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RESEARCH ARTICLE

A Customized Analytical model to assist ecommerce firms in devising business strategies

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Abstract

This paper identifies, customizes and proposes an analytical model taking into consideration various metrics and analytical tools available in order to support ecommerce firm in their decision making process while analyzing data generated from their website and accordingly devise their business strategies. This analytical model is based the application of big data analytics which will helps ecommerce firm in prioritizing departments and identifying customers which are most favorable for their business.

INTRODUCTION

Ecommerce sector has made the data as their biggest asset and not the byproduct of their business activities (Edosio, 2014). The data can be efficiently used in determining the customer behavior, predicting the needs of the customers and advertising parallel to their needs, determining the impact of promotions on the customers and forecasting the sale of different products.

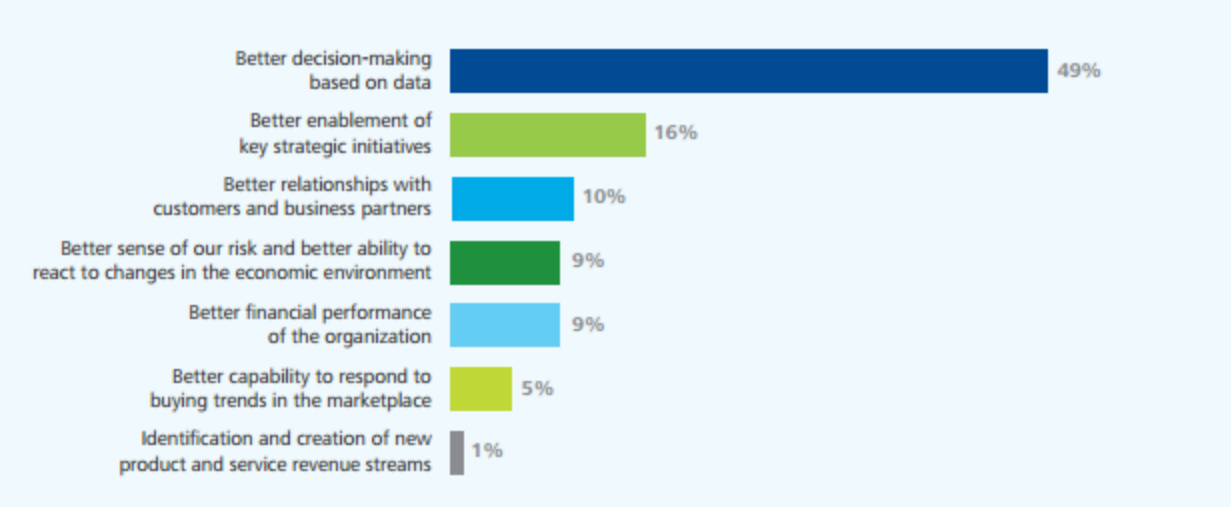
The big data analytics help ecommerce vendors in developing better marketing strategy of goods and services. It most importantly helps to improve their revenue and brand awareness. It enables the ecommerce vendors to make more informed or data driven business decision making and gain competitive advantage over other ecommerce vendors. It helps to drive the customer traffic to their respective websites and by improving customer satisfaction it increases their loyalty and retention towards them. Figure 1 shows the greatest benefits of implementing data analytics according to the analytics advantage survey done by Deloitte.

Companies in industrial and manufacturing, business services, life sciences, financial services and any sector you think of are creating e-commerce sites to replicate sales and in some cases even replace a direct sales or indirect sales experience and along with it to provide their customers with a 24/7 online sales presence. The customer today is expecting dynamic catalogs, recommendation engines and personalization similar or better than from offline stores. Thus with increasing competition between ecommerce vendors itself and with of-line stores and with increasing customer expectations it has become necessary for ecommerce vendors to efficiently and prominently use big data analytics to foster their revenues.

The paper presents the customization of existing RFM (recency, frequency, monetary) model by taking another factor into consideration that is time spent (T) by the customer on the website. RFMT model is then used to identify the best customers in the view of the company. The model is based upon application of big data analytics in

ecommerce which is further presented in the paper. The data required to form RFMT model can be acquired by using various metrics and tools which are mentioned in the table 1 and 2 respectively.

Fig 1 Benefits of implementing data analytics according to survey done by Deloitte



LITERATURE REVIEW

To grow business it is vital for ecommerce vendors to develop a system that must provide customers preferred traversal patterns from product awareness and exploration to purchase commitment. Kwan et al. developed a model for measuring the online movement of e-customers, identified the four important dimensions of e-customer behavior which are length by session, access frequency, revisit, recency and duration and also abstracted their behavioral changes by developing a three-phase e-customer behavioral graph.

Hadjiphanis and Cyprus in their study mentioned aspects of consumer needs which an e-retailer must consider in an online environment. They examined how retailers are facilitating consumer information searches for products and services and how online retailers offer consumer value. Search tools such as search engines, browsers, use of bookmarks and good web site design can speed up the process of purchase decisions all of which go to support the operational, spatial and temporal dimension of a consumer information search. While the customer value is delivered in the form of excellence, efficiency, play, aesthetics, esteem, status, and ethics.

Customer relationship management (CRM) is a methodology that helps companies understand, anticipate and manage customer needs. Farooqi and Dhusia in their study discussed the impact of CRM on ecommerce. CRM comprises the acquisition and deployment of knowledge about customers to enable a company to sell more of their product or services more efficiently. It is a disciplined system that property allocated investment to maximize the value of customer. It priorities and optimizes marketing, individual customer relationship are prioritized and optimized, channels utilization is optimized and each campaign and marketing contact is optimized.

Singh and Mehrotra in their study discussed about the application of recommendation systems (RS) in predictive analytics. Searching an item from e-commerce sites was a turn off for the users as the problem of information overload arose thus the need of filtered information from a huge set of available alternatives arose which saw the application RS to make users take decisions based on what they want. The goals of RS are suggesting users, increasing sales, and diversified item selling, increasing user fidelity, increasing user satisfaction and influencing users.

Social media is providing the source of target marketing, promotional activities, reviews, customer relation, product development forums, after sales service forums such activities has made the social networks a very cost cutting and dynamic tool for the e commerce, where companies can directly go to their customer without any geographical restriction and promote the product in those area and can get feedback, exploit the need of the product without going direct to customers. Khalid and Khan mentioned the impact of social network on E-commerce in their study. They described social media is playing a crucial role in influencing ecommerce decisions and also provides a very precise and comprehensive targeted marketing.

APPLICATION OF BIG DATA ANALYTICS

Data Analytics can help ecommerce companies to enhance the customer experience and customer acquisition and retention as well as cultivating brand loyalty. It provides e-retailers to capitalize on their data for better chasing of sales opportunities. It has wide scope application in ecommerce, which has been illustrated in the points stated below:

Determining The Customer Behaviour

The success of ecommerce vendors relies heavily on the experience of customers on their websites. The general customer online experience has significant impact on their satisfaction which in turn leads to actual purchases. Understanding customer behaviour while their navigation on the websites has enormous potentials for e-commerce firms in creating value (Hahn, 2002). In addition to acquire new customer to the websites and estimating potential buyers, ecommerce firms are striving hard in retaining the existing customers to build up a long term and close relationship.

The potential buyers can be converted to actual purchasers by the firms if they give them choices in accordance to their buying preferences and buying history. Data analytics can be used by highlighting related content based on their previous purchases to the customers or by making offers and promotions to returning customers. They have to prioritize their top customers and use data like purchase history and frequency, related patterns in the last few purchases, product category being viewed, web pages being visited and click.

For recognizing potential buyers and up sell seasonal buyers we can firstly segregate the data as buyers and non-buyers, and then further group them as frequent and seasonal on the basis of frequency of visits on the website. The customers under seasonal buyer category should be worked upon to up sell them and the customers under frequent non buyer are potential buyers so they should be upon to convert them to successful purchasers. The customers can be segregated firstly according to segment they are looking into then under each segment the product category or type they are viewing and then finally the brand they usually prefer. This will help to analyse the taste of the customer and the ecommerce firms can accordingly market or target them.

Social Media Analytics

Facebook and Twitter are two mainstream channels in social media with number of users being over 500 million and 175 million respectively. By harnessing the power social media analytics the ecommerce vendors can fuel their business revenues and customer engagement as this channel is growing every day. It is necessary for ecommerce vendors to use data mining techniques across data available in social media channel to understand deep customer insights. As the social media plays a crucial role for customers to decide from where and what to buy thus it will helps ecommerce vendors to understand what products and promotions will resonate best with customers. Some ecommerce vendors are also operate through Facebook fan page along with their websites through which they directly place orders without visiting the e-retailers website. The e-retailers can collect, archive and analyse large amount of data to forecast the conversions through social media and its impact on overall business.

Social media analytics prove to be beneficial because it helps to track the particular brand's influence, reach and sentiments among the masses as the people share their experiences after using different products or brands and review about them positively or negatively in blogs or other social media sources. Thus it helps ecommerce vendors to quickly track a brand or product reputation which increases their reach to customers through improved behavioral targeting and planning. The customer feedback obtained through social media channel help management act according to the customer needs and sentiments. The social media analytics help in capturing online conversations in groups, blogs and chat forums to understand the trends and interests of the customers. It is necessary for the e-retailers to pay attention to customer complaints and questions because this is the opportunity for them to learn and guide.

Dynamic Pricing

In ecommerce business most of the sales activities are handled electronically. This automation in price management reduces the labour cost, business operation costs and at the same time automates the sales process. It is very useful for ecommerce vendors with enormous product range maintained by them. By analyzing the customer preferences, browsing behaviour, previous purchases the e-retailers can learn about the individual insights and willingness to pay and can personalize pricing through devices such as coupons, promotional pricing, customized banner ads or pop-up videos ([Hinz and Hann, 2011). Dynamic pricing uses data from different sources such as historical product pricing, customer activity, preferences, order history, competitors pricing, margin on the product and its available inventory.

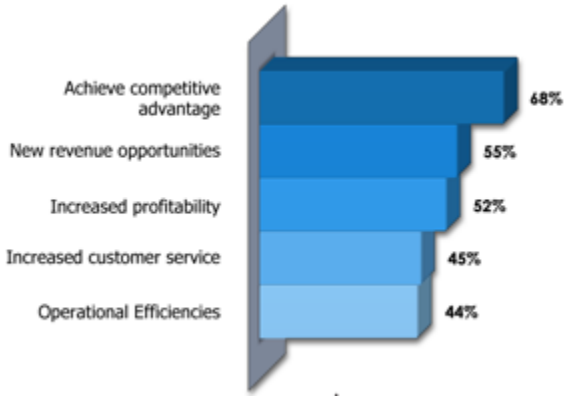
This will enable ecommerce vendors to discount a product to suit a particular customer in real time. It is even possible that two different customers purchase the same item from an online store at two different prices (Edosio, 2014). Using statistical analysis, operations research algorithms, distributed processing and real-time capabilities firms can derive practical pricing mechanisms specifically designed for each customer profile. This enables the ecommerce vendors to sell better by equipping themselves with such real-time price management.

Predictive Analysis

Predictive analysis is the use of business intelligence technologies to understand relationships and patterns within large volumes of data that can be used to predict behaviour and events. It uses the past historical data to predict the future events, trends and behaviour. It helps to take the real-time decisions such as the best day to launch a promotion, identify products that will generate more sales, target segments with specific campaigns, etc. Predictive analytics helps to look at all the different variables to generate the desired engagement from the customer which could be signing up for a newsletter, clicking on a promotion or any other form of engagement. It correlates data from multiple sources or channels to determine a personalized promotion or to execute a marketing campaign that will be directed towards a customer segment. It helps to better understand customer behaviour, in order to develop a solution that helps to propagate the sales and most importantly provide the competitive advantage over others. Figure 2 show that more than two-thirds of companies view the use of predictive analytics as conferring a competitive advantage according to the Ventana Research Predictive Analytics Benchmark Research.

Predictive analysis minimizes the required or threshold inventory for a product if the predictive model developed by the e-retailer sees no immediate big sales. This helps the e-retailers to allocate their funds more proficiently and to buy products that have a higher demand and greater profit potential. Predictive analytics solutions allow a retailer to analyse browsing patterns, payment methods and purchasing patterns to detect fraud. Thus it minimizes the fraud by proactively detecting it.

Fig. 2 Reasons of implementing predictive analysis



TOP ANALYTICAL TOOLS FOR ECOMMERCE

For analyzing the online traffic on the website there are several metrics to determine the insights about the customers which are presented in the Table 1 along with the description of each. Then there are several analytical tools to determine these metrics which are mentioned in the Table 2.

Table 1 Metrics with descriptions

S.No.	Metric	Description
1.	Traffic	Most fundamentally important metric which determines the total number of visits on the website.
2.	Source/Medium	It determines the source of the visitor: Organic: from search engines Referral: from another website Direct: from the browser Social: from social media
3.	Page Views	It determines the number of pages viewed in a specific period of time
4.	Bounce Rate	It determines the percentage of traffic leaving the website without viewing more than one page
5.	Conversion Rate	It determines that how well you encourage to make actual purchases
6.	Keywords and phrases	It determines the customer requirements
7.	Behaviour flow	It determines the flow of traffic within the website from one page to another
8.	Site Speed	It determines the page timing and speed suggestions
9.	Acquisitions from Adwords	It helps us in optimizing are adwords account
10.	Acquisitions from Social Media	It helps us in developing a social media strategy

Table 2 Presents top analytical tools used in the ecommerce industry with the description of each

S.No.	Tool	Description
1.	Google Analytics	Provides insights of the website traffic and marketing campaigns effectiveness.
2.	Followerwonk	It provides detailed breakdown analysis of the followers and their activities
3.	Kissmetrics	It measures user identities i.e. it tracks the journey of every visitor before and after they become customers.
4.	Adobe SiteCatalyst (Omniture)	Determine content value on the website, how visitor navigates, product viewed, added to cart and purchased, performance of marketing campaigns, onsite search, and visitor segmentation.
5.	IBM Digital Analytics	Digital marketing action and comparative benchmarks

RFMT ANALYSIS

RFM is a quantitative technique to determine the affluent customers so that the organization can target the its marketing campaigns more effectively. It is based upon Pareto rule which says that 80% of the company revenue is derived from 20% of its customers. It takes into consideration three factors which are:

- Recency (R): Number of days before a customer has purchased
- Frequency (F): Number of items a customer purchases annually
- Monetary (M): Revenue generated by the company through a customer annually

RFMT model enhances the capability of the existing RFM model by taking an additional factor into consideration which is the time spent (T) by a customer on the website. Time spent is a crucial factor which cannot be ignored it tells much about the behaviour of the customer on the website. Time spent is directly proportional to impulsive buying, potential customers, purchases of newly launched products, exploration across various departments on the website. The model presented here will help any e-tailor to determine its best customers, department wise and top customers of the company. This will assist in executing marketing campaigns more effectively both department wise and in overall company. Table 3 shows five customer rating corresponding to four factors considered i.e. Recency

(R), Frequency (F), Monetary (M), Time Spent (T) across three department: electronics, apparels and books. The ratings have been done on scale of 5 with 5 being the best and 0 being the lowest rating. The rating can be done with the help of data collected by using different metrics and tools presented in table 1 and 2 respectively.

Table 3 Ratings assigned to different customers across all the departments

Customer_id	Electronics				Apparels				Books			
	R	F	M	T	R	F	M	T	R	F	M	T
1	3	4	4	4	3	2	2	5	1	2	3	3
2	0	0	0	2	3	3	5	4	3	3	4	4
3	1	2	1	3	4	3	4	3	0	0	0	0
4	4	2	1	2	2	4	2	3	2	1	1	3
5	3	4	3	3	1	3	3	4	2	3	4	4

To determine the top customers in each department a weightage has been given to each factor and the weightage assigned to the factors is different for each department. For example the life cycle of electronics will be greater than any other category thus the weightage of frequency (F) parameter will be low. Similarly time spent on an average, by a customer in a book department will be lesser than any other department thus the weightage time spent (T) parameter will be low. Table below show the weightage assigned in different departments.

Weightages in Electronics Department			
R	F	M	T
0.15	0.15	0.55	0.15

Weightages in Apparel Department			
R	F	M	T
0.2	0.2	0.4	0.2

Weightages in Books Department			
R	F	M	T
0.2	0.3	0.4	0.1

Total rating of each customer, department wise can be calculated by multiplying the ratings in table 3 with weightages obtained for a particular factor (R, F, M, T) and then adding for all the four factors. Table 4, 5, 6 shows the total rating for electronic, apparel, books department respectively.

Table 4 Total Ratings of the customer in Electronics Department

Electronics					
Customer_id	**R**	**F**	**M**	**T**	**Total Rating**
1	3	4	4	4	3.85
2	0	0	0	2	0.30
3	1	2	1	3	1.45
4	4	2	1	2	1.75
5	3	4	3	3	3.15

Table 5 Total Ratings of the customer in Apparels Department

Apparels					
Customer_id	**R**	**F**	**M**	**T**	**Total Rating**
1	3	2	2	5	2.80
2	3	3	5	4	4.00
3	4	3	4	3	3.60
4	2	4	2	3	2.60
5	1	3	3	4	2.80

Table 6 Total Ratings of the customer in Boos Department

Books					
Customer_id	**R**	**F**	**M**	**T**	**Total Rating**
1	1	2	3	3	2.30
2	3	3	4	4	3.50
3	0	0	0	0	0.00
4	2	1	1	3	1.40
5	2	3	4	4	3.30

Thus top customers can easily be determined for each department by observing their corresponding total ratings. Now for determining top customers in view of the company, weightages have to be assigned to the above three departments. Assigning weightages to the departments depend upon three factors revenue or profit, market share, market potential or future prospective of the departments individually. Table 10 shows the weightages assigned to different departments.

Table 7 Weightages assigned to different departments

Departments	**Electronics**	**Apparel**	**Books**
Weightages	0.5	0.3	0.2

The total customer rating can be calculated by multiplying the weightages in table 7 with total ratings of the customers department-wise and then adding all the three products. Table 11 shows the total customer ratings considering all the departments.

Table 8 Total ratings of the customer across all the departments

Customer_id	Total Rating
1	3.155
2	2
3	1.77
4	1.89
5	3.065

On the basis of the total rating the best customers can be easily identified.

CONCLUSION

Big data analytics has great potential to enhance the ecommerce business. It has huge capability for providing deep business insights, better understanding of customers, identifying buying trends. It has potential to increase the revenue of the firm and brand awareness among the masses. The RFMT model based on the application of big data analytics which can be easily implemented by any ecommerce firms to determine the top customers of the company and the top customers department-wise. Thus helping the firm in executing marketing campaigns more effectively and taking better business decisions.

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