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# Finance Management and Pricing in Subscription business

## Introduction

Online shopping portals sell a vast variety of products to the consumers and adjust their prices so that each product line offers sustainable sale as well as steady state growth. Products are different in their types/variety but for merchants they are different in terms of their demand, velocity/frequency of sale, margins etc.

Since subscription to products in retail business is not so popular/ available in current market, one need to understand the potential similarities as well as differences between normal retail business and subscription business. These attributes are contributing to the overall success or failure of subscription thinking.

**Instantaneous vs long term association**: In a normal retail business a customer logs in to a portal, adds the desired items to his cart, make payment and finally shopping site delivers him his desired goods. Here the association of a buyer with shopper ends for that moment.

The purpose is to buy a product at a displayed price at that instance. Next time even if the same customer wishes to shop the same product again, he does not expect that his last association with same shopper would pay him any extra benefits.

In case of subscription the intent is to establish a long term association of customer with a product (or set of products), where he/she wishes to receive the set of selected products repeatedly at desired intervals. Since he is getting into long term commitment with the merchant he would expect merchant to provide him added benefits for it. Moreover, he would not like to see different prices (different discounts) billed to him at different intervals. So at product level a merchant is expected to commit him a price of a product (per unit) which would not change until the end of current subscription contract.

This is a difficult challenge for the merchant as he may be witnessing ups and downs in product price and effects of inflation, shortage of goods, change of prices due to increase in demands etc. Subscription platform is expected to help merchant solve this puzzle.

**Products Collaboration Model**: In instantaneous business typically individual products are offered with varied discounts. Some inquisitive customers compare the prices being offered by different merchants and decide to buy few items from one merchant whereas others from other, so as to maximize their gains.

In case of subscription business the expectation is to have long term association of merchant with the customers for set of selected products. So the subscription provider should make provision of additional benefits other than item level benefits. The benefits should be such that he would not have to go to competitor sites for price comparisons, rather should get attracted to buy more and more from the same merchant so as to reap more benefits. Basket level benefits are one such way where customer is offered additional discounts/points/cashbacks on the total amount of items added in basket. Loyalty level benefits are another way where customers having loner associations with merchants/products/brands get rewarded for their loyalty. Thus in order to arrange for provisions for these additional benefits, managing product prices in isolation do not help, as every product going into some basket should also contribute to the basket/loyalty benefits.

Every product may not be able to make up with this challenge of offering individual, basket level as well as loyalty based benefits as it may not be doing a great business (or event getting into losses) for longer term, whereas some others may be doing even better than offering all types of benefits.

So a new philosophy is thought of where every product should be considered as profit (or loss) carrying social agent who not only contributes to the basket/loyalty level benefits but also collaborates with other products to help them recovering from lesser margins/losses, wherever applicable.

## Objectives of subscription business

1. Price of a product committed to a subscriber should remain same until end of his current subscription (contract with merchant). This should hold true even if the product/merchant is making losses on that product OR cost of that product gets changed one/many times during subscription period (after committing one price).
2. Products registered as subscriptionable items should be categorized into three categories.
   1. Products for which price can be committed to subscriber at the time of commitment
   2. Products for which percentage of discount can be committed (on the latest price at the time of actual delivery) to subscriber at the time of subscription.
   3. Products for which no commitment is made at subscription and product price may vary according to market fluctuations
3. For the first category of products though price of a product committed to a subscriber should remain same, it can change across subscribers on their subscription if they subscribe on different days.
4. Item level discount should not depend on the subscription duration of an individual. Mostly everyone who has subscribed to the same product on a same day will see the same (per unit) price for that item, regardless of subscription duration of each subscriber.
5. Along with product level discount, basket level benefits should also be offered. Subscription business is not sustainable if subscriptions for single/few products are encouraged. In order to handle the equilibrium between profit and loss among products, in order to minimize operating expenses and in order to maximize benefits on sales and marketing expenses it is essential to encourage a subscriber to add more and more items in his basket as well as remain subscribed for as longer duration as possible.
6. Unlike individual item level discount, basket level benefits depend on
   1. Demand of the items added to the basket(thereby profit margins available on these products)
   2. basket worth
   3. Subscription duration.
   4. Static basket definition vs changing basket definition

Consider following scenarios as below

* 1. In case two subscribers who has subscribed for the exact same set of items on a same day will be given different basket level benefits if their subscription duration is different.
  2. In case two subscribers who have subscribed on the same day with same duration will be offered different basket level discounts if their basket worth are different. Basket worth is a function of basket amount as well as demand level of basket ingredients.
  3. In case two subscribers who have subscribed on same day with same total basket amount, may get different basket level discounts as demand levels of the products added to respective baskets are different. The subscriber who has added more high demand products will get lesser basket level discount than the one who has added more low demand products.
  4. If two subscribers who have subscribed for same set of products and for the same duration are offered same basket level discount until their basket definition remains unchanged. Now if one of the subscribers has made changes to his basket content, his basket level benefits will get recalculated and he will be offered lesser basket level benefit.

1. The basket price with benefits (with item level as well as basket level benefits) will remain same only until the content in the basket remains unchanged. In case a subscriber modifies the content in the basket (replace few items with few other etc.), the basket level benefits will be recalculated. In this case item level discounts for the items subscribed in the past should remain unchanged.
2. For the same reasons platform should make provisions for offering benefits for the customers loyal to the merchant, brand etc.. The more association a subscriber has with a merchant the more benefits he/she can be awarded. This benefit will be on top of item level and basket level discount.
3. The overall benefit to be offered to a customer should be distributed between product, basket and loyalty. So platform should provide configurable rules to set policies for making customers eligible for different benefits.
4. There should be rules around how many maximum units of a same product can be subscribed by a subscriber. Also the rule regarding what should be the maximum allowed subscription period for any subscriber. The first rule is to eliminate the possibility of some retailers pretending themselves as subscribers and subscribe for large volumes of products (thereby getting heavily discounted) and selling those to their actual customers. The second rule is to limit the price commitment period in the truly volatile and uncertain market situations.
5. A Price of a product should be calculated every day (regardless of whether it will change every day) based on its demand, its categories and the past trend of business done by it. It should also consider an element of future uncertainty(steep price changes in some necessary commodity item)
6. Also there should be some mechanism to validate if the computed price of a product is close to precision (may be by deriving it through basket level trends)
7. Products should collaborate among each other indirectly through an intermediator (nodal account) so as to share their profits and losses as well as for building corpus for basket and loyalty level benefits. The reason they do not directly collaborate is to avoid any bias in sharing benefits among competitors.
8. On every day when a profit is registered for a unit of product, this profit amount should be distributed to various portfolios and in the given sequence/priorities
   1. Operating expenses share( even if loss occurs still this share needs to be given mandatorily)
   2. Nodal account share( money will go here only if profit is registered else no money is deposited)
   3. Product account share (If profit is registered the product will hold its own share of profit equal to the targeted/forecasted profit or less, in case of loss nothing goes here)
   4. Merchant account share: the remaining (in case of profit) after distributing the above components will get added to this account. No money is deposited if there are losses.

Following section describes categories of products in terms of the yields they bring to the merchants.

## Product Categories

## Essential Vs Optional products

As per the lifestyle of a territory where merchant is intending to do business products can be categorized as essential (mandatorily needed) products versus 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 under retail, 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 schemes (one free on the other etc.), providing some offers/schemes 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, specific brand of biscuits, tooth brushes.

So the 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.

Thus even if the high frequency items are getting consumed from low demand brands they may yield higher consumption 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 class.

## 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 marginal 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 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.

## 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 home made 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.

## Determinants of Demand

There are five determinants of demand for a good.

qD = *f* (price, income, prices of related goods, tastes, expectations)

1. **Price of goods**- The [law of demand](http://useconomy.about.com/od/demand/a/Law-Of-Demand.htm) states that when prices rise, the quantity demanded falls. This also means that, when prices drop, demand will rise. People base their purchasing decisions on price, if all other things are equal. The exact quantity bought for each price level is described in the [Demand Schedule](http://useconomy.about.com/od/demand/fl/Demand-Schedule.htm). It's then plotted graphically to show the [Demand Curve](http://useconomy.about.com/od/demand/a/Demand-Curve.htm).

If the quantity demanded responds a lot to price, then it's known as [elastic demand](http://useconomy.about.com/od/glossary/g/Elastic-Demand.htm). If the quantity doesn't change much, regardless of price, that's [inelastic demand](http://useconomy.about.com/od/glossary/g/inelastic_demand.htm).

1. **Income** - When income rises, so will the quantity demanded. When income falls, so will demand. However, even if your income doubles, you won't necessarily buy twice as much of a particular good or service. Since this is not which the platform can influence this attribute is considered to be **out of scope**.
2. **Prices of related goods or services** - The price of complementary goods or services raises the overall cost of using the good you demand, so you'll want less.

The opposite reaction occurs when the price of a substitute rises. When that happens, people will want less of the good or service.

1. **Tastes** - This is the desire, emotion, or preference for a good or service. When tastes rise, so does the quantity demanded. Likewise, when tastes fall, it will depress the quantity demanded. This is what brand advertising is all about. Again this is not something which the platform can influence, though it can show the trend if the taste is getting shifted from product A to product B.
2. **Expectations** - When people expect that the value of something will rise, then they demand more of it. Even from merchant’s point of view this attribute may hold considerable value.
3. **Number of buyers in the market** - The number of buyers affects overall, or aggregate, demand. As more buyers enter the market rises, so does the quantity demanded -- even if prices don't change.

## Provisioning needs

When a merchant is about to set retail subscription business for subscribers, he is expected to have some estimation/forecast regarding

1. Probable number of subscribers he may win over a period(monthly, quarterly, yearly) as well as probable turnaround of subscribers(subscribers leaving their subscription OR they are not renewing their expired subscriptions due to competition or other reasons)
2. Average subscription amount per subscriber per period(say Rs. 2000 per subscriber per month)
3. Probable average distribution of subscription basket (how many product categories an average basket will constitute. Example: grain, bathing soap, washing powder, suger, house cleaning items, spices, sauces/jams, ready to eat food items etc.)
4. Periodic operating expenses(total monthly/yearly as well as per subscriber monthly/yearly )
5. Sales and marketing expenses to acquire every new subscriber.
6. Probable changes in the prices of items due to inflation, short of stock or other reasons.
7. Other losses due to situations like payment defaulters, rejection/returning of goods by subscribers, wastages and handling damages, interest on delayed payments etc.

Based on this estimation merchant is expected to allocate some annual budget for the subscription business. It is the provision of amount he has made to run the subscription business, as well as to recover from any possible losses. Typical provisions include

1. **Cost of goods/purchase price** for different products as per the estimation about their demand and usage volume. Since the subscription platform does not take care of the actual purchase process and relies on the main shopping application to take care of it, this is simply a purchase price of an item when someone subscribes for it. The job of forecasting the future purchase need and investing onto its procurement is out of scope for the subscription business and main shopping application is expected to take care of it. This price becomes the investment reference against which the margins are estimated, sale prices are decided for each product as well as actual margins are realized. Ideally there should not be any separate provision required at item level discounts as the products provisioned for purchase are expected to make it through their sale.
2. **Provision for basket level\loyalty benefits**. Basket represents set of products (each with certain quantity) which a customer has subscribed to for periodic buying. Subscription business demands more benefits at basket level than at individual product level, so as to attract subscribers to add more to basket as well get benefitted more for subscribing to higher volume of goods, loyalty with merchant/brand. This provision is expected to be required only for initial set up of subscription business because after it is stabilised every profit making product is expected to contribute into it.
3. **Provision for promoting overall sale/create goodwill**. This amount is typically expected to be used for offering additional /seasonal/surprise benefits in addition to the normal discount/benefit calculations already made for every product as well as at basket level. In case of crisis situation for some products which are incurring losses, this can be used as a rescue mechanism in order to boost the sale for these products. This provision is optional. Whether to make this provision is on merchant’s discretion.
4. **Provision for Operating expenses**. It includes the expenses incurred on managing the inventory of subscribed products, cost one periodic deliveries to subscribers; cost of managing the software systems for subscription business, cost on personnel required to run the business etc.

Again dispatch to customers or managing any systems for that is not in scope of the subscription platform, but this figure is going to be very important in identifying the breakeven quantity/price below which sale of any product is not recommended. Also the gross and net profit calculations are heavily based on this.

1. **Sales and marketing expenses** so as to acquire more subscribers as well as an attempt to retain them. Again the actual efforts on sales and marketing is not in scope for subscription business but will be carried out by the parent organization along with normal/instantaneous business. But the investment being made on subscription specific sales/marketing should be known to compute the impact of it on acquisition and retention of customers for subscription business. Its computation provides some metrics (Lifetime subscriber value(LSV), Lifetime subscriber period, Cost of acquiring a subscriber(CAS), LSV/CAS ratio etc. which indicate health of subscription business.
2. **Provisioning for losses** due to reasons mentioned above.

## Budget Distribution and lifecycle management

Based on the above provision needs, platform defines different accounts which are responsible for managing transactions in respective areas as well as flow of money from one account other in case of specified events. These accounts help in

1. Tracking the impact of different events/activities on the overall money being invested.
2. Making provisions for contingencies
3. Getting ready information on how different products are doing, and how overall business is doing

## Subscriber account

Subscriber account keeps track for all transactions such as payments made, provision for different expenses, payment due, loyalty points, prices committed for every product he has added to basket, basket level benefits committed, last subscription history ( should it be in Subscriber instead?).

## Item prices

When a subscriber confirms subscription to few items for a specific period, the item level prices are committed to him. For every item he has subscribed to, the identifier of the **price bucket** (described in Product Account) has been linked against that item for the periodic quantity he has asked for.

In case subscriber increases the quantity of some product later (than subscription date) the new quantity gets associated with latest price bucket, so that his total quantity of a product may get distributed into one or more price buckets. When a subscriber decreases the quantity of some product then the total quantity remains associated with original price bucket of that product. Also basket level discount will be recalculated

In case subscriber removes some product from his list completely, no price will be charged to him on that product then onwards but basket level discount will be recalculated.

## Basket level Benefit

This will have the discounted on total basket price per period (per month/week). When subscriber confirms subscription the basket level benefits (per period) should be calculated and kept here. It should also keep the mode of redemption. The mode of redemption can be either of

1. Redemption points of the discounted price per period, every end of a period they will get added here. Different rules should be configured on how the redemption can be done.
2. Direct discount form the total basket amount every period. In this case while subscriber is paying for the subscription duration he/she will pay the total basket amount minus discount per period.
3. Cashback option where the subscriber will pay for the total basket amount and discount money will be refunded him/her after certain duration( based on set rules)

How to calculate Basket level benefit: Basket level benefit should depend on following factors and in the given sequence

1. Demand of the products being added to basket. More demanded products will yield lesser benefits. Demand can be realized by credit points earned by each product. Each product added to a basket should contribute to basket level benefit and the same can be calculated by using the credit points earned by that product.
2. Total amount of basket. Obviously higher the amount of basket, more will be the benefits.
3. Duration of the subscription. More the subscription duration more will be benefit.
4. Payment mode. Full advanced payment for the whole subscription duration will attract more benefits
5. Stability of basket content. If no content is changed in the basket after subscription then it will attract full benefits. But if the content is modified /reduced the benefits should be reduced.

## Payments

When a subscriber confirms subscription for some items for a specific period,

1. When subscriber confirms his subscription for a desired period the total subscription amount is registered in the “Payments to be made by Subscriber” attribute of this account. The total amount in this attribute indicates the total subscription value for a subscriber, which he will be expected to pay (as per the agreed payment modes) during course of subscription.
2. If subscriber has made partial payment or full payment of the total subscription value, then amount paid will be set as credit amount (positive) in “payments made by subscriber” attribute.
3. Every time when a basket is delivered successfully to a subscriber, the basket amount (offered) is debited (negative) in the “payments or equivalent made to subscriber” attribute.
4. If subscriber changes content of the basket due to which total basket value changes for the remaining period, then the difference amount ( positive or negative) will have to be added in “Payments to be made by Subscriber” attribute depending upon whether new basket price is more or less than original basket price. In case new basket amount is more than original basket amount then the difference is positive. If it is less, then the difference is negative.
5. After the change of basket content system should ensure that revised basket amount should get debited in the “payments or equivalent made to subscriber” attribute, when next time the basket with revised content is delivered to him.
6. If subscriber cancels subscription in between the subscription period, then the total basket amount paid by him for the remaining subscription period is calculated by total payments made by him minus “payments or equivalent made to subscriber”. This amount should be debited (negative) in the “payments or equivalent made to subscriber” attribute, so that payments made by subscriber should get nullified by payments or equivalent made to subscriber.
7. Even if subscriber does not cancel subscription, the difference between payments made by him and payments/deliveries made to him should be periodically calculated so that when they nullify each other but registered subscription period is not yet over, then a notification event should be sent to subscriber telling him the payment of the remaining subscription period is due, which he should pay in order to ensure next delivery.

## Provision for operating expenses

When a subscriber creates his/her subscription basket and makes payment (advanced/partially advanced), this event should be considered as a trigger when every item (added in the basket) will contribute to the “Provision for operating expenses” for the period that subscriber has made the payment for (in case of yearly advanced payment 1 entry will be added to account = 12 months operating charges(as per forecasting done above) for all items added to basket, in case of quarterly advanced payment 1 entry will be added = 3 months operating charges for all items added to basket). Thus the amount equal to the provision calculated as described above will get debited from the payments section and credited to this element.

Every time when the basket is successfully delivered to that subscriber, the periodic operating expenses amount will get debited from this provision and get added to the Operating expenses account.

In case subscriber who has subscribed for one year and made full/advanced payment, decides to quit his subscription then the remaining amount credited to “provision for operating expenses” should get debited from there and should get credited back to payments, so as to return total remaining amount left at the time of cancellation.

## Product Account

The product account represents snapshot of product targets/forecasts as well as actuals for the given period (month/week).

When platform administrator registers a product for subscription its product account should get created.

## Forecast

When platform administrator creates forecast for every subscriptionable product, it goes in this section.

1. Its purchase price from the manufacturer/wholesaler(Cost of goods sold-COGS)

* If this price changes in a month due to inflation/excess demand and low supply then the changed price should be marked from that month onwards

1. Its MRP( manufacturer suggested sale price)

* If this price changes due to change in purchase price (due to any reasons mentioned above), then the changed price should be marked from that month onwards.

1. Its weight, which may be impacting its operational cost.
2. Its expected margin(gross profit/selling price)
3. Its categorization as high demand/high frequency/regional/perishable/semi-perishable etc.
4. Expected number of new subscribers/item registrations(?) each month
5. Expected number of churned subscribers/item registrations(?) each month

When churning of subscribers happen, one need to also register

* + Churned subscribers/items affiliated to price at start of the years
  + Churned subscribers/items affiliated to the changed sale price1
  + Churned subscribers/items affiliated to the changed price2 and so on.

1. From date of the forecast
2. To date of the forecast.

The forecast should be entered manually for every set period (weekly/monthly etc.). Merchant can set forecast of many months ahead of time, depending upon his confidence level on a given product.

Based on these forecasts following values are calculated.

1. Monthly operational expenses to be borne per product. It should be calculated based on the annualized operational expense forecast provided by customer( as described in operational expenses account)
2. Monthly sales and marketing expenses calculated per product based on monthly sales and marketing expenses forecasted by merchant (total expenses to be distributed across all the products..)
3. Net new customers and Total customers per month(to indicate demand)
4. Total churned customers and % customer churn per month(- #number of churned customers current month/total # customers at last month)
5. Monthly recurring revenue due to new customers in a month( MRR New)
6. Monthly Churned MRR among customers affiliated to price1, Churned MRR among customers affiliated Price2 and total churned MRR( approximate indication of impact of changed price on customer churn),percentage net MRR churn( churned MRR/starting MRR)
7. Monthly Average revenue per new subscribers (ARPS (New) = New MRR/# New Customers \*1000) and Average revenue per total subscribers( ARPS= Ending MRR/# total customers\*1000).
8. Total monthly revenue
9. Cost of goods sold (COGS= Total customers\* latest purchase price): Though customers are committed the instantaneous sale price at the time of registration, they are periodically dispatched these products which are purchased at the latest purchase price( at the dispatch time). This is an important indicator of impact of change in product price on the revenue and margin.
10. Selling price derived from margin percentage( revenue-COGS/margin)
11. Operating profit/loss(gross margin – operational expenses) and Operating profit/loss percentage( operating profit or Loss/COGS)
12. Subscriber Lifetime Value(SLV): ARPS(New)\*Gross margin%/%MRR churn
13. Subscriber lifetime period = 1/%customer churn
14. Cost of Acquiring a customer (CAC=(sales& marketing expense/# new customers) \*1000) : Isn’t giving discount per item included in cost of acquiring a customer?
15. SLV to CAC ratio: SLV/CAC. This indicates how much a customer will yield by investing specific cost of acquiring him/her as a customer. For a healthy product this ratio should be more than 4.It means if a merchant invests x rupees in acquiring a customer, the customer should at-least yield 4x rupees of business with the merchant.
16. Months to recover CAC= CAC/(ARPS(New)\*Gross Margin%) . This indicates how many months (minimum) an average customer should be retained in order to at least recover cost of acquiring him/her.

## Actuals

Actuals should have similar attributes which forecast section has. Every day a multiple data procuring jobs run which keep on updating different attributes. Every day a job should run and compute different metrics (listed in forecast) and store in data repository in order to compare them with interpolated forecast values.

Each product account has **price buckets** in order to keep track of the offered prices for that product as well as registered subscribers for each offered price. When the product is launched on a day a price bucket is created for it, having the current purchase price (and date) and sale price of that product. When a subscriber subscribes to that product on the same day his/her id is registered with this price bucket.

Whenever the offered (sale) price of the product changes(every day platform should receive latest price quotes from main application) due to profit margin and discounting calculations a new price bucket will get created where the subscribers subscribing on the price change day are registered with this latest bucket.

Whenever purchase price of a product changes due to inflation or shortage, all the price buckets will get impacted. In this case a new version of purchase price will be added in each price bucket indicating the day on which purchase price has changed and the changed purchase price.

Example: consider that subscriber has subscribed to two units of toothpaste per month on 1st January 2016. On this day purchase price is 45 rs. And current offered sale price is 72 rs, then system will create a price bucket in which it will having first version of purchase price dated 1 Jan 2016 and amount as 45 rs, offered sale price as 72 Rs and the subscriber’s Id registered to this bucket. So all the subscribers who have subscribed to this toothpaste on the same day will get registered with the same price bucket.

After few days when few new subscribers are subscribing to the same toothpaste, if the offered price has been changed from 72 Rs to 69 Rs a new price bucket has been created mentioning the same purchase price but a different offered price and these subscribers will get registered to this new bucket.

So assume that there are these two price buckets only as of date 23rd Feb 2016. Now if the purchase price of the toothpaste has changed from 45 Rs to 48 Rs., both these price buckets will be updated where a new version of purchase price will get added to both with current date. So both buckets will have to versions of purchase price ; 1st with 45 Rs. dated 1st Jan 2016 and other with 48 Rs. dated 23rd Feb 2016.

Though purchase price of the product has changed, offered price for the subscribers who have subscribed to the earlier price cannot be changed. But the same will get changed for any new subscribers subscribing to the toothpaste newly on 23rd Feb 2016 or later by creating a new price bucket.

1. Its actual margin(gross profit/selling price)
2. Actual number of new subscribers/item registrations(?)
3. Actual number of churned subscribers/item registrations(?)

When churning of subscribers happen, one need to also register

* + Churned subscribers/items affiliated to price at start of the years
  + Churned subscribers/items affiliated to the changed sale price1
  + Churned subscribers/items affiliated to the changed price2 and so on.

The forecast should be entered manually for every set period (weekly/monthly etc.). Merchant can set forecast of many months ahead of time, depending upon his confidence level on a given product.

Actuals are collected and updated daily but many of the below metrics are calculated monthly as it does not make much sense to calculate them on a daily basis.

1. Actual operational expenses spent per product. It should be calculated based on the annualized operational expense forecast provided by customer( as described in operational expenses account)
2. Monthly sales and marketing expenses calculated per product based on monthly sales and marketing expenses forecasted by merchant (total expenses to be distributed across all the products..)
3. Net new customers and Total customers per month(to indicate demand)
4. Total churned customers and % customer churn per month(- #number of churned customers current month/total # customers at last month)
5. Monthly recurring revenue due to new customers in a month( MRR New)
6. Monthly Churned MRR among customers affiliated to price1, Churned MRR among customers affiliated Price2 and total churned MRR( approximate indication of impact of changed price on customer churn),percentage net MRR churn( churned MRR/starting MRR)
7. Monthly Average revenue per new subscribers (ARPS (New) = New MRR/# New Customers \*1000) and Average revenue per total subscribers( ARPS= Ending MRR/# total customers\*1000).
8. Total monthly revenue
9. Cost of goods sold (COGS= Total customers\* latest purchase price): Though customers are committed the instantaneous sale price at the time of registration, they are periodically dispatched these products which are purchased at the latest purchase price( at the dispatch time). This is an important indicator of impact of change in product price on the revenue and margin.
10. Selling price derived from margin percentage( revenue-COGS/margin)
11. Operating profit/loss(gross margin – operational expenses) and Operating profit/loss percentage( operating profit or Loss/COGS)
12. Subscriber Lifetime Value(SLV): ARPS(New)\*Gross margin%/%MRR churn
13. Subscriber lifetime period = 1/%customer churn
14. Cost of Acquiring a customer (CAC=(sales& marketing expense/# new customers) \*1000) : Isn’t giving discount per item included in cost of acquiring a customer?
15. SLV to CAC ratio: SLV/CAC. This indicates how much a customer will yield by investing specific cost of acquiring him/her as a customer. For a healthy product this ratio should be more than 4.It means if a merchant invests x rupees in acquiring a customer, the customer should at-least yield 4x rupees of business with the merchant.

Months to recover CAC= CAC/(ARPS(New)\*Gross Margin%) . This indicates how many months (minimum) an average customer should be retained in order to at least recover cost of acquiring him/her.

## Credit Points

A batch job is targeted to calculate the performance of every product at the end of configurable period (typically every month). When it runs for a product it calculates the forecasted operating profit and actual operating profit.

If actual operating profit is a positive amount and is more than the forecasted profit then the surplus amount should be credited to nodal account.

If actual profit is a positive amount but less than forecasted figure then nothing gets transferred to nodal account. SHOULD IT GET TRANSFERRED TO SOME INTERNAL ACCOUNT??

If actual profit is a negative amount (it is loss) then the money equal to the break-even situation (no profit no loss) is borrowed from nodal account and it is used to reduce the price of that loss making product.

For every deposit that a product account will make to the nodal account it will get 1 credit point for every 1000 Rs (configurable), which is stored in this attribute. Similarly when a product wishes to borrow any money from the nodal account it will lose 1 credit point per 1000 Rs.(configurable) borrowed.

Credit points will be an easiest mechanism to track the credit history of any product and weigh it against its competitors. Also credit points are the investments a product is making so that it can first use it for itself (offering instantaneous, basket, loyalty level benefits) as make a social contribution towards upliftment of loss making products.

## Total Debit

This field is computed on a daily basis by some job. The product account also has total debit where sum of products of every purchase price and the items subscribed at that purchase price( (purchase price1\* subscriptions at price1) + (purchase price2\* subscriptions at price2) +….) is calculated.

## Total Credit

This field is computed on a daily basis by some job. Then it will have total credit where sum of products of every sale price and number of items registered at that sale price has been calculated.

( (sell price1\* subscriptions at price1) + (sell price2\* subscriptions at price2) +….)

## Contingencies:

Finally it should have provision for contingencies. In case the product needs money in addition to the money that it is earning, then it will refer to this contingency before borrowing it form the nodal account. Thus in case of loss making products, if product wish to offer more discount in an attempt to recover from losses it will make use of this provision. In case available provision is not enough then it will try to borrow money from nodal account. It should be typically an annual deposit which few percent of the total spend (purchase) on the product.

Most importantly this account should be self-sustainable. In case it is unable to sustain itself it should raise a notification to the merchant so that the merchant will do manual intervention either by pouring additional contingency amount or by deciding to take the product out of subscription business.

One Rule to be followed is that when a product is making profits beyond the set targets, then this account will hold only amount equivalent of targeted profit in addition to the spend. The incremental/additional profit will be deposited to NODAL account for it to be used for provisioning across products and customers.

Example: Consider at start of the year merchant has targeted 3000 per month sale of a product, whose purchase price is 30 Rs and sale price is 50 Rs. So this is how the flow will happen.

A forecast is created by merchant for each month, where he will set the forecasted sale volume, forecasted purchase price and sale price and finally from and to dates for each forecast. These figures are completely based on his past experience. So volume forecast is 3000,forecasted purchase cost will be 3000\*30=90,000 Rs and forecasted sale amount with proposed offered price of 50 Rs will be 3000\*50= 150,000 Rs.( so expected profit of 60,000 Rs.), from date of forecast 1 Jan 2016 ,to date as 31 Jan 2016.

A contingency amount of 9000 Rs. (10% of purchase cost) has been added in the contingency provision.

A price bracket will get created with purchase price 30 Rs dated say 1st Jan 2016 and offered price 50 Rs, MRP as 56 Rs.

Say 300 subscribers register for this price bracket. So they get registered with the first price bucket. Total debit will be 300 \* 30 = 9000 rs and total credit is 300 \* 50 = 15000 Rs.

At the end of Jan 2016 if there is a volume of 3400 subscriptions for that product. The profit incurred out of the forecasted sale volume(3000) is the earning of this product( 3000\*(50-30)=60,000 Rs).

Since this is more than the forecasted volume of sale of 3000 the profit earned from additional sale of 400 items (400 \* (50-30)= 8000 Rs) is a bonus which should be transferred to the nodal account.

So in above cases the product has earned 8 credit points.

## Operating expenses Account.

This account keeps track of forecasted vs actual operating expenses and notifies the merchant if the provisioning (based on forecasting) is not enough to meet the actual expenses. We can broadly classify operating expenses into “fixed expenses” and “recurring expenses”. Fixed expenses are not handled by the platform (as the platform is not an independent shopping application but acts as a subscription agent of some shopping application). But recurring expenses are used to handle the lifecycle of subscription business and hence should ideally be managed by products themselves.

Again here the same philosophy is recommended where since every product item being sold is consuming its portion of operating expenses, hence it is responsible to contribute to it in such a way that overall expenses should get nullified by the overall contribution by the subscribed items.

Initially merchant has to make forecast about the probable operating expenses he may incur throughout the year. Actual expenses are reported back by the main application when items are actually shipped to subscribers. Against these expenses all subscribed items will contribute so as to nullify the effect of expenses.

* + Forecast: Merchant need to forecast the periodic (monthly) recurring operating expenses. He can choose some of the following headers for entering forecasted expenses per month under each, for the whole year.

Recurring expenses

* + - Creating and maintaining the web application(obtaining domain on cloud, procure number of servers, hosting site)
    - Expenses on integration with third party paid services (payment gateway, goods tracking system etc.).
    - Expenses on communication charges(phone, internet usage)
    - Data Backup and software maintenance/enhancements cost
    - Office and Inventory storage space expenses( rent)
    - Personnel related expenses( salaries, bonuses, HR)
    - Goods Delivery expenses : A merchant need to specify average delivery expenses per basket for every KG. When a subscriber confirms registration of basket items, the same event should calculate the total weight of that basket and registers total delivery expenses per delivery.
    - Resources expenses
    - Housekeeping expenses( maintaining office, storage spaces, disposing/returning expired goods, electricity bills, personnel transportation)
    - Cost of recurring travel( personnel traveling across locations for any official purposes)
    - Renewals of licenses/permits/certifications

Forecasting should be typically based on historical data and platform should provide some mechanism to prefill the forecast based on the actual data that is getting received in the past.

* + Actuals
    - Credit:

Thus every product is sparing some amount from the profit that it has earned (as customer has paid for it, it has earned some profit) for the operating expenses incurred by the system to manage it’s own subscription lifecycle.

The interesting part is how to calculate each item’s contribution to the operating expenses.

Simpler approach is to divide total monthly operating expenses by total number of items subscribed (in different baskets) so as to arrive at the “per item” expense. Here all the items are considered equal in terms of weight, frequency of delivery etc.

A tedious but precise approach is to

1. Divide the recurring expenses into subscription independent expenses and subscription dependent expenses. So among the type of recurring expenses listed above ,the categorization will be
   1. Subscription independent :
      1. Creating and maintaining the web application(obtaining domain on cloud, procure number of servers, hosting site)
      2. Expenses on communication charges(phone, internet usage)
      3. Data Backup and software maintenance/enhancements cost
      4. Office space expenses(rent)
      5. Resources expenses
      6. Personnel related expenses( salaries, bonuses, HR) -
      7. Housekeeping expenses( maintaining office, storage spaces, disposing/returning expired goods, electricity bills, personnel transportation)
      8. Cost of recurring travel( personnel traveling across locations for any official purposes)
      9. Renewals of licenses/permits/certifications
   2. Subscription dependent
      1. Expenses on integration with third party paid services (payment gateway, goods tracking system etc.). – frequency dependent
      2. Inventory storage space expenses( rent) – weight dependent and frequency dependent
      3. Goods delivery expenses – weight dependent and frequency dependent
2. Categorize the subscription dependent expenses into weight and/or frequency dependent.
3. Distribute the subscription independent expenses equally among all items subscribed.
4. Distribute the subscription dependent expenses across items depending upon their weight and frequency of delivery.
5. Summarize c and d so as to arrive at total credit to be made to this account.
   * + Debit: The main shopping application is expected to provide actual operating expenses made on subscription business by provide this feed to the platform on a monthly basis. The feed should contain different ingredients of operating expenses (as listed in headers above). When such as feed is received it should be used for realizing the actual expenses and hence an amount equal to every product’s contribution towards operating expenses should get debited from this account. Again the same calculations should be made (as in credit procedure) to derive operating expenses per item delivered in that month.

Example: If total monthly operating expenses are forecasted as Rs. 200,000 and if there are total 100,000 items subscribed so far for monthly subscription then per item operating charges= 200,000/100,000 = Rs.2 per item. Every item so far added in every basket will credit Rs 2 upon subscriber payment per month. If a subscriber has added total 15 items in his basket and made a full yearly advanced payment then total credit by that subscriber = 15(items pm) \*2(Rs. per item pm ) \* 12(months subscription)=360 Rs.

In this case every month a basket is delivered successfully 15\*2 = 30 Rs get debited from this account.

If another subscriber has subscribed for same number of items but made an advanced payment of only 3 months then his contribution towards operating expenses as a credit = 15(items pm) \* 2(Rs. per item pm) \* 3(months subscription)= 90 Rs.

In this case too, every month a basket is delivered successfully 15\*2 = 30 Rs. get debited from this account.

In ideal situations the debit and credit entries should nullify each other. But there a few cases where this may not be true.

1. When a basket delivered to a customer has returned back and it needs to be resent(resulting into double dispatch charges)
2. When the planned/forecasted operating expenses are no longer valid due to environmental factors but products have already provisioned for them as per the forecasts.

These cases should be handled by platform carefully and should make provision to add more money to this account externally if required.

## Account for sales and marketing expenses (should we have this under scope??).

This amount is spent for acquiring more subscribers and retaining existing subscribers. These expenses should be correlated to the number of new subscribers joining each period to check the effectiveness of the effort. In case it is not enough then a separate additional provision should be made for it.

## Nodal Account

For motivating customers for buy more as well as to remain associated longer. This provision is used for basket level discounts for the eligible subscribers. There should be rules on how much basket level discount should be provided and to whom. Initially some provision will be made by the merchant but later all products should contribute to this account, as basket is an aggregation of these items for a customer. So if a product is making excess profit than its forecast, then it should contribute this excess profit amount to this account.

## Merchant’s account.

A Merchant will anticipate some periodic profit for himself on each product that he is selling under subscription. So every product should deposit that expected percentage of profit out of total profit into this account. The products who are making lesser profits than merchant’s expectations for himself or those which are making losses will not contribute to this account. Merchant can decide to spare the money from this account for any purpose that he wishes to and it will be a manual process.

## Calculating the price of a Product

This is the most crucial step of the overall process. We will try to divide it into steps and develop a full-fledged mechanism for the same.

## Calculate price based on expected margin

Initially we do not have any historical data and setting the forecast for the first time. So we will start with the basic pricing calculation based on expected margin.

Margin = gross profit/selling price

## Adjust price based on demand curve

## Adjust price based on extrapolation of profit/revenue

## Adjust price of associated products(substitutes and complementary)

### Interpolation for transforming monthly target parameter values into daily values

1. Targets are set at monthly level as it is not practically possible to set target for every day, for the whole year. But they need to be available at daily level so that they can be compared with daily actuals. Comparing them at month interval may be too late as non-performing product may cause significant damage to the overall scene. So in order to compare the targets with actuals on daily basis the target parameters for the set discounted price(say 5%) are getting interpolated using cubic spline interpolation method. A Java code for cubic spline interpolation (SplineInterpolator) has been provided by apache.commons.math3 library and can be readily used here.

### Extrapolation of actuals for the current day for comparison

1. With the start discounting price product is getting sold every day in some volume. The sale volume on a day may be more than the set target or it may be lesser.
2. Values of parameters for a current day (where sale is not yet happened) and until the end of current month are obtained through extrapolation of actual parameter values until yesterday (which one??)
3. These extrapolated figures are compared with target figures for that day (obtained at day level through interpolation). If the actuals are higher than targets it indicates that the product is doing better than expected and hence no more discounts pouring is required at this time.
4. If the actuals are lesser than targets then it indicates that the demand trend may be on negative side than expected but cannot be confirmed with a single day
5. Demand Curve???
6. Elasticity : strength of the relationship between price levels and consumer demand. A product is highly elastic if consumer demand varies considerably with price.
7. Non-Price shifts: Sometimes, non-price factors such as consumer taste, income or expectations affect a change in the relationship between price and demand. In these cases, businesses responding to non-price factors stimulate sales of a product by lowering prices to increase demand. In this way, a non-price shift in demand will result in a change in price, even if price did not originally cause the shift.
8. For every product the intended profit target is considered to have been reached if the target volume (for the specified period) of units is sold at the carefully calculated target retail price, all other parameters (purchase price) being constant.
9. Usually the target exceeds for some products whereas for some it falls short of its targets. If the volume of sale exceeds beyond target, the additional profit (in addition to targeted profit) should be considered as the “**bonus**” for that item.
10. There is more likelihood of guaranteed profits (though limited per unit volume) on established brands. So these products should be considered as vehicles for sustainable business with gradual growth. In order to get considerable bonus from them the volume of sale (sale target per unit period) should be substantially high as these items usually yield lower profit margins per unit for the retailers. So the unique sales proposition for selling established brands is to earn a very high volume of business for them. Let’s call them “Volume Driven” products.
11. There are brands which are so popular that despite of considerably higher retail price than all their competitors they undoubtedly rule the market. But again, more the monopoly lesser is the margin for the retailer.
12. On the contrary less popular/secondary demand products do everything to conquer considerable portion of market and hence yield much higher profit margins for the retailers even for a moderate volume of sale. Their consumption turnover may not be guaranteed and can change across geographies. A clever retailer needs strategies to promote sale of few carefully chosen such products (without compromising his reputation) in order to rip more profits and eventually start gaining bonuses from them. The investment for promotional measures for these products can be provisioned form the bonus gained from high demand/monopolistic items.
13. But all low demand items do not necessarily yield greater profits, as few of them cannot pick up well in the market, despite of adequate promotional measures. Also as the “bonus” available out of sale from high demand items is limited and hence retailers need carefully crafted strategies to determine how to effectively promote these items and which products are the best candidates for promotional investments.
14. How to choose right products which are eligible for increased promotion? And how to decide on how much promotional investment to be made on every item (obviously it will be different for every product based on its proven historical merits)?
15. First let’s see what can be the strategies to earn more and more bonus. First let’s make an assumption that few products exceeded their target sale at target retail price and hence won some “bonus”.
16. This strategy considers use of the accumulated “bonus” from various items to aid in determining
17. The revised price of the same item for new subscriptions, so as to lift more “bonus” on them.
18. For determining and sustaining the price of low demand items, who are unable to make their targets.
19. For maintaining the corpus to yield additional benefits to subscribers such as offers, loyalty points, basket level discounts, brand loyalty discounts etc.

## Setting targets for a product.

1. To successfully run a business without making loss you should always know gross margin, markup and breakeven figures.
2. Breakeven analysis is helpful information when preparing and updating your business plan and can be used to set sales targets.
3. Breakeven dollar value needed before net profit = Overhead expenses/ (1 – (Cost of Goods Sold / Total Sales))
4. Breakeven number of units to be sold before net profit = Overhead expenses / (Unit selling price – unit cost to produce)
5. <http://www.business.vic.gov.au/money-profit-and-accounting/pricing/calculate-your-breakeven-point-margin-and-markup>