End-To-End Predictive Analytics and Optimization in Ingram Micro's Two-Tier Distribution Business.

OVERVIEW

INGRAM MICRO,is the biggest company which distributes products related to technology.It operates in a high volume low margin environment.The origin of this business was in North America in 2009.This company has developed a innovative price optimization engine.It has developed a set of analysis applications which identifies sales options for companys' sales purposes.An integrated digital marketing platform was developed to run its data driven marketing campaigns for its customers.Because of these products and analytical programs a revenue of $1.3 billion has been generated.A profit of about 42 million was made.This is a two tier information technology distribution system and products are purchased by resellers through their distribution partners.Products are reselled from Microsoft,Hewelette-Packard,Lenovo,Cisco,IBM and many different companies.For example,a customer can purchase Microsoft Office 365 from Ingram instead of purchasing it from Microsoft.Ingram the largest 2 tier company,are spread out along 39 countries and has 1400 suppliers.It also delivers products and services to more than 200,000 solution providers.It processes more than 10 million orders.It generates a revenue of more than 46 billion each year.

How was Predictive analysis applied?

Solutions have been evolved over a period of years.A decision support system was introduced where a report was sent to each field sales representative.The first 5 representative accounts are listed that has the most cross-selling oppurtunities.The top 5 accounts have an attribute are also listed.The feedback was provided by the field representative.The feedback was that they liked the format and the content of the reports.Their accuracy was measured by taking samples randomly.When the samples were tested,they found out about call-dispositiom logs,certain accounts were not attended by the representatives because of other priorities.This ia the main reason why a digital communication system was introduced.In this system a mail was used to communicate with the customers within in install basis respectively.Incentives were offered so that they purchased the product.This was a good approach and within first 2 weeks there was an increase in the white space revenue.The revenue earned was $4.3 million.The first program which was introduced was BI(Business Intellegence) programs.A model called marketing-as-a-service was introduced which included digital and telemarketing marketing programs.

Zilliant price optimization suit was built up in 2007.For 2 reasons,next generation business-to-business price optimization was built.The first reason was,business conditions were put in 2007.A fresh thought was made towards price optimization which included additional business objectives and price setting.This depended on a product life cycle.The second main reason was there was an improvement in collecting internal and external information which led to an improvement in prediction abilities and accuracy in demand parameters.A separate data infrastructure was built outside of INGRAM's core IS infrastructure.This infrastructure gave us the flexibility to append,enrich and cleanse data and external data as well.Some of the applications were developed in 2011.

Solution A:IMPRIME-It is a patent-pending scalable B2B price-optimization system.It sets data-driven prices,which include list price or matrix price and also gives data-driven negotiation guidance.

Solution B:Intellegence INGRAM-Its an integrated analytics driven-digital marketing platform.It helps us to use data insights at the customer and EU levels through data-driven marketing programs.

Solution C:IMSMART-It's a data driven mobile application which helps sales team to find out account oppurtunities.There are 4 major service layers-

1.Data Integration
2.Analytics
3.Application service
4.Market-as-a-service

1.Solution A-Price Optimization Module:IMPRIME

Application consists of 6 plug and play modules.
1.an input user interface(UI) to capture scope,business rules and requirements.
2.demand modelling
3.a price optimization module
4.a postprocessing unit for integration with price management systems
5.a review UI for reviewing,editing and accepting price recommendations
6.a negotiation guidance and cross-tell applications

Optimal price points are estimated at 4 levels-

SKU-customer level.vendor(group of SKU's) customer levels,SKU-customer segmented level(group of customers) and vendor customer level.All these 4 levels are combined for each pricing project.A vendor business manager/product line manager initiates a pricing project.This is defined by
1.A set of in-scope products
2.target customers or out of scope customers.
3.business objectives(maximize profit or revenue)
4.parameters(eg.maximum or minimum allowable price changes)
There are 500-700 price points for each high velocity SKU,specifically some are for high volume customers and some for customer segments.A new price optimization engine was introduced with the existing one.Millions of optimized price recommendations were uploaded to the price optimization systems within minutes.Multiple times prices can be changed within a day.
Customer Segmentation-It is the process of grouping together of customers who are similar.They are grouped together in clusters.Its done using a mathematical algorithm.It is done on various parameters.Factoring of pre-existing customers is done,we can choose the desired service level and price levels of our choice.
The factors that define service levels are-
1. order threshold for free grounf freight
2. credit terms
3. technical support coverage prior to and after sales
4.sales coverage model
Demand Groups- In demand groups similar or substitutable products are grouped together in hierarchial trees and customers who are in the same groups are expected to react in a similar manner whenever there is a price change.This is achieved through a 5 level functional product hierarchy.It can also be achieved through an analysis of dominant product attributes obtained

from product information management system.For example-A new product demand group can be formed by pooling all laptops which has 17inches screens.Another example is that a new group called customer demand group can be formed by pooling all customers from a particular business unit and the only condition is that they should be spending between $50,000 and 150,000 on networking products.

Demand Modelling-Customer segment level adjustments are performed based on 4 models as follows-

Model 1- Demand is calculated in units.It calculates how much the product is in demand.This is calculated each week amongst all vendors and all distributors which included Ingram.

Model 2- Market share is calculated of a particular manufacturer.Keeping a particular category in mind across all distributors.

Model 3-This model calculates the total demand of the vendor,distributors,share of vendor and total demand using logistic regression(LR) model.

Model 4 – CRM line level data is given win rate is estimated as a function of product,customer, and quote attributes which includes last offered price.Normalised price is calculated as offered price or reference price.It is used to pool similar products in this model.

1. Gross Profit Organization- When the expected gross profit is maximized,it is subjected to a revenue loss tolerance.
2. Revenue or Market share optimization- When revenue is expected,it is subjected to a gross profit loss that the business is willing to tolerate.
3. Purchase discount and rebate optimization- The sum of the expected front end gross margin and the expected back end rebate dolloar is maximized.They are subjected to revenue constraints.
4. Web discount pricing- Additional discounts are given for web orders.An estimate of service telesales orders are made.It costs on average 30 points more than servicing web orders.Therefore an additional discount is given.Discounts are based on click-stream and data for particular product-customer segments.
5. Volume-Discount optimization- Determines the order quantity and the depth of the discounts.It can be any user such as manager,buyer,pricing analyst and it includes the following-
    Business objective- What we are trying to accomplish
    Scope- Which products and customers can be impacted.
    Trade off- What's the maximum revenue-loss trade off that we can tolerate
    Bounds- What is the largest price change on a single item that we can tolerate
6. Review User Interface and Implementations- The review UI gives permissions to users o review price recommendations for the price-optimization projects and these include price recommendations like
    1. Distribution of price changes which includes breakdown of price increases and decreases.
    2. Magnitude of price change distribution.
    3. Constraints that are binding and slack
    4. What-if-scenarios
    5. Financial implications such as revenue and profit lift which is evaluated based on rolling window of transactions or pipeline as baseline.

2.Solution B- Intellegence Platform:Analytics Driven Digital Marketing

White Space Programs-The white space programs is a program where the resellers are provided with incentives to buy adjacent technologies based on their historical purchase pattern with Ingram.For example, if a reseller is buying servers without disk storage units,then the disk storage units are the white space programs.The 2 products are required together,.The market based analysis is made to identify these oppurtunities.A reseller is informed about white space oppurtunities with the help of marketing emails and microsites during final five weeks of quarter.The program became a success and this was measured by white space revenue.It is also measured by number of resellers who got motivated to purchase through the campaign.Revenue generated through the campaign was around $10 to $18 million during five week period.It was also observed that certain white space products were purchased repeatedly in each campaign.

3.Solution C:IMSMART Applications

Maintaining a good relationship with the reseller partners is very important.To assist sales representatives in doing so,Micro strategy platforms are being used.Two mobile applications were built,one for account planning and the other for customer profiling.IMSMART was internally developed by Ingram.Lets talk about the account planning.When it comes to account planning,sales representative have some accounts assigned.These assigned accounts are segmented.The account which is related to growth,risk,or loyalty is also segmented.The account can be segmented based on the condition,whether the account is new to Ingram.It also shows whether the customer has purchased specific technology products previously or not.Ingram application also checks if similar products have been purchased from other vendors.Customer oppurtunities are defined by the sales representatives based on product,customer and EU.

Some of the models that run in the background are-
1.Customer index modelling
2.recency-frequency-monetary modelling
3.K-means clustering
4.decision and logical trees.
The users have all the ability to drill into specific account information in a particular customer profile.This is done to determine white space oppurtunities,account specific alerts and credits in credit utilization.The sales representative can download some important list of accounts with some important contacts based on priority.

BENEFITS

1.IMPRIME

Measurement is a very important step in any price optimization project.Control group uses business as usual pricing which in turn helps us to measure the impact due to changes in price.Measurement is calculated on the following topics

1.revenue or average daily sales

2.machine margins
3.gross margins
4.machine margin percentage and finally
5.finally customer count.

Every project has one primary KPI and have a number of secondary KPI's.In a market share optimization project,ADS is the primary KPI and machine margin is the secondary KPI.Now there would be a fluctuation of prices.A methodology called life-measurement methodology is used to compare the before and after prices.YOY comparision is used to compare the before and after prices.

2.IMSMART

Process improvements are measured based on the impact caused by IMSMART.Its benefits are described based on its qualitative terms.With the help of IMSMART customer intelligence information the sales represenatatives a can prioritize their accounts.Other than the sales history, ISMART helps the purchasing department to utilize all the data.The sales history consists of channel total addressable market,web search and conversions.This helps to take better decision and make proper classifications.A highly customizable analytic report is generated by the sales and marketing team.The reports which are generated contain a list of prioritized resellers which also contains their details like number of miles from a zip code or city.It also describes the nature of the reseller like which product they would buy,they would buy product x,but not product y and which event would the reseller attend,the trade show or conference.