Manufacturing Industry

a data analytic solution

Ideal-Analytics is a suite of software tools to glean information and therefore knowledge, from raw data.

Self-service, real-time, on-demand ad-hoc analysis and high performance exploration functionality with plug-ability, scalability & security, available in both SaaS and on-premise model

A Data analytic solution for the Manufacturing industry - Off-bit and yet appropriate!

Two schools of thought, two patterns of solutions - that is what covers the knowledge base tackling the manufacturing arena in knowledge based approaches. The former is in manufacturing management and the latter in providing a technological aid to the decision making.

In organizing manufacturing process in optimization of resource inputs toward the best possible output one school of thought would control their production volume, time of output and re-order time or time for the new set of production in planning road map. This school assumes that the market segment demand is much more what they can ever produce, and therefore they need to produce to cater in the shortest possible time so as to make the supply line seamless. This scenario is appropriate for big companies to whom monitoring and management of their production capacity is the key in their business plan.

A second school of thought produces products to be sold to downstream producers who would use this product for their final product. This market introduces to their production challenge another aspect that is market driven and yet has to depend on the final producers. This is the case where the concerned companies act as vendors to the final-product companies. In a typical cash stricken economy as ours small and medium enterprises usually act in this mode. The final-product-company lays down very strict vendor management policies and even after that imposes down a buyer's market to which the first producer has very little leeway. In this case the production volume, its quality and the price becomes a captive element and gets out of the market consideration- this is a paradox because first it started as the market driven model and yet later it went out of the market changes. This school of thought has to plan for its production in terms of volume, time and quality as dictated by the final company(s). The need for business analytic tool loses its fullest realization.

The corresponding patterns of solutions are therefore one with supply induced or economy of scale induced, thereby the considerations of an optimum supply chain and supply schedule takes the preponderance in making the decisions- this results in dealing with those metrics that measures output in volume with respect to the inputs provided. So the conditioning criterion would dictate the volume and number of production from one period to the other with respect to variable inputs only.

The second approach is that of controlling the input price, resources, volume and other factors when the price is given - as the price is pre-fixed by the contract they signed. This approach is more in the traditional supply industry or vendor space where optimization is constrained by extraneous measures handed down by the final product company.

OUR own market investigation actually has made us take upon a new approach- that of open market induced approach, where production volume, time, price, re-order level, turnover time and quality is dictated by the market demand. The basic assumption is this approach is to factor-in

1. all production may not be sold in every cycle of production and that the market may want products with slightly varying composition, price, size and even quality depending on different groups of customers being targeted.
2. Production may be distributed to cater different geographical market segments and quite often production may need different types of packaging depending on the demographic and cultural changes.

We have found that this is the scenario of a complex variegated market that needs to be cater many cultures, tastes and consumer behaviour, with respect to income groups and other miscellaneous other considerations. On-demand production is many a times an additional aspect of production need that is necessary over and above the constant requirement of the base demand.

This is the scope where scope of the ad-hoc metric study comes into play. It has to be ad-hoc, real-time, fast and self-serving. The production vectors cannot wait till a trained IT professional goes into his wares and brings out a different model and then caters to the decision makers. The decisions had to be taken across the table on a conference with many alternatives bringing out optimum results in a result space and then a free play may decide the production vectors at any given point-in-time only to change it in the next instant with other slightly varying considerations.

OLAP based usual fancy business analytic solutions that cater the present market of business intelligence usually forces down this in-ordinate delay as it has to go through the complex modelling exercise of a decision support system. Decision support systems have to store the transaction data into another database where they can play on the aggregate functions on each column that hold the facts or measures of each row. Running through such columns for a huge number of transaction rows needs to get channelled or disciplined through a proper judicious modelling. This introduces the in-flexibility of the approach.

Data analytic tools that hit directly the transaction dataset and can pivot the row/column matrix very fast not bothering about the number of rows is the problematic that needed to be solved for most of the players in the business.

The provider space of manufacturing now is played by 96% players who are either small, medium and are market driven or other very niche custom producing players who produce on-demand products. This is huge, very business oriented, tech savvy and need very flexible direct easy-to-use handy tools.”User friendly” is hardly the appropriate term, one need to be “user appropriate” and “user driven”. A business analyst with the least skill and experience in software tools should be able to change the input vectors at-will to take alternative decisions at buttons ends.

IDEAL-ANALYTICS [IA] the product aimed at the planning stage of its creation to address these considerations. The built-in algorithm we used was of a very high mathematical skill that needed to be the most advanced and at the same time needed to be hidden for all practical purposes from the users’ considerations. A user should be able to use the tool as if he is using a normal sql-type query and that too without knowing much of the intricacies in resolving the mapping or join clauses. They should be able to write complex queries through drag & drop facilities without much being bogged down by the semantics and syntax of the language and the tool should understand their need and send the correct grammar to the system fetching appropriate results. We have achieved all these!

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In our experience we found that a manufacturing data contrary to the popular conception or traditional usage deals in datasets apparently disjoint or loosely related with each other. The inner implicit relationships are more meaningful than the articulated ones that can be mapped from the design considerations. Say for example, a production volume measure in a particular month may be connected with the data of a festival

season where end customers' disposable income goes through a sudden hump or a jump as the case may be. Design wise this becomes very difficult to relate, which requires a cross dataset connection when a fact of one dataset may be measured against dimensions from apparently unrelated datasets, but this would be done may be once a year or even once in long time. On the other hand a very random need may arise to ascertain the production possibility due to some sudden change in the money market. Companies usually do leave these studies outside the system and take their traditional way of arbitrary decision making techniques to come to some decision-point. Technology can easily be used to aid these decisions if we have designed them in the right fashion. IDEAL-ANALYTICS [IA] helps us use apparently disjoint datasets and ascribe relations on-the-fly so that mapping can be undertaken with varying degree of intensity and meaning and then show pictorially the moving values. The next moment a different relationship may be struck and the same datasets or combined with other datasets can be brought to use where facts of some datasets can be measured against dimensions of other datasets. This unique feature gives the freedom to see our decision vectors across various alternative constraint conditions. The optimal solution space can undergo therefore many transmutations helping the user take a confident decision vis-à-vis the various available alternatives.

Instead of the usual Cartesian multiplication of data vectors and then projecting on them to figure out the solution space that we generally find in RDBMS and OLAP tools we take a circuitous way avoiding the matrix multiplication using the filters in the beginning to project the needed vectors and then pivoting them through a different style of database management. This highly advanced technique we insulate from the customer and provide them the black box with all interfaces so that the user-customer does not feel its existence. This has given us the benefit of a very fast operation. In one case study with a very high metal trading and production company we could cut down one operation of 76 hours in a sophisticated SAP based operation to less than 4.5 hours. In a second case in health care industry we could reduce the operation time from overnight operation and calculation to minutes. In both these cases the wizardry being done through our matrix manipulation algorithm.

We are now much comfortably placed in dealing with huge apparently unrelated datasets and cross measuring them or cross filtering them as per the demand and bring out the inner meanings and relations.

Transiency of our data values in the output rendition is actually a feat we have established that once was considered a taboo in the industry. We might want to save the queries and not the data as data fetching now is with so reduced time-taking. We gain the currency of the data in this way. Additionally the same query that hits the transaction data base and renders data takes less time when they are fired again, the query is saved and may be cached [on-demand] and the data updated with the latest transaction data. Any kind of saving of the output aggregated data, compromises with the currency of the data in the fast changing transaction databases. What it required was a very fast rendition of data to the presentation layer – this could not be delivered by OLAP tools and can be very successfully delivered by data analytic tools in general and IDEAL-ANALYTICS [IA] .

Security and authenticity in distributed modes:

Data security in manufacturing is as important as any other industry if not more. The details of production and those of the production planning is crucial for every company- that is so to say their trade secret. Security at various levels differentiated with differing privileges and yet after rendition they would like to see it changed and keep the data secured from all kinds of snooping/phishing/ or hacking. This is additionally

assured by not keeping the data in the rendered cubes in some intermediate data stores. Every time data is fetched the logic has to be filtered with the privileges and security arrangements.

Conclusion

Manufacturing is fast becoming market induced and market oriented. Market these days are less fixed and more demanding on varieties in the on-demand outputs with many variations only to demand a change in their components, sizes, complexities, nature and even packaging. Every one of these aspects are decision-points by themselves. The decision process has become more complex than ever and very fast changing. Decision-needs therefore hit the process almost randomly may be practically in every production cycle. The technological aid exigent therefore needed a whole new look and a whole new motive. Old fashioned heavy-duty OLAP tools fail through the creek. Market demanded a fast user-driven flexible technology - this was the entry point of Data Analytic tools that would deliver the solution hitting the transaction database. IDEAL-ANALYTICS is one such tool designed to deliver this set of problematic in the industry. It is remarkably affordable either as a Software-as-a-Service [SaaS] version or as in in-house version. It is slick and is productive from hour one without any training overhead or time.

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Analytics On-Demand

www.ideal-analytics.com

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