This is because

* Subscriber may subscribe to more than one product per unit period and for definite periodicity and duration.
* The same subscription repeatedly adds to revenue/profit for the agreed subscription period.
* A subscriber can change his total subscriptions one or more times during subscription period resulting into changing revenue for from the same subscriber.

Also if subscribers are changing their product subscriptions multiple times (replacing products, removing products from baskets) during subscription period, it may negatively impact forecasting and management of resources.

# Objectives of Subscription Business Model

Based on the expectations described above let’s lay down the main objectives to be fulfilled by stakeholders if they are to be benefitted by following subscription business approach. These objectives are based on their obvious expectations from the long term relationship notion in subscription business model as well as few innovative advantages which are available due to nature of business model

## Subscriber centric objectives

### Quality

Regardless of nature of business (periodic or instantaneous) quality of purchased goods has always been and will always be the first criteria for any customer. In case of branded products this is not needed to be handled by merchants as customers are already associated with some brands or the other. This may be an issue for non-branded products such as fruits and vegetables.

So merchant has to ensure that whatever products (branded or no branded) products he/she is offering they should be of good quality. Many new/upcoming products get launched in market with highly competent prices as well as lucrative margins for merchants. Hence merchant as well as subscribers may get tempted to offer them/buy them. But if these are found to be of inferior quality subscribers will not blame their own choices but will blame the merchant who offered these products.

### Convenience

Lot of convenience, by buying things online has been one of the main motivation factors for customers.

* Subscribers will be happy buying their periodic needs online through a self-intuitive user interface, so that they will save lot of their time going to market for shopping of these items, standing in long billing queues etc.
* Subscribers will want the purchased goods to be delivered at their doorsteps, mostly on precise time. These are periodic needs; so they may not wait for the goods to be delivered later than the day when they need these products.
* If subscribers are subscribing for multiple products, they may not need all of them at the same interval as each of their consumption rate may be different. Example: customer may want two toothpastes per month but need toothbrushes to be delivered every four months.

So they will need different items to be delivered to them, at different times, closer to their need time. It means that subscription business should manage multiple deliveries spaced with different intervals for a registered subscription, each of them having their own periodicity and these deliveries are received by subscriber close to their needs. In order to optimize on the delivery cost overlapping product deliveries should be clubbed together (example: items to be delivered quarterly should be delivered along with every third monthly delivery, in case of weekly deliveries along with monthly deliveries with the same subscription every 4th weekly delivery should be clubbed with monthly delivery and so on.) and the timetable of deliveries will be projected upfront to the subscriber and his/her consent is taken on this delivery schedule.

* Payment for subscriptions is a challenging endeavour in subscription business. This is because
  + Subscriber will be subscribing for deliveries for now as well as for future days/months. It may not be appropriate to charge all subscribers in advance for the whole subscription. This is because total subscription amount may be huge which a subscriber may not be ready to invest upfront.
  + We have seen earlier that product are categorised in “Price Committed”, “Discount Percent Committed”, “Non-Committed” etc. Hence it may not be possible to calculate total amount for the whole subscription upfront, as the products selected by a subscriber may be falling into any of the above categories and hence price of each product may not remain constant. For example : For non-committed product different price may have to be charged at the time of every delivery. Thus the notion of “Full Advance payment” is not realistic if merchant has decided to use all three categories, for categorising products.
  + Also as subscriber may be altering his/her orders during subscription period, due amount may also be varying.
  + It may be annoying to claim the dues periodically through monthly reminders. He/she should be provided easier options of payment suiting to his/her appetite. Some may prefer majority of payment to be done in advance whereas others may prefer cash on delivery kind of options. Few may make some payment in advance but process the remaining payment in instalments.

The only rule that merchant may want subscribers to adhere to, is that they will get only those deliveries for which merchant has received/is receiving payment (if cash on delivery option is chosen). So subscribers at least need to pay in advance for any upcoming delivery. But again it is up to individual merchants how much liberty they want their subscribers to enjoy for fulfilling their dues.

* Money should not be the only instrument for making payments. When subscribers are subscribing for large volume of goods or for longer subscription duration they should be rewarded with appropriate number of reward points proportional to the added revenue/profit being added to merchant’s wallet. They should have an option to pay their dues using the accumulated reward points. It is synonymous to an investor making investment in a business to grow it and gains returns from the business in proportion to its growth and his/her contribution to the growth. It will be a very big “feel good” factor for subscribers that their current/earlier associations with a merchant is paying them good returns and thus motivates them to retain or even extend this association for longer period and for bigger volume of orders.

### Benefits

We have already discussed in multi layered business model that subscribers should be benefitted on account of his/her association for merchant, for the duration of association and for the volume of purchases that he has been registering with merchant. But benefits can be also be used for various promotional purposes. For example: If an existing subscriber refers a new/prospective subscriber to the same merchant he may gain some rewards for referring them and few after the reference is materialized (when new subscriber makes some potential purchases through subscription). Also when a new subscriber is subscribing for the first time merchant may want him to enjoy some reward points as a gesture of goodwill. Many more such combination of benefiting subscribers can be thought, for each of the act which is adding new business opportunities in merchant’s portfolio.

Thus the benefits model should attract a subscriber to subscribe for more, to subscribe for longer duration, to subscribe again and again with the same merchant as well as to promote subscription to others as a real brand ambassador for the merchant.

* For periodical needs such as grocery items or medicines, subscribers may prefer to subscribe for them if these are offered at some discounted prices. This is how a subscriber will maximize his/her gain as the same item will be shipped to him periodically for longer duration with discounted price. As merchant is dealing with large volume of goods he should manage to determine the offer price of every product based on its demand vs supply dynamics and gains coming from it in such a way that he/she should be able to offer subscribers most of the products with attractive discounted prices and still be able to registers huge profits with each of them.
* Customer happiness may ruin away if merchants start charging considerable shipping charges on the delivery packages. In case the shipping charge grows proportional to package size/weight it may further add to customer dissatisfaction. The sole purpose of making a subscriber subscribe for more and more items will ruin away if shipping charges increase proportional to package size. They may find it more appropriate to buy these items from a nearby mall (although it is less convenient).It is for the merchant to manage operating expenses in such as manner their effect should not be visible to the subscribers through some sort of shipping charges.
* The most difficult problem to handle in case of subscription model is the product price to charge to a subscriber during whole subscription period. Should subscriber pay the same price for a product throughout subscription contract? If price of a product increases, what will be its impact on existing subscriptions? The price commitment model described above should be adopted here to categorize products according to their price elasticity and try to offer maximum products with some form of commitment of price benefits.

### Value added benefits

Some segment of customer base perceives different products at lesser prices than their offered (discounted) prices. Such price sensitive customers may compare offered prices of different branded products at different shopping malls/portals and selectively buy their needs from different shopping malls/portals so as to maximize their overall benefit. Also their choice of a merchant keeps on changing based on who is providing maximum benefits for each of their needed product at every time.

If customers are provided ‘package’ level benefit as an alternative to OR in addition to product level benefits, they will be tempted to add more items in their package(because more the package amount more is the benefit),thereby buying all their needs from same merchant. Also the more time (more subscription duration) they keep buying from the same merchant more will be their benefits.

Notion of package level benefits is that, when a subscriber buys a goods worth ‘X’ amount and other subscriber buys worth ‘2X’ amount, each of them will be awarded some package level benefit proportional to the amount of goods each of them is subscribing to. In this case the second subscriber should be appraised with more benefits, as he/she is contributing more to merchant’s overall revenue and profit. This is how second customer will get a feeling of added gain and it will add to his satisfaction level. Also the visible price of a purchased item will appear to be too less as it will be a combination of price discount and a factor of package level benefits.

### Rewards for loyalty

If a subscriber is periodically buying all his needs from the same merchant, is he/she being rewarded for his/her long term affiliation with that merchant?

Looking little deeper in this kind of relationship, a subscriber is getting into long term agreement with the merchant where he promises to buy certain (perhaps same) set of products periodically for the agreement duration. So the merchant is awarded with an assured business for a fixed duration. It is resulting into merchant making more precise demand predictions, negotiate better on price front, reduce losses, optimize on operating expenses and maximize self-gain.

Hence subscriber loyalty with the merchant should be rewarded in some form or the other. It can be in the form of additional discounts or cash back schemes or loyalty/reward points etc. Thus this loyalty makes the subscriber win more benefits on top of product level and volume based benefits.

As merchant is automatically wining a long term relationship with existing subscriber, he can focus more on winning new subscribers.

There should be strategies in place which will compute the loyalty units for every customer based on duration of their agreement as well as number of renewals of agreements. They should then be converted in the form of benefits such as redemption points, added discounts, gifts etc.

### Promotional Rewards

The best promotion for any business is achieved when its own customers act as brand ambassadors for that business. If a customer is using product X and he/she likes the quality of that product, he/she does not hesitate to appreciate that product in relevant discussions, which may influence listeners to think of buying same product/ replacing their existing competitor product with product X. Such promotions happen as a spontaneous reaction of customer on certain product experience and hence unintentional by the customers. But there is no guarantee of such promotional conversations to happen. Furthermore its impact on the listeners is also uncertain.

But if a promoter (customer) is appreciated /rewarded for such promotions then he/she may get motivated to promote a product/business approach and will take intentional efforts to describe its benefits to their near ones.

Benefits can be planned for such promoters. Example: If an existing subscriber refers someone and if the referred person subscribes to the same merchant then some reward points may be gained by the referrer upon actual materialization of the reference.

## Merchant centric Objectives

### Sustainable customer base

In case merchant attracts customers to get into such long term association it will be a complete business transformation for him.

His/her relentless efforts and investments to obtain new customers as well as retain existing customers will be greatly saved as customers are turning into ‘subscribers’ with the intent of not just buying once but buy periodically and hence remain associated with him for a longer duration.

If a merchant takes appropriate measures to ensure longer term association of existing subscribers by proportionately rewarding them for their loyalty/relationship, it helps create affinity for him among subscribers. Such a relationship is much more precious than just a momentary commercial association for the purpose of trading.

Moreover such relationship also enables him to know his customers better, by knowing their choices/preferences, their usage patterns, their periodic volume needs, cost vs. brand preferences etc. This data is extremely valuable asset for analysing and categorizing customer base, so as to offer them better value proposition based on their personas. This too will help increase affinity towards him.

So when merchant is adopting subscription business model the model should provide him appropriate metrics which are not just useful to measure business growth but should also be useful in

* Analysing customer behaviour
* Current buying trends/Changing Trends
* Current Products/brands trends
* Customer expectations
* Tracking of individual product /business performance
* Identification of products which prove themselves eligible for subscription model whereas some others which may prove to be not suitable for trading through this model
* Effectiveness of efforts put on cost optimization and areas where cost may be optimized further
* Effectiveness of promotional/benefits schemes
* Areas where investments need to be increased instead of spend optimizations

Merchant can make strategy decisions based on these inputs and tune the business so as to improve further on current improvements as well as avoid policies which are hindering customer experience.

### Optimizations through Precise Predictions

Through subscription business model merchant should be more equipped to make considerably precise predictions related to business forecast. 60-70% of his future business will be the actual active subscriptions, as they are going to continue in near future. Remaining 30-40% will be predictions about new subscriptions based on current trend. This is how the future prediction are much more precise as compared to those made in case of instantaneous business.

Such precise predictions will make him better prepared to manage goods as well as resources well. As he almost exactly knows how many subscribers to serve, at what periodicity, with what quantity, he can precisely order goods for current/future period.

Moreover by analysing the deliveries and volume of goods getting delivered per delivery, he knows how many baskets/packages are to be delivered, at what periodicity; with what weight (per basket) he can precisely budget for transportation/delivery cost. Such information not only helps him manage budget for theses expense but also help him negotiate better with logistics vendors, if any and ensure better rates from them.

Due to predictable demands and logistics, merchant is in a better position to optimize on personnel cost of infrastructure etc. etc.

As the inflow and outflow of goods is assured, he can negotiate better with suppliers (may be getting into long term supply agreement with them). Also he will manage ordering goods in specific quantity for every period depending upon predicted demand for those products for that period. It will help him reduce wastage cost to minimum (as there are hardly any batches “expiring”). In turn he can launch his products at competitive prices which will be difficult for his competitors to beat.

The reduction of wastage which is improvising his gains can be used to feedback subscribers in terms of discounts as well as different form of benefits and this process should be recursively goes on which is improving customer satisfaction more and more.

### Optimization of Operating Cost

Imagine that a shopping portal is trading in instantaneous mode. Customers purchase products and those are shipped to them. Assume that it is dealing with approximately 10,000 customers per month. Some customers make purchase of multiple items per instance, but many of them purchase single item at an instance. So merchant is making approximately 7000 to 10000 deliveries per month. In this it is shipping 10000 to 20000 items (i.e. approximately 1.5 to 2 items per delivery). If average shipping cost per delivery is 40 Rs. then shipping cost per item is approximately 20 Rs.

In all the cases, it may not be possible to absorb the shipping cost by merchant as the price of the content in a delivery is not bringing enough gains for the merchant so as to absorb such a high shipping cost. So in case of shopping of less expensive items, the shipping cost is separately charged to the buyer.

Now assume that same portal is dealing in subscription mode and with same number (10,000) of subscribers. So it will be making 10,000 deliveries. But as subscription is providing better benefits if more content is subscribed to, a shipment may contain 10-20 items. So in same number of deliveries, around 100,000 to 2, 00,000 items are getting delivered. Even if average shipping cost per delivery is significant (as weight of delivery increased due to more items in it), its distributed bourdon per item is significantly minimal.

Due to repetitive nature of ensured business, and cost being less as compared to price of item, it will be more possible ‘absorb’ this cost in the available gains.

In case future deliveries to be made are already known in advance, logistics costs (storage, shipping, routing etc.) can be better optimized. Such optimizations can add huge gains into merchant’s wallet.

As a summary, merchants can increase their profits by optimizing their costs per item sold. As we have seen above, a merchant in subscription business has better avenues for the cost optimizations than those available in instantaneous business.

Hence the expectation is, given the average shipping cost per kg of delivery anywhere in the region subscription business model should be capable of deriving per unit shipping cost for each product. This per unit cost should be proportional to the price of the product, though delivery itself is evaluated based on its weight. This is how more expensive products will absorb more portion of shipping cost (for the package) as compared to their less expensive products. Here the assumption is that products with more selling price usually yield more absolute profit (may not be always true).

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### Optimization of Wastage Cost

Though precise predictions get relatively closer to actual demand procurement of these goods should also be very closer to their shipment to subscribers. No one wants to buy items which have very old manufacturing date. Ideally if a merchant wants to ship 2000 units of product X by say 30th Jan, then 2000 +/- 5% units should land in his inventory on 20th or on 25th. Thus the supply chain management is very closely tied to the precision of predictions.

Techniques/models of predictions/forecasting makes significant impact on the procurement timings.

Some popularly used forecasting techniques include Time series analysis, Regression Analysis or machine learning techniques.

We will describe each of them in detail. But before understanding the techniques themselves it is important to understand the problems they are trying to solve.

Consider the graphical comparison below where a subscription forecast for a product and its actual subscription are shown for few weeks. At some places actual subscriptions are way bigger than forecasted demand whereas at some points that are relatively/considerably smaller.

If merchant has procured units of that product as per forecast then for first 11 weeks, the procurement has been more than actual consumption. It means that batches of goods will be left unconsumed. In such case even if he procure lesser units for the coming period he will have to make sure that the goods left in inventory is not too old. From week 31to 43 the surge it actual demand of the product surpasses procured goods. In such case even if he has some stock left from earlier dip, he may not be able to use it as it may be too old to dispense. So he may land up in “Out Of Stock” kind of situations. So if he revises his current predictions based on this instantaneous surge then he will have to incur losses due to wastage of procured goods because from week 43 there is again a big dip in demand.

Imagine how complex the situation would be in case of seasonal goods, which are consumed only in some period of a year. Also imagine a situation where a change of trend is inculcating very high volatility in market of few products (Example: Patanjali toothpaste is eating a long term conventional market of Colgate toothpaste).

So mere mathematical forecasting may not be useful for predicting such demand irregularities. Various machine learning techniques are essential to study subscriber behaviour, variations in demands of complementary and substitute product and derive conclusions on future demands of a product.

### Value based benefits instead of competitive benefits

In instantaneous business world, different merchants compete with each other to attract more customers as well as get customers into habit of using them as de-facto shopping channel.

It gives rise to price wars. Many times merchants are ready to bear huge losses, by offering products at dirt cheap prices. Because they think that, cheapest prices visible on their shopping sites, will get their customers into a habit of buying anything from them. Game theory based pricing determination models are being used for this purpose.

In subscription approach the ‘offered’ price of every product should be the function of all of the following

1. Breakeven price of the product, and margin available( between MRP and breakeven price)
2. Current demand of the product
3. Time of subscription(every day new/same price may be available for a product)
4. Total basket (delivery per period) size ,value
5. Duration of subscription.
6. Subscriber’s loyalty with merchant (total duration of all subscriptions with same merchant, number of subscription renewals etc.)

So same product will be offered to subscribers at different resultant prices based on all above criterion.

Due to this it is not possible to compare price of a product on different sites and determine the cheapest option, because price is not only calculated on product characteristics but also on the subscriber’s and subscription’s characteristics.

Instead of giving haphazard discounts on individual products (just for beating competition), benefits for a subscriber can be better organized based on volume of purchase, duration of their association, loyalty, brand loyalty etc. Such a multi layered benefit model not only attracts more subscription but also tempts subscribers to buy more goods as well as extend association for longer term.

### Intelligent Pricing Engine

As we have seen above the net value that a subscriber has to pay for a product is result of multiple factors.

Abut among all these multi-layered benefits the offer price is a component which does not depend on subscription dynamics (such as volume of subscription, duration of subscription, recurrence of subscription etc.) but more on market dynamics.

As per rules of economics except monopolistic products, price of a product is mainly driven by its demand. When a product is launched in the market it starts its journey with a certain MRP. The MRP typically has taken into consideration all the overheads it has to bear before it reaches into customers hands. Due to along supply chain from the manufacturer of a product to the customer, every element in this chain reserves some gain before passing the product ahead to the next element in the chain. That is how a regional distributor receives the at a certain purchase price, he applies his margin onto it and then passes the item to the local distributor with a higher purchase price. Finally it reaches into customer’s hands at an MRP.

Assuming that large subscription business may break the long supply chain and directly purchase large volume from manufacturer or from main supplier, the merchant will have large margin in his hands behind each product.

Merchants usually pass on some portion of this profit to the customers, depending upon how much yield the product is bringing to him.

For subscription business the same model will follow with few modifications to the pricing decisions. Merchant may start with lowest possible offer price, by reserving only a small portion of total available margin just to ensure some profit and passing the rest to subscribers so as to attract large volume of subscribers.

Depending upon increase in demand he will calculate profit that the product is making with current offer price. If profit is increasing he may decrease the price further (if margin allows him) or keep it the same. At certain demand the total operating expenses per unit of product may outperform the profit figure (because shipping charges, storage expense etc. will increase with demand) and profit may start decreasing. In such situation where demand is increasing and profit is decreasing he will make moderate stepwise increase in the offer price to ensure stable or gradually increasing profit. Now product has achieved new normal offered price. When the same situation arises again (demand is increasing but profit is decreasing) the offer price will be increased to the new normal and so on.

Instead of increase in demand, if the demand starts decreasing (due to churning of existing subscribers) resulting into loss of profit the merchant should decrease offer price so as to attract more subscribers. He may continue doing so until demand is decreasing but only until the offer price reaches equal to the breakeven price (cost per unit of product to the merchant). If still demand continues to decrease then he may decide to incur loss and continue decreasing offer price or he may decide to take that product off the subscription business.

Such as precise calibrated offer price calculation may not be possible at right triggers manually. Merchant may need sophisticated algorithms implemented by software systems who will be responsible to tracking the price and demand of each product and come up with price change recommendations at appropriate times.

### Intelligent Budgeting and corrections

As 70% of the future business is getting registered in advance and remaining 30% is forecasted based on this 70%, the precision in the forecast is higher and it should drive budget provisioning for different cost headers/activities.

Due to precise predictions it may be possible that merchant may be fixing the purchase volume of each product in the beginning by negotiating with suppliers. Hence provision of purchase should be recommended by the business model instead of merchant calculating how much investment is needed for purchasing of goods.

Similarly 70% of the delivery schedule as well as volume per package is known expenses on delivery should also be recommended.

Same applies to investment on goods space, electricity/other operational charges as well as need for staff to manage the business should be recommended by business.

It may be obvious that some products are doing bad and hence more efforts and money will be needed to boost their sale (before concluding on taking them out of the business). If forecasts are revealing bad performers and difference between target performance and actual performance of each of them, business should recommend how much provision should be made on an effort to boost their sale.

Moreover the business should tell the merchant when a slab of budgeted amount should be released for its consumption. Even if annual provision under each expense category has been made, one should also be able to determine how much of the provision should be released in each cycle and how are the cycles scheduled. This way merchant will be notified if out of cycle release of some provisioned amount under a specific category needs to be released. It means that spend of budgeted money for a category is not going as per the predicted path and there is some intermediate surge in demand of money due to some deviation in business. Such an indication of deviation may be a good or bad sign. For example if merchant comes to know that he has to release additional money for purchase of additional goods stock much ahead of its anticipated purchase date, it is a good sign because it indicates that business is growing much faster than anticipated. Whereas if merchant needs to release additional money for branding/advertising expenses of a product or for making provision for additional discounts, out of schedule it means that product may be doing really bad business and hence needs urgent monetary support to boost its sale.

Another approach is to feed back the deviations in anticipated/forecasted demands to the business so that business model should be able to recalculate revised needs for additional/lesser monetary provisions. For example: Sale of a product is exponentially growing much ahead of its forecasted demand. It indicates more provision for purchase of its additional stock. It may also indicates more provisions for delivery expenses as more subscribers are connected to business than anticipated.

If the business rules in subscription business model help the merchant make the budgetary decisions, he will be able to equip himself very well against the dynamics in the market.

### Products collaboration model

In banking business, few wealthy people keep their income in banks in the form of deposits and earn interest on it. Bank uses the same money to lend it to the needed but deserving people and earn interest from them. Bank charges more interest from the lenders than what it pays to the depositors and thus makes money to run the business.

Here the proposition is to have a centralized “Nodal” account where ‘well doing’ products will deposit their “excess” profits. This money is lend to the new coming products or non performing products to launch/boost their business. It can be used on advertising expenses on these products or offering additional/promotional discounts. The “Donor” products will gain credit points in proportion to the contributions that they have made and the “Lender” products will lose credit points in proportion to the amount they lend. This credit history will be used to clearly distinguish Top rated products from the low performing products. In case of top performing products merchant may wish to adopt different pricing strategy due to their dominant/monopolistic business growth. In case of low performing products merchant may work on appropriate business recovery measures or may decide to take some of them from subscription business.

# Product Centric Subscription Model

One can think of an approach to define the subscription model where overall business is considered as an atomic entity and all the predictions, calculations, decisions are done at business level. Business tells its overall forecasts, its procurement needs for different products, it overall revenue, profits/losses and performance is measured at a business level. Business centric metrics such as percentage revenue growth/loss per period, percentage profit growth per period, percentage subscription churn per period, average monthly recognized revenue at business level, percentage MRR churn, Average revenue per subscriber etc. can be tracked at business level.

But the challenges with this approach are manifold.

1. In case business is doing well by exceeding all its forecasts/targets it is difficult to identify the contributors to the success as all measurements are happening at business level.
2. The same is true in case business is doing badly. Which products are not letting the business scale as expected is not coming out from business level metrics.
3. Few of the subscriptionable products would be doing better than expectations whereas some of them struggling to perform. In such if a well doing product needs to contribute its excess gains to the inferior doing product (as described in product collaboration model), product level performance need to be measured and product should be capable to keep track of credit of its excess gains to nodal account and their recovery at later point of time. Also products should be tracking the credit points for their donations or loosing credit points for lending for performance recovery efforts.
4. Some products may not do well alone but may do well if coupled with their complements. For example: XYZ brand of baby powder will only gain momentum in the market if it is offered as a package deal with ABC brand diapers which are doing very good. Such substitute/ complement dynamics can be revealed out only after tracking individual product’s sole performance as well as its combined performance along with some other product.
5. Tracking at product level can also reveal important observations around changing trends such as which of the products, which were gaining more loyalty are now facing major churning, which products are gaining more momentum as compared to their substitutes, for which products the offered discount in the offer price may be reduced as their demand is exponentially growing whereas the other products which need more discount offerings as they are significantly deteriorating in demand.

Demands vary from product to product so that some products are doing great and some are struggling to compete. When a subscriber wishes to subscribe for number of products, it may be combination of preferred brands for primary needs and cost effective brands for secondary/optional needs. So it would be strongly advisable to measure success or failure of a subscription business in terms of dynamics associated with each product, instead of measuring it at business level.

**Product centric subscription business model looks at overall business as composition of businesses of multiple individual products their collaborations among each other and their impacts on each other.**

Each product has its own story to tell. It may be doing very well because it is among the top brands, or it may just have appeared in the market and trying to establish its identity. A product may be providing great margins per unit to the merchant but its overall sale is moderate, resulting into limited overall gain. Alternatively, a product may be providing very narrow margin per unit but its sale volume is very high, resulting into considerable gains for the merchant. Some products bring great profits whereas others bring great revenue. A product may be very price elastic. It means a small variation in its price may result into huge variation in its demand. Similarly some product may be price inelastic, resulting into no significant change in demand for a moderate change in its price.

A product does not operate independently in the market. It has various forms of correlations with other products. These relationships aid in determining the price and performance of a product.

Some products are more essential than other. Clever marketing can make a less essential product more essential by making people habituated to it. Some products are required more frequently than others.

## Rules for product centric subscription model

The business model proposed in this thesis is product centric business model. Following rules for a product will provide its characteristics as well as responsibilities in order to operate in subscription business

1. Forecast will be made for every product individually, depending upon DNA of the product. It will include how many subscriptions it may win during the period and how much churning in its subscription may take place. The actual performance for a product will compete with forecast and periodically ‘corrects’ the forecast based on the actual trends. Thus forecast keep on getting more précises and tougher for the actual product performance to follow/overcome it. Overall business forecast will be an aggregation of forecasts of individual products being traded.
2. Every product will maintain its own profit/loss account. Any new sale of a product registers appropriate profit in its own account, whereas any churn registers loss.
3. A product knows about all its substitutes and complements. It can decide its price by taking into consideration price of its substitutes as well as complements.
4. A Product’s account maintains list of its own price buckets. Price bucket represents any offered price of a product at an instance (for the given purchase price and MRP) to which one or more subscribers have subscribed. When a price is offered newly, all new subscribers then after subscribes for the product at this price. Until there remains a single active subscriber subscribed at this price, its price bucket will remain active. When all subscriptions associated with a price get exhausted, the price bucket expires.

Since product prices are calculated periodically and may be changing very frequently, at any given point a product may have multiple active price buckets. Total subscription to the product at any point of time should be the aggregation of subscriptions associated with all active price buckets at that time.

1. A Product can be a good revenue generating contributor, whereas some other product may be a good profit generating contributor. Appropriate contribution targets will be used to trigger price changes. Revenue generating products will change their price when their actual revenues grow/fall by x% than current forecasts. Similarly profit generating products will receive price change trigger when their profits grow/fall by x% than forecast.
2. Every product bears its own share of different costs/expenses incurred for running the business. Depending on special maintenance needs, some of these expenses may vary from product to product. Example: Milk needs refrigeration whereas body soap does not have any such special needs. Hence milk may have to carry additional share of electricity expenses.
3. Every product reports its own performance metrics by which its performance can be analysed in isolation as well as against all its competitors.
4. Every product decides next sale targets for itself based on forecasting on historical actual performance data. Also it decides the trigger event (decision point) to change its offer price, based on how much variation of actual revenue/profit from the forecasted targets should trigger the price change.
5. In case a product is doing better than expected, then it contributes some of its additional gains to a central repository called “Nodal Account” and earns credit points proportional to the amount it donated. The product which is not doing well it can borrow some money from this repository so as to recover from losses. It in turns loses its credit by losing number of credit point proportional to the loan availed.

Thus performance of an overall business can be granularly tracked as aggregation of performance of every individual product offered for subscription.

# Elements of subscription business model

The subscription business model described here is viewed as a subscription software system model. In the modern world defining any new business model without inferring its implementation is an online software system would be inappropriate. Also success of the subscription business model lies in its volume of subscriptions and such a voluminous business cannot be thought without having an underlying software system which would track performance of each product and contributions/ loyalties of each subscriber. Though the elements of business model can also be implemented without any software in place as those are just representing essential parts of subscription business domain will lay out rules to run business in subscription approach.

As we have created the ground for subscription business model in the above section now let’s walk through each sub-domain of the subscription domain.

Each subdomain is responsible for finite set of activities/functions and these activities are triggered by either external stimulus (some operation done by subscriber or by merchant) or they are triggered by the life cycle events by the same or different sub domains.

Few Examples of event based processing are given here. A product is registered by the merchant by setting certain business rules associated with it. Then only it is available for subscription. An increase in the purchase price of a product will trigger recalculation of its offer price ( as per new purchase price). A Delivery made to a subscriber will register a revenue and profit appropriate to its basket value in business account. Registration of an excess profit on account of a product will register donating the excess profit into nodal account.

The reason for describing the sub domains using event based processing are

1. The boundaries of all sub domains can be marked precisely without any interference from other sub domain. Typically any lifecycle flow will complete only by series of activities happening across multiple sub domains. In case of their description in the event based approach each sub domain will process its part of the lifecycle flow and bounces an event thereby publishing the outcome. If the next activity is to be performed by a different sub domain then it will simply receive the published event and proceed on it. Thus sub domains will not inter mingle with each other and responsibilities of each domain can be precisely defined.
2. Event based processing can also be viewed as a software design. In case the business model need to be transformed into a software system no separate design will be needed to describe it.

## Product

Product business domain represents every product as an active entity which has its own characteristics and it is responsible for collaborating with other domains so as to serve number of responsibilities.

### Pricing categories

As we described earlier depending upon the price dynamics of a product, which are mainly associated with supply and demand of it each product should be priced into one of the following pricing categories.

1. Price Committed Products: In case of price committed products, price of a product committed to a subscriber at the time of subscription, should remain same until end of his current active subscription (contract period with merchant). This should hold true even if the product/merchant has started incurring losses on that product (after committing price) OR cost of that product gets changed one/many times during subscription period (after committing one price).
2. Percentage Discount Committed Products: In case of percentage discount committed products a subscriber should be committed a constant percentage discount on the latest MRP at the time of every delivery. In this case the actual price to be paid by subscriber may vary as the percentage discount is calculated on latest MRP at the time of every delivery.
3. None Committed Products: In case of no commitment products the subscriber has to pay latest offered price on the product at every delivery. Some time it can be much lesser than the one shown at the time of subscription and sometimes it may be considerably more.

### Product Attributes

In order to take care of aspect of an intelligent product, each product will be associated with following attributes which will describe a product in from of its metadata.

1. Unique product identifier and name to distinguish it from other products
2. Category/sub category of product describing the product belonging to which family and if there is any sub category where they are further classified into. Products in the same category/sub category may be substitutes or complements of that product.
3. Weight of the product which will help in precisely identifying a specific product subtype among all variants of the same product/brand as well as it will be used to calculate the delivery charges required to deliver product.
4. Unit of measurement (ml, gram, kg etc.)
5. List of its substitutes and complements; as price changes in them are impacting pricing of the product
6. Demand density of the product. It defines the percentage share of a product in its category against all its substitutes/competition. Here assumption is made that total demand in market for given type of product is 100.If product A is sold 20 out of 100 then its demand density is 20(%).Demand density indicates a product’s market share against all its competitors. It should be periodically recalculated so as to see if the product is getting stronger or weaker against its competitors.
7. Average demand per year per subscriber: It provides average number of units of a product ordered per year per subscriber. This can be used to offer basket level discount per product (added to basket). If a subscriber orders above the average demand then he should be entitled for more basket level benefits and inverse if orders lesser than the average.
8. Product account. As we have described earlier product oriented subscription business model assumes that each product is a revenue/profit carrying agent and hence needs to track its performance dynamics by itself. In order to achieve this, each product maintains its own business account in itself. We have named it as “Product Account”. A Product’s account is responsible for maintaining predictions for the parent product as well as tracks the actual transactions happening with product including its price change. We will see it in detail in next section.

#### Product Account

Product account is responsible for maintaining financial attributes and metrics associated with a product. In all of the following scenarios appropriate attributes of product account should be updated.

Product Pricing Category: Product account maintains pricing category of the product. Every product can be categorized either as “Price Committed”, “Percent Discount Committed” or “None committed” depending upon, with which type of commitment it is being offered to subscribers. Also this category determines how the price buckets are managed (multiple price buckets for committed price or various committed discount percentages or single price bucket because for a “None Committed” product).

Tagged Price Versions: The list maintains versions of purchase price and MRP pairs that have associated active subscriptions. When purchase price (and MRP) of the product undergoes change, this pair should get added in Tagged Price Versions list as a new tagged price version. A tagged price version should be active until active subscriptions are associated with it. Then the same can be archived. These different versions having active subscriptions, enable calculation of appropriate metrics listed in performance tracker.

Fixed Expense Versions and Variable Expense Versions: The total business is expected to report total monthly fixed and variable expenses. The same should be distributed to each product depending upon how that product has contributed to these expenses. A sophisticated distribution algorithm is required to distribute these expenses across all subscriptionable products we will see this algorithm in the subscription domain. For a product, when it receives its contribution of fixed and variable expenses it should add a new version of fixed/variable operating expenses in the versions list maintained by Product account.

Current Stock of Units: The parent business is expected to keep track of periodic demand and supply of stock for each product. The business is expected to periodically inform current stock of a every product against which subscriptions can be received. When the stock information arrives, and if it is different than earlier one, it should be updated in “current Stock in Units” attribute.

List of active price buckets: All price buckets, each having active subscriptions associated with it is called as active price buckets. These are maintained within a product account. We will get more description about them under Price Buckets section.

Product Performance Tracker : Performance of a product need to be periodically calculated/measured in terms of basic metrics and tracked so as to understand if product is doing good/average/bad business. Moreover some of the performance metrics such as profit or revenue are tracked against forecasted performance figures to determine if offer price of the products needs to be changed. We will get more details about them in pricing section. The periodicity of calculating performance metrics should be determined by the merchant.

Credit points: As described in product collaboration model, product donates its excess profit (profit earned above set target) to an intermediary “nodal” account. When it does that it earns some credit points for each unit of money donated. These credit points indicate credibility of a product as well as help it get financial help in crisis situation or during execution of expansion plans

##### Price Bucket

In instantaneous business offered price for a product remains active only until a new offer price replaces it. So any customer who is buying the same product at different times may likely pay different prices. But since his/her nature of association with merchant (for the purpose of buying a specific product) is instantaneous, he/she may agree to pay different price for same product for different association instances.

Subscription approach intends to have long term association with every subscriber. So charging different prices for a subscribed product at different times in the same subscription agreement, may ruin the trust of the subscriber. Hence subscription approach should try to provide some level of price assurance wherever possible to the subscribers, in order to make the commitments bidirectional. Of course complete price assurance for all types of subscriptionable will be practically impossible, as price elasticity of each of the products are different , their demand vs supply equations are different and hence prices of few products may vary significantly and such products may not be offered with absolute price assurance. In case of other products though the changes are less frequent impact of inflation is going to influence its pricing, resulting into increase(most of the times) in their base prices. So we have to answer find solution to the challenge of price assurance.

Subscription business may commit an offer price for a product to its new subscribers so that they will keep receiving the product with same offered price (regardless of changes in its base price). Alternatively it may offer committed discount percentage, where subscriber will always gain a committed percentage discount on latest MRP.

When its offer price changes, a new price bucket gets created and any new subscribers thereon get associated with the latest/new price bucket. Earlier active subscriber still remain associated with earlier price buckets. If a subscriber remains associated with a single price/percentage discount or should be paying new price every time is determined by the pricing category of the product.

This results into multiple offer prices being active for every product until each of them has at least one active subscriber. Price bucket represents these prices and number of subscribers associated with each of them.

###### Price Bucket for Price Committed products

When a product is launched for subscriptions, its first price bucket is created for it, having some offer price. When a subscriber subscribes to that product on the same day he/she gets registered with this price bucket. Then he/she is assured of getting the same price throughout his/her subscription contract.

Offered (sale) price of a product may keep changing due to dynamics of its demand OR due to change in the base (purchase and MRP) prices. For every changed offered price, a new price bucket will get created with a new offer price. Subscribers subscribing on/after the price change day are registered with this latest bucket.

Following are the attributes of a price bucket.

1. Offer price per unit
2. Start and end date of the offered price
3. Tagged price version providing base purchase price and MRP on which this price is being offered
4. Number of new subscriptions getting associated with this offered price
5. Number of subscriptions churned out from the offered price
6. Total number of subscriptions associated at any point of time.
7. Total number of subscriptions delivered from this price bucket.
8. Status of price bucket( CREATED,ACTIVE, EXPIRED)
9. Total profit earned by a price bucket( on account of subscriptions earned on the given offer price)

Example: Consider that On 1st January 2016 purchase price of product X is 45 Rs., MRP is 90 Rs..On the same day platform generated a new offer price of 72 Rs.. A new price bucket has been created on 1st Jan 2016, in which it has offered sale price as 72 Rs. The new/churned and total subscription count is 0 at present.

A subscriber has subscribed to two units of product X per month (for one year) on the same day. Subscriber’s total subscription count (2 units per month \* 12 months=24 units) gets add to “Number of New Subscriptions” attribute of this bucket. Also the price bucket ID gets registered in his/her subscription definition (so as to remember which offer price has been committed to him/her).Thus all the subscribers, who have subscribed to product X on the same day/time, will get registered with the same price bucket. Also until new price bucket gets created, all subscriptions to product X will continue getting registered with the same price bucket.

After a few days the offered price has been changed from 72 Rs. to 69 Rs.. A new price bucket gets created. Now onwards any new subscriptions will get registered with this new bucket.

In case of price committed products, though purchase price of the product has changed, offer prices committed to subscribers so far, cannot be changed. But the same will get changed for any new subscribers subscribing after purchase price change. Change of purchase price will trigger new price calculation and it will result into calculating new offer price, thereby creating a new price bucket.

###### Price Bucket for Percentage discount committed products

In case of percentage discount committed products too, price buckets get created in the same way as described in above category. But instead of offer price attribute they will have percentage discount attribute associated with them.

Periodically based on performance of a product or based on the base price changes new price buckets keep getting created (as in price committed category).But each price bucket ill offer a different percentage discount on latest MRP instead of offered price. Subscribers associated with each of these buckets will enjoy the offered discount prescribed in that price bucket.

In case base price (purchase price and MRP) of the product undergoes change, it gets reflected to all the price buckets. From that day subscribers will be charged new price with fixed (committed) percentage discount but applied on new MRP.

Following are the attributes of a price bucket.

1. Offered discount percentage(on MRP)
2. Start and end date of the offered price
3. Tagged price version providing base purchase price and MRP on which this price is being offered
4. Number of new subscriptions getting associated with this offered price
5. Number of subscriptions churned out from the offered price
6. Total number of subscriptions associated at any point of time.
7. Total number of subscriptions delivered from this price bucket.
8. Status of price bucket( CREATED,ACTIVE, EXPIRED)
9. Total profit earned by a price bucket( on account of subscriptions earned on the given price discount)

Example: Consider the same example given for price committed price bucket. But now assume that instead of committed price the product is offering percent discount commitment.

So on 1st January 2016 platform has created a new price bucket for product X where 7% discount (on latest MRP) has been committed; gets created. As a new subscriber subscribed for 24 units of product X for one year, 24 units (2 units per month subscribed by a subscriber for 12 months) get added to “new subscription count” of this price bucket. All subscribers subscribing to product X on and after 1st Jan 2016 will be committed 7% discount on latest MRP.

In case means base tagged price (pair of purchase price and MRP) undergoes change, the value of tagged price version will get overridden by new tagged price version in same price bucket. Hence the actual offer price subscribers of this price bucket will have to pay, will also change, despite of the discount percentage being constant. THs is because this 7% discount will now be calculated on new MRP.

When platform changes the discount percentage from 7% to say 6%, a new price bucket gets created. Any new subscriptions after this time will get associated with this price bucket.

###### Price Buckets with ‘None’ commitment

There is no need to form multiple price buckets in case of products configured with ‘None’ commitment as all subscribers of this products will always be paying the latest offer price. A single price bucket will be created with latest offered price. All subscribers to that product are associated with same price bucket (regardless of when they have subscribed for the product). As and when offered price changes, the same will be reflected as offer price in this price bucket and the same will be applicable to all its subscribers. Structure of this price bucket is same as the one for price committed products. Only difference is, in this case a single price bucket is created per product.

1. Offered price per unit
2. Start and end date of the offered price
3. Tagged price version providing base purchase price and MRP on which this price is being offered
4. Number of new subscriptions getting associated with this offered price
5. Number of subscriptions churned out from the offered price
6. Total number of subscriptions associated at any point of time
7. Total number of subscriptions delivered from this price bucket.
8. Status of price bucket( CREATED,ACTIVE, EXPIRED)
9. Total profit earned by a price bucket( on account of subscriptions earned on the given price discount)

Example: In a country which imports Lentil, the lentil prices are very volatile due to supply vs demand dynamics and uncertainty of international lentil price. Lentil prices keep changing so frequently that it is impossible for a merchant to offer them using either of “price committed” or “percent discount committed” approach. So merchant has configured lentil as a “None Committed” price category.

A single price bucket gets created for Lentil product item with latest offer price say 100 Rs per Kg. If a subscriber A has subscribed to 1 Kg lentil per month for 12 months, a subscription count of 12 units gets added to “New subscription Count” attribute of this price bucket.

Very soon offer price of Lentil has risen to 120 Rs per Kg. In this case subscriber A( and all subscribers subscribed for Lentil earlier and new) will have to pay 120 Rs per Kg from now onwards.

As subscribers have chosen this item for subscription despite of its published pricing category being “None Committed”, they are made aware of volatility in its offer price and hence should be ready to pay the price differences, if any.

#### Product Performance Tracker

Product performance tracker keeps track of periodic performance metrics of a product. Number of metrics are defined below which indicate health of subscription business for a given product. Merchant can decide at what periodicity he/she wants the metrics to be calculated (default is monthly). There should be a batch job to calculate all these metrics and store them in appropriate repository. The same are then used to monitor performance of a product in different formats (text, graphs/bar charts, comparative view with substitutes, snapshot for a period etc.).

A domain “Business Activity Monitoring” makes use of this performance data of each product to monitor overall business progress at a business level as well as at individual product level.

##### Product Level Metrics

Performance of a product in the business is tracked using following metrics

1. Number of new subscriptions each month : New subscriptions registered with a product in given month
2. Number of churned subscriptions each month: Subscriptions related to a product those are churned (cancelled) in a given month.
3. Total subscriptions per month: Total subscriptions of last month + number of new subscriptions in current month – number of churned subscriptions in current month.
4. Monthly operational expenses to be borne per product. This should be calculated based on per product operating expenses contribution calculation made by operating expense distribution job described in coming section.
5. Monthly sales and marketing expenses (Optional) : In case merchant is making any sales and marketing expenses in order to promote a product
6. Breakeven price: The minimum price per unit of a product to cover the all associated costs but will result in 0 profit.

Breakeven price = Fixed cost for a product per unit + variable cost for a product per unit.

**Breakeven price = product’s purchase price + operating expenses per unit + sales expenses per unit + taxes and misc. expense**.

1. Offered price per month: The price(s) offered to subscribers in a given month. When metrics related actuals are tracked there can be multiple offer prices per month. But when metrics are calculated for the forecasted demands/churns, the number of times an offer price may change is not known. So forecast will assume single average offered price per month. In this case there are twelve (12) offered prices per year (one average offered price per month) to which subscriptions are affiliated.
2. Net new subscriptions and Total subscriptions per month to indicate demand
3. % subscriptions churn per month = - #number of churned customers current month/total # customers at last month
4. New MRR: Monthly recurring revenue due to new subscriptions in a month. – Σ (number of subscriptions for offer price \* offer price).
5. Churned MRR: Monthly churned revenue due subscribers associated with different offer prices getting churned. Σ ( number of churned subscriptions per offer price\* offer price)
6. Net new MRR = New MRR + Churned MRR
7. Percentage net MRR churn( churned MRR/starting MRR)
8. Ending MRR = Ending MRR of last month + Net New MRR
9. Ratio of Its expected quantity demanded per month against total quantity demanded of all products in the same category( product and all its substitutes)
10. Monthly Average revenue per new subscriptions (ARPS (New) = New MRR/# New Customers \*1000)
11. Average revenue per total subscriptions (ARPS= Ending MRR/# total subscriptions\*1000).
12. Total monthly revenue
13. Total Cost of goods sold (COGS= Σ (Total subscriptions for a purchase price\* purchase price in a month)): Though subscribers are committed the latest sale price of a product at the time of registration, they are periodically dispatched these products at different times during subscription period. At every dispatch time, the product being dispatched may have been purchased at different purchase price. This metric captures the total cost of number of product units dispatched in the current month having different purchase prices. This is an important indicator of impact of change in product price on the revenue and margin.
14. Gross Margin = Revenue - COGS
15. Operating profit/loss(gross margin – operational expenses) and Operating profit/loss percentage (operating profit or Loss/COGS)
16. Subscription Lifetime Value(SLV): ARPS(New)\*Gross margin%/%MRR churn
17. Subscription lifetime period = 1/%customer churn
18. Cost of Acquiring a subscriptions (CAC)=(sales& marketing expense/number of new subscriptions) \*1000)
19. SLV to CAC ratio: SLV/CAC. This indicates how much a subscription will yield by investing specific cost of acquiring a customer as a subscription. For a healthy product this ratio should be more than 4.It means if a merchant invests x rupees in acquiring a subscription, the subscription should at-least yield 4x rupees of business with the merchant.
20. Months to recover CAC= CAC/ (ARPS (New)\*Gross Margin %) . This indicates how many months (minimum) an average subscription should be retained in order to at least recover cost of acquiring it.

### Lifecycle

#### Product Registration & Configuration

1. Product should get registered with Subscription ecosystem in order to be identified as a “subscriptionable” product, product to which subscribers can choose to buy. This distinction also helps merchant who are also doing instantaneous business to distinguish the products which are available for subscription business form the range of products that they offer. In order to register a product following set of activities need to be performed.
   1. Assign unique product identifier and name to a product to distinguish it from other products.
   2. List the product in appropriate category and sub category describing the product family and if there is any sub category where they are further classified into. Products in the same category/sub category may be substitutes or complements of that product. Merchant can opt to define his own categories based on the product offerings he have. For retail business product categories mentioned earlier can be sued as reference point to start defining categories.
   3. Define Weight/volume of the product which will help in precisely identifying a specific product subtype among all variants of the same product/brand as well as it will be used to calculate the delivery charges required to deliver product.
   4. Define Unit of measurement in which product is measured (ml, gram, kg etc.)
   5. For each product list of all identifiers of its substitutes and complements; as price changes in them are impacting pricing of the product. It also helps in comparing product’s performance against its substitutes and complements.
   6. Sensitivity characteristic of the product to illustrate if product is consuming more electricity or more space. Per unit operating expenses are calculated according to the sensitivity characteristic of the product.
   7. Assign appropriate pricing category to the product to describe if product is ‘Price Committed’ or ‘Percent Discount Committed’ or ‘None Committed’.
   8. Define base purchase price of the product. This is the purchase price the merchant is paying at the time of product registration.
   9. Define base MRP of the product. This is the MRP of the product at the time of registration. Since purchase price and MRP of the product are going to change multiple times in future this initial purchase price and MRP pair is maintained as first element of tagged price version, a collection which keeps versions of changed pairs of purchase price and MRP.
2. Registration is followed by configuration. It’s configuration should dictate how and how much it can contribute in the subscription business. Following configuration attributes are set which determine how the product is going to be managed during its life. This configuration is required mainly in case the product forecasting and pricing is driven by a computer based system. In that case the system should know how to determine the forecast and which factors will contribute to the price determination of a product.
   1. Define Pricing Strategy Type: In case merchant is practicing multiple pricing algorithms for price determination of different products, pricing strategy determine which one should be applied to determine/change the price of a specific product. There can be multiple strategies in place such as demand based price calculation strategy, demand and cost based pricing strategy, instantaneous pricing strategy etc. We will see the different strategies in the “Pricing” section. Depending upon price elasticity of the product merchant need to decide which pricing strategy should be adopted by a product. Thus different products are configures with different pricing strategies.
   2. Decide aggregation period for target forecast: When a forecast is to be made it can be weekly, monthly, quarterly, yearly depending upon nature of analysis. The subscription model should keep flexibility for the merchant to choose appropriate forecast granularity depending upon price elasticity of a product and amount of historical data available for future predictions. A merchant may wish to use different forecasting intervals for various products to forecast demand and churn of a product. In case forecast aggregation interval of 15 days then existing daily actuals data of demand and churn is aggregated into chunk of 15 days the such as list of demands /churns each of which is 15 days is fed to the forecasting mechanism so that next forecasts those are derived are also spaced at 15 days intervals. For some products he may wish monthly aggregation of actual data so that he will get monthly forecasts and so on. Thus depending on demand and churn frequency he may choose to apply different forecasting intervals.
   3. Determine target change threshold for price change: New price needs to be calculated for a product if the difference between its forecasted demand and actual demand is consistently more than certain threshold value for a specific duration. This threshold is configurable as ‘Target Change Threshold for Price Change’. So if merchant sets this threshold as 10%, then price will be recalculated when the difference between forecasted demand and actual demand is consistently +/- 10% over a specific duration. This setting acts as a trigger to initiate price recalculations for various product and its value will be product specific.
   4. Decide if Cross price elasticity should be considered for price determination. The demand function for computing price may include cross price elasticity. Cross price elasticity denotes impact of price change in substitute products on demand of this product (and thereby price of the product). In case merchant wants to include cross price elasticity in price determination it will indicate so by setting this flag.
   5. Decide if impact of advertising expenses should be considered on price determination: The demand function to be used to determine price of a product at certain demand can also encompass impact of advertising expense on increase in demand (thereby increase in price).SO merchant can determine if this impact needs to be considered during price calculation for some products.
   6. Determine the extent of old /historical data to be used for forecasting (Demand Curve Period). While forecasting for a product too old data may add noise to the forecast quality. This is because in case of products where trend has drastically changed the data depicting too old trend may not have large relevance. But on the other hand too less data may provide inaccurate forecast due to insufficient quality of behavioural patterns exhibited by it. So one can set how much period is appropriate for a product to determine its forecast by setting appropriate period for this attribute.
   7. Determine which Pricing Options is opted by the merchant. In case automated price determination is happening merchant can decide whether he wish to rely fully on this price generation OR whether he wishes to have a recommendation of price from the pricing system (which he may or may not accept) OR whether he does not want to use pricing system. In case he decides to fully rely on automatic price generation then the price get computed when certain demand/supply thresholds are met and automatically gets set as new offered price. If he has chosen the option of getting ‘recommendation’ then newly calculated price is shown to him for ‘acceptance’. He may accept the same or may override it. In last case where he has not opted for automated price calculation option, the price will not be calculated by the system and he will drive the price of that product manually based on his experience.

#### Manual Forecasting

Forecast is used to extract all the information about the future that is already present in the past.

Typically when a product is launched in the market, it has a specific volume of fan followings. So its demands starts growing from 0 at a rate proportional to the popularity and need for it. At certain point it reaches to some saturation level and then its demand becomes constant.

In case trend changes or a product starts losing its popularity, its demand starts decreasing at a rate proportional to the change sweep in the market. In that case too, the rate of decline is predictable to a great extent.

Rise in demand of a product and fall in its demand is stored as the historical demand information and its probable behaviour (demand trend) in near future can be “forecasted” by using this historical data.

In absence of any historical data, forecasting starts with demand predictions manually set by merchant, based on experts’ judgements and experience. Since these predictions are merely expert guesses about the rate of demand growth they may not be close to reality. Actual performance of the product may go vastly different than these predictions. As actual performance of a product starts getting captured, it gets used to correct the manual forecast figures (through automated forecasting) so as to match it with current demand/churn trend for that product.

Manual forecasting is a prerequisite lifecycle activity (after product registration and configuration) in order to launch a product for subscriptions, in case no historical demand information is available for a product.

As we have seen before demand of a product depends on various factors. Many of them are related to regional dynamics, trends as well as different personas and their preferences and hence are not under the control of business. The only element that has considerable impact on demand for most of the products, is the offer price of a product. Hence the rate at which demand changes is correlated with price to determine right price which will help boost demand.

Assuming that a product is launched with a clean slate (no historical data), for first few days merchant has to manually set following attributes as a forecast of the product.

1. Define periodicity of each forecast (Weekly, monthly, quarterly etc.): Merchant can decide to set weekly / half monthly/ monthly/ quarterly/half yearly data as a forecast (projections). Based on the periodicity of this data, forecast engine should compute future forecast values in the same periodicity cycle. For example if merchant has manually set demand projections of a product at monthly periodicity for first four months, say for January, February, March and April then using this demand values the forecast engine will project next two forecast values which will also be monthly, viz. May and June. The software system should provide this flexibility to choose projection period for every projection as start and end dates for the projection element (daily /weekly/monthly etc.)
2. Define purchase price per each forecast: Based on visibility of the merchant he can predict if the same purchase price will continue until the end of forecast that he has defined or whether there is a likelihood of change in it, what will be the changed purchase price and in which forecast period it will change.
3. Define MRP per each forecast: Similar to purchase price the merchant can predict if the same purchase price will continue until the end of forecast that he has defined or whether there is a likelihood of change in it, what will be the changed MRP and in which forecast period it will change.
4. Define number of new subscriptions per forecast: Merchant based on his experience will try to predict how much will be number of new subscriptions for a product in each forecast unit period.
5. Define number of churned subscriptions per forecast: Merchant based on his experience will try to predict how much will be number of subscriptions for a product those will be churned in each forecast unit period. Based on the predictions on new subscriptions and churned subscriptions number of total subscriptions can be derived.

Example: new subscriptions of first month for product X are 1245, number of churned subscriptions for X for same month are 0, So total subscriptions for X in first month are 1245. Now if number of new subscriptions for X in second month are 1356 and churned subscriptions for the same period are 124 then

Total subscriptions for X at the end of second month= Total subscriptions at the end of first month + new subscriptions in second month – churned subscriptions in second month.

Total subscriptions for X at the end of second month= 1245+1356-124 = 2477

1. After defining the forecast values for some period when the actual subscriptions start getting registered for a product then they are used correct the values for remaining future forecasts. When earlier forecast for a period gets overridden then earlier forecast value gets expired and new forecast value is tagged as ‘Active’.

Example input parameters table will look like this

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Month1** | **Month2** | **Month3** | **Month4** | **Month5** | **Month6** | **Month7** | **Month8** | **Month9** | **Month10** | **Month11** | **Month12** |
| Purchase Price | 45 | 45 | 45 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| MRP | 75 | 75 | 75 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Average Offered price | 65 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 |
| New subscriptions | 3000 | 2300 | 2400 | 2540 | 2600 | 3200 | 2800 | 3500 | 3200 | 3300 | 3100 | 2800 |
| Churned subscriptions | 300 | 200 | 120 | 160 | 150 | 210 | 160 | 140 | 120 | 100 | 130 | 170 |
| Merchant’s expected profit (%) | 10 | 10 | 10 | 10 | 12 | 12 | 12 | 14 | 14 | 15 | 15 | 15 |

Merchant will set above mentioned forecast attributes for first few weeks/months. Based on actual performance (actual changes in purchase price/MRP, actual increase in new subscriptions/churned subscriptions) he should keep on correcting the forecast figures for respective periods manually. This is because actual forecasting/pricing calculation algorithm will be able to execute only after having at least 10/15 forecast entries. Manual forecast will not be required once appropriate historical demand data for a product is available.

The above graph represent a two months snapshot of forecasting of total daily subscriptions and daily churned subscriptions of a product. This a plain forecast representation forecast a product without considering impact of actual performance of product in the forecast. It will help us understand how the forecast undergo corrections due to deviations of actual performance from the forecasted figures.

Example: For a product having 30 Rs. as purchase price, 3 Rs. as operating expenses per product per unit and 55 Rs. as MRP, a merchant has decided to launch a product ‘X’ with opening offer price 52 Rs. and predicated that its subscription for first month will be 750 based on his expert judgement.

But soon he realizes that 750 subscriptions have been crossed in first 15 days. So he/she “corrected” prediction for subscription count for current month to 1200. Also he decided to change the offer price, so as to further boost the subscriptions rate and offered a new offer price of 51 Rs.. Also he predicated subscription of next month as 2200 units.

He witnessed that 2200 subscriptions are covered in first 5 weeks. So he /she again corrected subscription prediction for current month to 2400 (from earlier 2200), changed the price to 50 Rs, and predicted subscription count of 3200 for the third month.

Thus initially he made few predictions manually as well as made manual offer pricing decisions. Based on the actual response to the sale, he/she keeps on repeatedly correcting forecasts as well as trying to offer products at more lucrative prices in order to attract more demand.

His predictions (new subscription count, churned subscription count, total subscription count) are stored in repository and corrected time to time when he manually modifies them. Also the actual daily subscriptions to product X are also stored in repository. After having sufficient actual subscription counts and offer price records in “actuals” repository, the same can be picked by appropriate forecasting algorithm for automated forecasts for the future period.

#### Periodic Automated Forecasting and forecast correction.

Merchant will set manual forecast for each product as described above and keeps on correcting them manually based on the actual performance for first few months/weeks(depending upon unit of forecast period selected) and then can trigger the automated forecast.

Once automated forecasting for a product is triggered it is expected to run periodically at a defined schedule (let’s say every day/week at a specific time). But performance of a product does not deviate every day. Then why do we need to run the forecasting every day? But on the other side, if we decide not to trigger forecasting every day, then how will we come to know when to trigger it?

There is a relationship between pricing and forecasting here. The flow of activities is determined as follows

1. A product forecast job once run, defines forecast for some future period (few weeks or months).
2. Every day a product keeps gaining new subscriptions as well as keeps churning few existing subscriptions. These are tracked as actual demand of the product.
3. On every run of forecast job this actual demand (and churn) of a product gets compared with its predicted value for that day.
4. When actual demand of a product starts deviating from its forecasted value by more than ‘target change threshold for price change’ for that product, it means that the product’s actual performance is considerably different than its prediction.
5. It also means that current offer price, which was set for a predicted demand (according to earlier demand trend) is not appropriate for its actual current demand, and hence the pricing algorithm gets triggered to reset the price to a new value.
6. It also means that current forecast is no more valid and hence it needs to be recalibrated according to the new actual demand trend. So day on which the difference between forecast and actual demand of a product exceeds its threshold, the pricing job sets the next forecast date for that product as current date plus the aggregation period (denoting if we need weekly forecast or monthly forecast or so on).
7. Also at this point the earlier forecast values for demand are marked as ‘invalid’ and history of actual demand values is going to be used for calculating series of next forecast values.

Thus forecast calculation job gets triggered every day but it will only triggers forecast for those products for which the next forecast date is set( by their pricing events) as the current execution day.

| Day | Forecasted total subscriptions1 | Forecasted total subscriptions2 | Forecasted total subscriptions3 | Actual total subscriptions | % difference between latest forecast and actuals |
| --- | --- | --- | --- | --- | --- |
| 1 | 530 | 521 | 521 | 521 | 1.698113208 |
| 2 | 750 | 680 | 680 | 680 | 9.333333333 |
| 3 | 970 | 880 | 880 | 880 | 9.278350515 |
| 4 | 1250 | 1080 | 1080 | 1080 | 13.6 |
| 5 | 1580 | 1379 | 1379 | 1379 | 12.72151899 |
| 6 | 1720 | 1480 | 1480 | 1480 | 13.95348837 |
| 7 | 2100 | 1899 | 1899 | 1899 | 9.571428571 |
| 8 | 2250 | 1956 | 1956 | 1956 | 13.06666667 |
| 9 | 2460 | 2356 | 2356 | 2356 | 4.227642276 |
| 10 | 2890 | 2678 | 2678 | 2678 | 7.335640138 |
| 11 | 3000 | 3145 | 3145 | 3145 | -4.833333333 |
| 12 | 3120 | 3657 | 3657 | 3657 | -17.21153846 |
| 13 | 3478 | 4217 | 4217 | 4217 | -21.24784359 |
| 14 | 3750 | 4446 | 4675 | 4675 | -5.150697256 |
| 15 | 3930 | 4678 | 4698 | 4698 | -0.427533134 |
| 16 | 4357 | 4789 | 4765 | 4765 | 0.501148465 |
| 17 | 4400 | 4965 | 5217 | 5217 | -5.075528701 |
| 18 | 4690 | 5100 | 5469 | 5469 | -7.235294118 |
| 19 | 5360 | 5360 | 5683 | 5683 | -6.026119403 |
| 20 | 5470 | 5570 | 5890 | 5890 | -5.745062837 |
| 21 | 5890 | 5890 | 6234 | 6234 | -5.84040747 |
| 22 | 5930 | 5966 | 6643 | 6643 | -11.34763661 |
| 23 | 6170 | 6270 | 6899 | 6899 | -10.03189793 |
| 24 | 6250 | 6532 | 7235 | 7235 | -10.76240049 |
| 25 | 6570 | 6790 | 7488 | 7488 | -10.27982327 |
| 26 | 6780 | 6998 | 7755 | 7755 | -10.81737639 |
| 27 | 7120 | 7256 | 7994 | 7994 | -10.17089305 |
| 28 | 7250 | 7250 | 8345 | 8345 | -15.10344828 |
| 29 | 7540 | 7540 | 8890 | 8890 | -17.90450928 |
| 30 | 7750 | 7750 | 9426 | 9426 | -21.62580645 |
| 31 | 8000 | 8325 | 10232 | 10245 | -0.127052385 |
| 32 | 8130 | 8890 | 11342 | 11678 | -2.962440487 |
| 33 | 8680 | 9234 | 11897 | 12457 | -4.707069009 |
| 34 | 8780 | 9765 | 12632 | 13441 | -6.404369854 |
| 35 | 9000 | 10342 | 13421 | 14302 | -6.564339468 |
| 36 | 9321 | 11421 | 14666 | 15671 | -6.852584208 |
| 37 | 9560 | 12012 | 15321 | 15701 | -2.480255858 |
| 38 | 9750 | 12987 | 16201 | 16012 | 1.166594655 |
| 39 | 10020 | 13367 | 17002 | 16987 | 0.088224915 |
| 40 | 10078 | 14685 | 17998 | 17345 | 3.628180909 |
| 41 | 10567 | 15399 | 18793 | 18342 | 2.399829724 |
| 42 | 10750 | 16201 | 19578 | 18999 | 2.957401165 |
| 43 | 11900 | 17092 | 20345 | 19869 | 2.339641189 |
| 44 | 12012 | 17989 | 21783 | 20253 | 7.023825919 |
| 45 | 12560 | 18367 | 22888 | 21012 | 8.196434813 |
| 46 | 13450 | 19436 | 23997 | 23444 | 2.304454724 |
| 47 | 13570 | 20037 | 25401 | 24654 | 2.940829101 |
| 48 | 14768 | 21576 | 27031 | 26342 | 2.548925308 |
| 49 | 14460 | 22679 | 28512 | 27389 | 3.93869248 |
| 50 | 14879 | 23477 | 29998 | 28545 | 4.843656244 |
| 51 | 15689 | 24321 | 32103 | 29887 | 6.902781671 |
| 52 | 15876 | 25686 | 34521 | 31279 | 9.391384954 |
| 53 | 16345 | 26544 | 36798 | 33256 | 9.625523126 |
| 54 | 16234 | 27789 | 38901 | 37821 | 2.776278245 |
| 55 | 16567 | 28955 | 40256 | 39546 | 1.763712242 |
| 56 | 16998 | 30211 | 43211 | 41998 | 2.807155585 |
| 57 | 17345 | 31989 | 47102 | 44789 | 4.910619507 |
| 58 | 17945 | 33412 | 49987 | 47983 | 4.009042351 |
| 59 | 18256 | 34978 | 52919 | 49989 | 5.536763733 |
| 60 | 18135 | 35289 | 55855 | 52001 | 6.900008952 |

Example table having forecasted and actual values of product X and its graphical illustration above explains the automated forecast correction scenario.

Suppose Merchant has set the “target change threshold for forecast change” value to 20%.

He has made some manual forecast for the anticipated demand growth for product X. It shown as “forecasted total subscriptions1”.

When actual total subscriptions count deviate from “forecasted total subscriptions1” by more than 20% on either side (increase or decrease by more than 20%),it is expected to trigger pricing for that product to reset its offered price to a new value in response to the new demand.

Also it triggers correction to the current forecast as the actuals curve no more align with forecast curve. Hence historical data gathered so far for actual total subscriptions is used to derive a new forecast “Forecasted total subscriptions2”.

Similarly when “Forecasted total subscriptions2” deviates from actual total subscriptions by more than 20%, offer price will be again correct and it will trigger a new forecast “Forecasted total subscriptions3” and so on.

This example is just an illustration of forecast correction. In reality forecast correction or pricing does not get triggered merely on an instantaneous difference between forecast and actual value crossing the threshold, but this deviation trend is observed for some period in order to conclude if the actual demand is deviating consistently from the forecast showing the real trend of deviation crossing the set threshold. This way it avoids effect of any instantaneous surge in actual demand, which may give an illusion that actuals are way more/less than forecasted value.

##### Forecasting algorithm

Forecasting of a product’s demand is dependent on volume of historical data available and will be gaining precision when more historical data is available. At the same time using too old demand data may add noise to the forecast as demand trend may have shifted drastically during the period in between, and very old trends may bias latest forecasts. Also there are number of forecasting algorithms available, each is predicting future trend and/or seasonality patterns and each of their data volume needs are different. Hence it is not advisable to use a single solution for forecasting product demands.

1. Simple Moving Average Demand Forecaster: This forecasting technique is useful when system has small set of actual data. Due to number of historical records are small in number they are unable provide any information on trend and seasonality aspects. An approximate prediction will be made by this algorithm which does not have much influence of trend and seasonality. Though it provides reasonable forecast it is not very accurate.
2. Simple Exponential Smoothing Demand Forecaster: Like simple moving average this forecasting technique too does not consider trend and seasonality aspects and considers that all observations are of equal importance and they are given equal weight when generating forecasts.
3. Triple Exponential Smoothing Demand Forecaster: These forecasts are more precise as compared to SMA approach as they are executed on adequate amount of historical data, capable of showing impact of current trend and seasonality.
4. Autoregressive Integrated Moving Average (ARIMA) Demand Forecaster: It is considered to be one of the most precise forecasting algorithms and hence takes the predictions closer to reality.

#### Receive and process new/added subscriptions

Subscription to different products by subscribers is the responsibility of Subscriber business domain. We will see that in detail there. But subscriptions to each product are received by product domain for each of the products, subscription is made to.

When a subscriber subscribers for one or more units of a product for a desired subscription period, with desired periodicity (weekly, monthly, quarterly etc.), the latest offer price/percentage discount of the product is offered to him. As we have seen in the ‘price buckets’ section, there is a price bucket associated for the latest offer price or discount percentage depending upon pricing category of the product.

When subscriber confirms his/her subscription, the “subscription confirmation event” is triggered. It contains details of all the products a subscriber has subscribed to, including the desired subscription count of each subscribed product. This event is received by each product( listed in subscription) and each of them increases their “new subscription count” associated with latest price bucket by total number of subscribed units by the subscriber (for total subscription period) for that product.

If a subscribed product has been categorized as “price committed” product, there is a price bucket associated for each ‘active’ offer price. When a new subscription is made to this product it increases the “new subscription count” of its latest active price bucket by total number of units subscribed to, indicating that for the selected product, for the latest offered price one more subscription has been added.

If subscribed product has been categorized as “percentage discount committed” product, then too “new subscription count” of latest price bucket(offering latest discount percentage) is increased by total subscribed units for that product, indicating that one additional subscriber will be getting same percentage discount on the latest MRP as offered by latest price bucket.

If subscribed product has been categorized as ‘None committed’ product, then ‘new subscription count’ of single available price bucket is increased by total number of units subscribed.

This is how any new subscriptions registered with subscription business are reflected to subset of products as an increased “actual” demand for them.

#### Receive and process subscription cancellations

Cancellation of subscriptions to a product (by subscribers) is the responsibility of Subscriber business domain. But similar to new subscriptions, cancellations of subscriptions are also processed by Products.

When a subscriber cancels subscriptions to one or more (may be all products, as a result of cancellation of total subscription) products the “subscription cancellation event” containing list/details of cancelled products is received by product domain.

For each of the cancelled product, depending upon committed price/percentage and date of subscription, its appropriate active price bucket is found out and its ‘churned subscription count’ is increased by the count of cancelled units of each product, indicating that those many items of the products are cancelled by the subscriber.

If the product is ‘None committed’ then ‘churned subscription’ count of single available price bucket is increased.

#### Dynamic Pricing

The recurring pricing job is responsible for recalculating the offer price of “eligible” products every day. The notion of eligible products is provided in the description of forecasting job. Every day demand forecast of a product is compared with its actual demand to check if the actual demand is matching, exceeding or falling short of the forecasted demand figure by a threshold value (defined as ‘target change threshold for price change’). When the threshold value is consistently crossed in such a way that actual demands for a product rises above or falls below its forecasted demand by more than threshold value, then pricing calculation is triggered for that product.

Thus pricing job runs every day but it does not calculate price for every product but calculates price for only those products for which actual demand deviations from the forecasted demand by more than threshold limit.

There are two price calculation algorithms provided here; both are based on demand function. But there can be many more new algorithms added to compute price of a product.

Before proceeding to actual algorithms let’s first understand the basics of demand function.

##### Introduction to demand function, Cost Function and price elasticity

The basis adopted by the subscription platform for calculating offer price of a product is the “demand function”. Demand function states that for a price sensitive product the demand of a product increases if its price decreases. This is represented as

**Price= Intercept + slope\* quantity**

Similar to demand function there is a cost function which states that cost of a number of products being sold is a sum of fixed cost and variable cost.

Cost= fixed cost + variable cost.

Fixed cost is usually independent of number of units being sold. Example: rental expenses, electricity charges, communication (phone, internet) charges etc.

Variable cost is dependent on number of units of a product being sold. So as quantity of product units being traded increases, cost increases. Example: purchase cost of products, special maintenance charges per unit of a product, labour charges per unit of a product etc.

Example cost function is :

Total Cost= 140000 + (10\* Quantity of product units)

Where 140000 is fixed cost and (10\* quantity of product units being traded) is a variable cost component.

This can be best represented by following graph depicting demand figures for a product having 30 Rs purchase price, 3 Rs. per unit operating expenses and 50 Rs as MRP.

X Axis represents the “quantity demanded”. The demand is ranging from 0 to 25600 units.

Y Axis represents offered price. Offered price ranges from 0 to 60 Rs.

MRP of the product in consideration is 50 Rs.. As subscription platform assumes that it will (almost) always offer some discount on MRP in order to win any subscription. This assumption gives rise to another assumption; that product will have ideally 0 demand if sold at MRP. Though practically this assumption is no true, it is required to determine amount of discount that can be provided on its MRP for a given demand. Hence we can assume that 50 is an intercept (point of demand curve cutting Y axis) where demand is assumed to be 0.

Slope of demand curve represents trend of a specific product. By means of slope value one can determine that for one unit decrease in offer price how much amount of increase in demand. It varies from product to product. In some product small decrease in offer price may result in large increase in demand, whereas in some other change of price may have negligible impact on its demand. The variation of demand for various prices may not be linear. For some price range the slope value is high (it means for a small change in price there is a large change in its demand), whereas for later demand values the slope may reduce. This relation between price and demand is called as “demand curve”.

Due to non-linear behaviour, regression techniques can be used to determine slope as one of the coefficients. We will see in price determination section how it is determined in subscription platform.

Typically slope of a “trailing” straight line is defined as

Slope of demand curve = - (y2-y1)/(x2-x1)

As shown in the graphical representation above, as offer price starts declining from Rs. 50(MRP) to a lower price, the demanded quantity starts increasing. This behaviour is represented by the “demand curve” showing negative (declining) slope. In this example case, based on trend the slope is 0.002.

At the same time as the quantity demanded starts increasing the overall cost also starts increasing because

Cost = (purchase price per unit\* number of demanded units) + fixed operating cost + (variable operating cost per unit\* number of demanded units)

Thus increasing demand does not necessarily ensure increasing revenue or increasing profit at all the offer prices because

Revenue = quantity demanded \* price at which quantity is demanded

Profit = revenue –cost.

Increase in demand may get compensated by decrease in the offer price. So at higher offer prices the revenue starts increasing from 0 (though demand is low). At certain offer price it reaches to maximum .Until this point increase is demand is dominating over decreasing in offer price. After this “threshold price”, decreasing price starts dominating the revenue, so that increasing demand no more compensate for decreasing price, so revenue starts decreasing. The yellow arc represents this behaviour. At demand 25600 the revenue is 0, as offer price is zero.

50- (0.002\*25600) =0

Similarly profit will be initially negative because cost is higher than revenue (see the intersection between cost curve and revenue curve). This is because sum of fixed operating cost and variable cost is more than the revenue due to less number of demanded units.

Profit starts increasing as demand increases and revenue grows greater than cost (Observe that profit curve is entering into non-zero zone at a demand where revenue curve is growing greater than cost curve). Operating cost per period remains more or less same and increased purchase cost (due to increase in demanded quantity) is compensated by the increasing revenue (despite of lowering price).

But after a cut-off point (seen at demanded quantity of 10600 in the above graph) the profit starts falling and eventually turning negative. Here the decrease in the offer price for the increased demand could not compensate increase in cost due to increased variable operating expenses.

One more term that should be understood is the “price elasticity of demand”. It is defined as percentage change in quantity demanded for one percent change in price. It is mathematically represented as

e(p)= (dQ/Q)/(dP/P)

Due to inverse nature of relationship between offer price and demand this formula usually yields negative value.

Price

e(p)< -1

e(p)= -1

e(p)> -1

Quantity demanded ---🡪

As shown in figure above, across the demand curve price elasticity is not the same at all the points.

In the initial stage when there is a large variation in demand in response to very small variation in price, the price elasticity is less than -1(e(p) <-1). In this phase the product is said to be highly price elastic. It means that minor variation in product price can make a significant impact on its demand.

At certain demand for a given price the elasticity becomes equal to -1(e(p) =-1). In this phase the product is said to be unit elastic; i.e. for one percent change in price there is one percent change in demand.

After the unit elastic stage, the price elasticity is increased further so that it becomes greater than -1 (e(p) >-1). Here the product is said to be in price in-elastic stage. It means that for a considerable change in the price there is minor/no change in its demand.

If we try to establish the relationship between price elasticity value and profit/revenue we will find that profit is maximum when price elasticity is less than -1 but close to -1. It means that profit and revenue maximization happens when the product demand is elastic to price.

So it means that when a product demand is in-elastic is profit is trailing. As price recommendation engine need to determine a new price to be offered it should change the price when the demand in “in-elastic” phase. Since in this demand range demand is not sensitive to price change, even a slight increase in current offered price does not impact its demand.

This is the core fundamental behind offer price determination. Let’s get into more details on how offer price determination happens when a product is in “in-elastic” stage of its demand, and where its profit has started declining.

##### Instantaneous price calculation

This algorithm tracks the profit associated with last two prices, and makes a decision on new offer price. The reason this is termed as “instantaneous” is because it does not monitor a trend of demands for different offer prices over a long period of time, but makes decision from demands (expressed in terms of profit or revenue) associated with last two offer prices.

The basic fundamental that has been followed is to keep reducing trend for price until merchant is making profit and his/her profit figures are increasing. When the profit starts getting hampered it may be due to following scenarios

1. Demand for that product has started reducing. In such case it may not be advisable to increase price even if merchant may be facing reduction in his/her profit figures. Hence price should continue getting reduced in an attempt to attract more subscriber for the product and eventually recover from demand crunch.
2. Demand for the product is continuously increasing but the offer price has been reduced to such an extent that the revenue (product of demand and offer price) may not yield increasing profits. In such case price can be increased gradually so that the profit will gain upward momentum again.
3. When the price is getting increased until demand is increasing but profit is decreasing, for some price threshold demand may start declining. In such case regardless of the profit health price should start decreasing again.

Here is the algorithm:

Prerequisite and Assumption: This algorithm assume that when there is no historical data present for a product it is not possible to derive an offer price based on demand function. So offer price is manually set by the merchant. This algorithm assumes execution after at least one price bucket (created for manual opening price) being present.

Receive purchase price per unit, operating expense per unit, any taxes per unit and any other miscellaneous charges per unit and calculate “Breakeven price” of a product;

Try to retrieve last (latest) two price buckets for product X;

//No price published: If merchant has provided manual /opening offer price but the same is //not published yet, then publish the same

If (number of price buckets associated with product X is 1 AND price bucket status is “CREATED”)

{

Get latest price bucket of a product set its status as “ACTIVE”;

}

//Single price published: If merchant has provided manual /opening offer price and the same is ONLY published in last execution.

If (number of earlier active price buckets associated with product X is 1 AND price bucket status is “ACTIVE”)

{

Get latest published price bucket of a product;

y2= get latest offer price;

y1=Get product’s MRP from this price bucket;

x2= number of new subscriptions associated with latest price bucket;

//as there was no earlier price bucket

x1= number of new subscriptions associated with earlier price bucket as 0;

Slope= (y2-y1)/(x2-x1);

Intercept= latest MRP; //MRP associated with latest price bucket

Receive product demand trend; //as UPWARD or DOWNWARD

//As price calculation is triggered only when new expected demand is more/less to current demand (new subscriptions) by “revenue change threshold for price change”

If(demand trend is UPWARD){

Expected demand=

new subscriptions associated with latest active price bucket +

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

Else if( demand trend is DOWNWARD){

Expected demand=

New subscriptions associated with latest active price bucket -

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

//Offer price calculation based on demand function

Offer price= intercept + slope\*expected demand

}

//If profit is growing (revenue growing more than cost) because demand is growing despite of “offer price” is decreasing… there is no harm to continue this trend

Else if( number of earlier “ACTIVE” price buckets for product are 2

AND

//“minus one” is current active price bucket; “minus two” is previous active price bucket

Total profit of “minus one” price bucket > total profit of “minus two” price bucket

AND

Total subscriptions of “minus one” price bucket > total subscriptions of “minus two” price bucket

AND

Offer price of “minus one” price bucket < offer price of “minus two” price bucket

){

Y2= offer price associated with “minus one” price bucket;

Y1= offer price associated with “minus two” price bucket;

X2= number of new subscriptions with “minus one” price bucket;

X1= number of new subscriptions with “minus two” price bucket;

Slope= (y2-y1)/(x2-x1);

Intercept= latest MRP;

If(demand trend is UPWARD){

Expected demand=

new subscriptions associated with latest active price bucket +

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

Else if( demand trend is DOWNWARD){

Expected demand=

New subscriptions associated with latest active price bucket -

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

//Offer price calculation based on demand function

Offer price= intercept + slope\*expected demand

}

// When profit is reducing because demand is reducing despite offer price is reducing, there is no option but to continue this trend (reducing price)

Else if(

number of earlier price buckets associated with product are 2 and both are “ACTIVE”

AND

//“minus one” is current active price bucket; “minus two” is previous active price bucket

Total profit of “minus one” price bucket < total profit of “minus two” price bucket

AND

Total subscriptions of “minus one” price bucket < total subscriptions of “minus two” price bucket

AND

Offer price of “minus one” price bucket < offer price of “minus two” price bucket

){

Y2= offer price associated with “minus one” price bucket;

Y1= offer price associated with “minus two” price bucket;

X2= number of new subscriptions with “minus one” price bucket;

X1= number of new subscriptions with “minus two” price bucket;

Slope= (y2-y1)/(x2-x1);

Intercept= latest MRP;

If(demand trend is UPWARD){

Expected demand=

new subscriptions associated with latest active price bucket +

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

Else if( demand trend is DOWNWARD){

Expected demand=

New subscriptions associated with latest active price bucket -

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

//Offer price calculation based on demand function

Offer price= intercept + slope\*expected demand

}

// When profit is reducing despite of demand is growing it means that there is a need to adjust offer price at higher value than before, by changing the slope

Else if(

number of earlier price buckets associated with product are 2 and both are “ACTIVE”

AND

//“minus one” is current active price bucket; “minus two” is previous active price bucket

Total profit of “minus one” price bucket < total profit of “minus two” price bucket

AND

Total subscriptions of “minus one” price bucket > total subscriptions of “minus two” price bucket

){

Intercept= latest MRP;

//Adjust slope with weighted average

Slope = slope associated with “minus one” price bucket –

(Slope associated with “minus one” price bucket \* weighted average of ALL offer prices from active price bucket AND total subscription count for ALL active price buckets);

//Weighted Avg= (Σ offer price per price bucket\*total subscription count per price bucket)/(Σ sum of total subscription count per price bucket)

//Offer price calculation based on demand function

Offer price= intercept + slope\*expected demand

}

// When profit is increased despite of increase in offer price (regardless of if demand is increasing or decreasing) then the demand function should get re-instated with based X (0 demand) and Y (MRP) values.

Else if(

number of earlier price buckets associated with product are 2 and both are “ACTIVE”

AND

//“minus one” is current active price bucket; “minus two” is previous active price bucket

Total profit of “minus one” price bucket > total profit of “minus two” price bucket

AND

Offer price of “minus one” price bucket > Offer price of “minus two price bucket”

AND

(Total subscriptions of “minus one” price bucket < total subscriptions of “minus two” price bucket

OR

Total subscriptions of “minus one” price bucket > total subscriptions of “minus two” price bucket)

){

Y2= offer price associated with “minus one” price bucket;

Y1= MRP of latest price bucket

X2= number of new subscriptions with “minus one” price bucket;

X1= 0;

Slope= (y2-y1)/(x2-x1);

Intercept= latest MRP;

If(demand trend is UPWARD){

Expected demand=

new subscriptions associated with latest active price bucket +

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

Else if( demand trend is DOWNWARD){

Expected demand=

New subscriptions associated with latest active price bucket -

(new subscriptions associated with

latest active price bucket \* revenue change threshold for price change);

}

//Offer price calculation based on demand function

Offer price= intercept + slope\*expected demand

}

The above algorithms should keep on varying offer price in response to varying demand and trying to ensure increase in profit is most of the cases except when demand is decreasing. Typical variations to offer price in response to demand is depicted in below graph.

X axis represents demand (total subscription count) and Y axis denotes prices being offered. As we see above the pricing algorithm tries to vary price in the range of 38 to 50 Rs. (50 Rs. being MRP and 37 Rs. being breakeven price) in response to variations in demand. The dimension which is not shown here is the variations in profit. The price is continuously getting adjusted in an attempt to keep increase in profit figures. Only exception case is where demand is decreasing, price will keep on decrease in order to attract more and more subscribers (thereby increase in demand at the cost of lesser profits or even losses). It can be also seen that when profit is decreasing despite of increase in demand price gets increased to keep profit upwards.

##### Regression based Price Calculation

Regression analysis is a statistical process of estimating relationship among variables. The focus is to establish relationship between a dependent variable and one or more independent variables so that for any combination of independent variables one can find value of dependent variable. In other words, regression analysis helps us understand how the value of a dependent variable changes when value of any of the independent variables is varied.

Regression analysis is widely used for predictions/forecasting. We can use regression analysis to “predict” value of offer price of a product based on changes in

1. Its demand
2. Demand of its substitutes
3. Demand of its complements
4. Increased efforts on sales, advertising and marketing ( which is influencing change in its demand)

In default/most simple case typical demand function is formed in the same way as described in earlier section as

**Price= Intercept + slope\* quantity demanded**

In a complex form it can be something like

P= a + α \* Qself + β\*Q (sub1+sub2+sub3) + γ\*Cmktg

P= price of a product

a= intercept (typically MRP)

α= coefficient1

Qself= Product’s own demand

β =coefficient2

(sub1+ sub2+sub3) = total demand of all substitutes of a product

γ = coefficient3

Cmktg=cost incurred on sales and marketing expenses

In both the above cases we have identified “price” as a dependent variable. It depends on demand as well as other independent variables such as demand of substitutes, expenses on sales and marketing etc. Since the relationship between dependent variable and independent variables may be

#### Receive and process daily price quotes from main application.

Subscription business platform assumes that some administrator updates changes in purchase price/MRP of every product. Any such price change for a product should trigger a “Tagged price changed event”.

As we have seen earlier, “Product Account” of each product maintains list of purchase price/MRP versions. So upon receiving the “Tagged price changed event” a new version of tagged offer price (composed of purchase price, MRP and change Date) is added to the list.

Change of purchase price should first trigger offer price recalculation where new breakeven price should get calculated and used for verification of new offer price.

When purchase price undergoes change, it has a winder impact on overall revenue and profit recognition.

Consider a scenario that for product X (it is price committed), there 3 active price buckets already existing prior to purchase price change, each having different number of subscriptions associated with each offer price. Assume that these 3 price buckets have offered prices based on earlier purchase price of 30 Rs and MRP as 55 Rs.. Also assume that standard total expense per unit for product X is 3 Rs. So the breakeven price will be 30+3=33 Rs. SO the 3 offered prices from these buckets are

Bucket 1 has offered 50 Rs with 2000 active subscriptions out which 300 items have been delivered so far.

Bucket 2 has offered 47 Rs. with 3300 active subscriptions out of which 450 have already been delivered.

Bucket 3 has offered 45 Rs. with 5200 active subscriptions out of which 670 have already been delivered.

Now purchase price has changed from 30 to 35 Rs. and MRP from 55 to 60 Rs.

After purchase price changes there are 400 items delivered from price bucket1, 600 from price bucket 2 and 750 from price bucket3.

For price bucket1 the recognized revenue = 400\*50 = 20000 Rs. and breakeven cost=400\*(35+3)=15200. Hence recognized profit =20000-15200=4800 Rs.

For price bucket2 the recognized revenue = 600\*47 = 28,200 Rs. and breakeven cost=600\*(35+3) =22800. Hence recognized profit =28200-22800=5400 Rs.

For price bucket3 the recognized revenue = 750\*45 = 33750 Rs. and breakeven cost=750\*(35+3) =28500. Hence recognized profit =33750-28500=5250 Rs.

As seen in the above example committed offer price could not be altered, but purchase price of the product undergoes change. So items delivered after purchase price increase report much lesser profit.

#### Also understand form the above example that profit and revenue calculations are not based on number of subscriptions of any product but they are based on number of actual items delivered to subscribers till date. This is because subscription for a product is just an advance intimation of the desire to buy that product in specific quantity per specific period. It can be changed by subscribers any/multiple times during their subscription period. Revenue and profit get recognized only after actual items are successfully delivered to respective subscribers

#### Receive and process subscription deliveries

Delivering desired count of units per product to a subscriber is expected managed by the main shopping application. Subscriber domain is responsible for triggering daily notifications for delivering delivery baskets to different subscribers.

When a subset of subscribed units of a product are delivered to a subscriber a delivery event is triggered by subscriber domain, the same event is received by each of the delivered product and it will update their appropriate price buckets for the delivered units.

For example: A subscriber has registered for product X with 2 units each month. When a third delivery has been delivered, the delivery event is also received by product X and it will update the delivered (2) units of a price bucket (representing price which was committed to that subscriber). So at the time of subscription ‘new subscription count’ of the price bucket was updated with count 24 (2 per month \* 12 months). At the third month delivery the “delivered count” of the same price bucket will be updated with value as 6 (2 per month \* 3).

#### Process price bucket expiration

When all subscribed units of a product, by a subscriber get successfully delivered to him/her, his/her subscription for that product is said to be completed. Each price bucket has an attribute “delivered subscription count”. When each delivery for a product is made its delivered subscription count is updated with number of unit delivered.

Among the subscribers who have subscribed for a specific product either successfully receive all their deliveries or they cancel their remaining subscription. Subscription churn is accounted under “Churned subscription count”.

Active subscribed items yet to be delivered = New Subscription count – (churned subscription count + delivered subscription count)

When the above arithmetic returns zero (active subscribed items yet to be delivered=0), it means that the price bucket is exhausted with all subscriptions associated with its offer price. This price bucket is then marked as “EXPIRED” in data repository as well as removed from list of active price buckets in respective product’s product account.

#### Calculate total profit of a product

In subscription business model the same product is offered to different subscribers at different times with different prices, and these subscriptions are active at any point of time. So profit calculation for a product at any time is aggregation of profit calculation of each of its active price buckets.

The examples described above in earlier section indicate how profit of each price bucket gets calculated separately for respective delivered items and then total profit is calculated by addition of all price bucket specific profits.

For illustration purpose if we have to calculate profit at a given date after purchase price change then it will come out to be

Total profit for product X at a given date = profit of price bucket1 at given date + profit of rice bucket2 at given date + profit of price bucket3 at given date.

So Profit(X) = 4800 + 5400 + 5250= 15450

Profit of individual price bucket gets calculated every time some units of product are delivered. At the same time aggregate profit is getting updated.

#### Contribute to Nodal Account

Product collaboration model suggests that “excess” profit attributed due to “over” performance of some products can be provisioned for helping underperforming products to recover. When any product is underperforming typically following provisions are tried to boost its performance.

1. Offer additional discounts/benefits on them so that price sensitive customer segment can be attracted.
2. Increase advertisement expenses to promote that product and broadcast added benefits being offered on it.
3. Initiate clearance sale for some underperforming products at throw away prices so as to minimize losses due to wastage of inventory due to expiry of such products.

The “excess” profit amount is periodically added to a central account named as nodal account. In order to understand this better let’s define “excess” profit.

Price change of a product is triggered by configured “threshold determinator” and “change threshold” values. Threshold determinator can be revenue or profit. Change threshold will be the percentage change in the determinator value which will trigger offer price recalculation.

Consider that threshold determinator for product X is defined as “revenue” and “change threshold” value is set to 5%. It means when revenue of product X deviates (up or down) from its forecasted revenue figure by 5%, its price will be recalculated.

If product X earns 7% more revenue than forecasted figure, it will trigger price calculation. But the additional 2% will be considered as “excess” revenue and hence will be contributed to nodal account.

The same applies to products having “profit” as threshold determinator. In this case if 10% is the “change threshold” and of product earns 13% more profit than forecasted profit figure then the amount equivalent to “excess” 3% profit will be contributed to nodal account.

When deliveries are made, revenue and profit get calculated and at the same time excess gains are added to nodal account.

For each 100/ 1000/ 10000 Rs contributed (configurable) the product receives 1 credit point. These credit points serve three purposes.

1. It will ensure that the gains earned by a product should be attributed to itself even if it has contributed to nodal account and total gains visible in its own account are less(due to the donation described above)
2. It will enable them to request for similar help from nodal account when similar situation may arise to them OR clearance sale need to be initiated for them OR Seasons sale need to be initiated for them OR additional discounts need to be provisioned for them for various reasons.
3. It will indicate their demand score in the form of credit points earned by them in business monitoring/reports which will help analysts take appropriate decisions while setting sales targets for them.

### Interactions

## Subscriber/Subscription

### Lifecycle

### Interactions

# Benefits

## Lifecycle

## Interactions

# Payments

## Modes of Payment

## Lifecycle

## Interactions

# Business Account

## Provision Types

## Lifecycle

## Interaction

# Business Activity Monitoring

# Processing Support