

Retail Business

and data analytics solution



Retail business deal in Products, products to be sold to Customers. Customers in this business are targeted to be end-consumers who buy not to resale. However if the business outlet is big, which usually is the case, and then the customers could even be very small traders who stock stuff at a much lower scale.

Retail business deals with Vendors small vendors who sell wares they produce or gather from direct peasants in very small quantities. They get the products from the points of production, cannot stock as they cannot afford storing facilities, and yet sell it to stockists. Retail outlets actually work as stockists vis-à-vis the collectors or small producers. Thus retail outfits have a buyer relationship with respect to the producers or small couriers and have a seller relationship with the end customer. Stock taking, preserving, categorizing, monitoring quality, organizing and disposing the sale process are the activities Retail outfits carry through.

Collecting materials directly from producers and/or production centers is a challenge that requires fast collection, very effective categorization, organizing to suit a very effective retrieval and fast disposal requires a scientific supply chain and demand chain management along with the appropriate and optimum value chain categorization and stocking.

Retail business is therefore a complex matrix of relationship algebra with Customers, Vendors, Storage space where PRODUCT is at the center-stage. The challenge however is in the fact that Product here means a set of products, where the set is fleeting! To a retail business the set of Products has different elements depending on season, on geographical, cultural and demographic space. Comparison and study of the performance of the product, its profitability, return per unit, saleability becomes very difficult because the individuals products in a packet differs. Even within the same type of food grain or consumable items the exact same type changes from one season to the other, viz, the different types of rice may not be acquired from one period to the other. The challenge is how to group these products for a meaningful comparison study.

Business Analytics has to drill down to the price and consumer behavior vis-a-vis individual products to figure out which is the best price the consumers are willing to pay as a sustainable buy. Prices of agricultural products change with season, with natural disasters, with sudden demand hike in festivals or in hearsay and/or with man-made supply mechanisms. Business analytic would look into the effects of these changes and would like to predict a stock pattern for optimum usage. The economic order quantity or reorder level cannot be so automatically or mathematically determined because unlike the manufacturing case, the next turn of reorder may not find the product in the natural market in the amount sought. Natural products or primary products appear in the market in a very short period of time. Hoarding or stocking them in the peak period to manage the lean period needs cold storage and good stocking, however the freshness is compromised in food items or in cottage produces. This compromise may not be appreciated and translated into price offers by the end customers. Thus any product duration, its stay in the market is constrained by the naturality and the related consumer behavior. Business Analytic thus has to properly categorize and group products as per definitions and nomenclatures that are not standardized. This challenge limits the comparison study across broad ranges of geography, demography and culture. The comparison knowledge artifact of one outlet or outfit of any mufti-facility, multi-product department stores may not be mapped with those of the others.

Unlike Manufacturing or service sectors the vendors here are not fixed, they vary as fleeting as the producers do. Retail outfits do not have backward integration of production points where they can directly control the name, amount and quality of the products. Sundry Vendors do not give a vendor behavior pattern controllable, monitorable and wait for any quality certification.

Data Analytics can therefore be effectively done as an intra-outlet management in figuring out profitability with respect to time and return on investments on groups or categories of products. Any smart drilling down would need innovative naming of the groups known and understood only to individual firms.



What we get in the market?

Retail management being a challenging field as it is in regard to the data analysis as we have found, has seen in the market space innumerable solutions, all in the name of Business intelligence, none of them however mitigates the already complex problematic. In actuality, the pressure of the solution aggravated the pressure of complexity of the problematic. The various solutions in this space may be grouped as

- Market Basket analysis [MBA]
- ANOVA analysis
- Aggregate analysis
- Product profitability analysis
- Shop profitability analysis
- Special promotion campaign efficacy analysis

We will spend a little time in each case to point out that none of these gives an elegant solution.

Market Basket Analysis [MBA] is however the best of the inventions in this space. Every transaction per customer at any point in time is a package with a specific identity. This enables to strike an association of the different products a customer goes for. As an example a very creative consumer behaviour is fathomed when a customer buys products when (s)he buys main items, like what does she buy with meat or with the main dish? – this is a question the industry always wanted to know, the follow up question would be how much of an associative product is brought with a main product and then go for the aggregate and the average- this will give the business analysts and idea of how much say of potato need to be stocked if there is a sudden surge of meat demand due to say some kind of an occasion. Many different algorithms are in the market trying to measure the comparative relative weights of products in associations with some specified "main products".

In this regard we must assert that the point-of-sales data at the transaction level can provide the best value and any kind of modelling would actually bulldoze these nuances. Data analytics as opposed to Business Analytics through normal OLAP based business intelligence tools are not addressing the problematic. Packets or baskets are physical realities that may and can be aggregated over consumers, sundry or repeat ones. They can however be conceived and created without the consumer oriented gaze but again through an aggregated measure viz, how much potatoes are sold in a weak and map that to the amount of meat sold-the assumption here is however a little romantic- that people who consume meat also would concomitantly consume potatoes- this again is arguable. But to cut the complexity many retail outlet owners take recourse to some assumptions in consumer behaviour which they augur with what they call empirical experience. Empiricization of this sort brings down the value of reality in the actual transaction data set- we may call these as "reading in of pre-conceived knowledge artefacts in the data set".

Market Basket analytics however has to deal in a huge number of data set and needs to be disentangled at the point-of-sale through algorithms built in to the ERP system. This can give us the data measure of the associative values of products with respect to some prime products. Which product is prime is again a complex assumption based or empiricism based knowledge and cannot be accepted without any debate. The internal handling of the data becomes rather complex adding on to the ready reckoning of the data. Yet, MBA is the most advanced and creative solution in finding out the consumer behaviour in retail industry and any fast ad-hoc self-serving data analytics tool can offer wanders.



ANOVA analysis that is the analysis through measurement of variation within a group and outside a group is inherited from manufacturing industry. In retail the ingress raises more questions than it solves. What constitutes a group? Would this categorization be based on natural variety like different types of rice or different types of cereals or different types of meats? Or would it be a grouping on a pre-conceived packet modelled on the class? Many firms conceive a packet with mid-ranging products which middle class buyers would buy. There is no point in putting a rice worth \$3 per kg with a rice worth less than a dollar per kg in the same group. But firms are there too who find worthwhile in grouping them too. So what is "in-group" to some firm may be "outside-group" to the other firm and obviously therefore these two data from the two outlets cannot be compared. Analysts in any one firm may use ANOVA but have to "read in" many empiric ideas.

In any case Data analytics tool would solve this requirement no less effectively than any Business analytics tool based on OLAP.

Aggregate analysis is the most popular technique used in this industry. This has been effective because drilling down to more atomic details becomes more uncertain and obscure. It is much easy or some kind of a compromisingly value-indicative if products of same type are grouped and their sale and procurement is measured in bulk as one unit, e.g. the performance of Rice as one product [which is never the case] in one week with respect to the next or previous. The performance in terms of revenue earning [depending on sale] or profitability [depending on sale and procurement] and then combining it with the turnover gives a good enough insight into the rate of future procurement and yet obscures deeper meaning of which particular rice pattern have fared better as compared to the others. Add to these the complexity of the challenge of the availability of one particular rice variety throughout the year. This obscurity embedded in the supply pattern of the product influences analysts to take a less rigorous track of aggregate analysis.

Data analytics tools that directly extract data from the transaction point and provides answers in the same system provides equally powerful analysis insights as an OLAP tool would give, and then its transient nature or on-demand preserving nature would show any changes in the transaction data set directly into the dashboard on real-time.

Ideal-Analytics [IA] - the product does have a unique advantage of using independent data sets in even differing formats where in relationship can be established on the fly so that the fact of one data set may be measured against dimensions of another dataset. That relationship does not have to be preserved.

Product profitability analysis is the only method that goes down to the atomic level, but that again poses a little challenge as the profitability derived figure might undergo a change for one product due to a reason while for the other product it is not corroborated, the differences in the cause might render the aggregate profitability of a group of products meaningless and yet would be used and inferences drawn. Business acumen and exogenous causes or explanations creep in that actually cannot be built in the data model. So product profitability is good so far as individual products are considered for a short period in time and loses its significance over cross products or over longer periods. Product profitability has to be conjoined with the product revenue that means with the measure of how much of that product is being sold. Profitability is quite often a function of scale but that is when the profitability figure is an aggregate figure, in case of individual product profitability scale is rationalized [as we term it in mathematics]. An OLAP tool fares better than any data analytics in cases of multi-basis study. However, even in this account, the fast changing of the bases pose a challenge in the fast rendition of meaning.

Shop profitability analysis is nothing but a grand rolled up measure that can be affected due to various reasons and effective drilling down can be obtained either from data analysis tools or no less or frankly speaking better in OLAP based tools. Roll ups are always nicer to view and draw inferences from in OLAP tools and yet the data analytics fare better in them being slick, and fast dismountable.

Campaign efficacy studies are equally effective in either type of analysis tools. IDEAL-ANALYTICS tool can create special named campaigns through preserved "connections", and "data presentations". These then can be dumped or produced or exported for further use in spreadsheets and can be preserved with the right chronology, time-stamp in different sheets and these sheets can be later handled programmatically to figure out comparative studies. The Unique proposition in IDEAL ANALYTICS is provided by the currency of the data, and that the analysis the same structure or query would give the current value- because the queries are fired real time and on-line in every rendition. The results in different point-in-time would not tally because the time change in the transaction data base has caused a difference in the dataset values. In this case the exact nature of the requirement calls the shot- if the need is to compare the historic data in different campaigns then the entire structure along with the data has to be preserved, if however the measure of the old campaign may be compared with the present data [however hypothetical it sounds] then IDEAL ANALYTICS fares better. IDEAL ANALYTICS can be an effective tool as well to compare the aggregate results of different campaigns and render on to the dashboard a comparative value.

Sifting through historical datasets, if they are designed to bear the timestamp, or if the transaction datasets are preserved on the basis of periods, could be handled very flexibly as new datasets can be created by culling fields from different datasets. The final rendition goes to the dashboard and yet the data values bear their own point-in-time stamp. Thus an otherwise only real-time loading of data is manufactured to compare among data values in different point-in-time. This is true as well for aggregate or derived data values.

Our specific experience with salience

In retail business challenges pile up when products are varying and are fleeting with respect to seasons or otherwise. Consumer non-durables items that have a very short shelf-life, and whose value change even faster, whose value change during the shelf-life [the freshness factor]. When geographical territories pose difference in price-acquisition vis-à-vis the competition, need a very appropriate technological tool to deal with. Food-crop and non-preserving food products sector is that challenge we figured that Data Analytics tools in general and IDEAL ANALYTICS tool in particular can provide the appropriate solution.

Empowerment of the analysts:

Simplicity, speed, ad-hoc, self-serving, business logic driven, technology-encapsulated solution like IDEAL ANALYTICS steals the attention of the user community mainly because the dependence of business analysts and decision makers on the technology professionals is removed. Our experience in food-retailing has steeled us to face retail business with consumer durables, those even with better and organized supply chain networks.



A short-lived shelf-life product retail outlet gets assisted by effective supply chain network. Supply chain systems can be well managed thru publishing the values of products in the point-of-acquisition, thus the prioritization and categorization of a supply chain information system can be undertaken by publishing the values and creating a real-time online value chain. This value chain then may be disseminated to the various nodes for fast distribution on-demand by the demand-chain. The most appropriate addressing of the demand chain by appropriate supply chain gives the best of the value chain. Data analytics can provide a very fast on-line ad-hoc and not pre-fixed analysis picture published through dashboards.

Security question:

Decision makers might want to see the same data with high security and with different privileges and yet from the same transaction data set. Security of each decision maker's view along with the ones that an individual analyst wanting to share with a chosen group takes up the prime importance. Transiency of the data added with the preservability of the queries for re-use and still giving out the current data is the unique requirement where a data analytics tool like IDEAL-ANALYTICS [IA] triumphs over OLAP based business analysis tools.

Data integrity kept unchanged by any analysis tool or operation:

Security of data-rendered when the transaction data is left unchanged is another salience of IDEAL-ANALYTICS [IA]. The intermediate technology is encapsulated and is insulated from the customer. The data in the transaction base is not affected by the operations of the tool where it resolves huge matrix inversions and transposes. A very unique mathematical algorithm has given the tool a phenomenal time saving power for huge datasets. Pivoting data and interchange of rows and columns to provide all the derived data facility is the unique proposition here. The tool does all these without changing any structure of the transaction database or does it without encumbering the transaction database with more tables or elements than what was present there. Data integrity of the transaction data base and then preserving on-demand the structure for rendition along with the backing up of the structure along with the data is achieved very effectively.

Thus DATA Analytics is a simple and slick solution that addresses all those that we have achieved through Business Intelligence tools based on OLAP, and yet much MORE--- the more bit is achieved by a state-of-the-technology algorithm resulting in fast rendition of pictorial representation in dashboards.

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