THE ROLE OF BUSINESS ANALYTICS IN E-COMMERCE

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Abstract: E-Commerce is a dynamic industry because of its rapidly changing technology. E-commerce performs a vital role in business phenomena in trading products and services. It provides extraordinary features in the business growth of the country's economy. E-Commerce firms are spending huge amounts of money on Data Analytics to extract actionable insights from larger datasets. Data-driven business insights are crucial for the E-Commerce sector to measure the changing market trends and consumer behavior. The business sector is grown-up to greater heights with the involvement of Data Analytics in E-Commerce. E-Commerce Analytics designed to analyze and predict the future trends of the market to attain a competitive advantage. However, E-Commerce may contain some critical challenges apart from the opportunities. This paper highlights the role of Data Analytics perceived as a value creator for the E-Commerce industry to attain competitive advantage.

Keywords: E-Commerce, Data Analytics, Descriptive Analytics, Predictive Analytics, Diagnostic Analytics, Prescriptive Analytics

1. INTRODUCTION

The invention of information technology motivated enormous growth in the business and reshaped into globalized. The new business models are developed and expanded with the utility of information systems. E-Commerce eliminated technical, geographic, business and cost barriers with global flow of information between buyers and sellers. E-Commerce is a tremendous change in business sector over the traditional Commerce.

Initially Netscape.com started E-Commerce web portal for the purpose of publishing organizational advertisement in 1995. There is instrumental growth in E-Commerce is much more than other inventions such as telephone, radio and television. The major setback of "Dot.com" companies in 2001, most of business organization learned a lot of experience. Only few companies like Amazon, Google; e-bay not only survived and stand with better growth. In 2006, E-commerce achieved the remarkable significance with retail market in various developed countries of US, Asia and Europe.

In recent, the trading community offered the services such as buying and selling products through E-Commerce. As per E-Commerce times report, the Amazon achieved 28% of sales increase in 2003, due to more than 20% Americans access the online shopping from their homes with their

broadband services. From year 2010 onwards, E-Commerce reached into people hands with their smart phones. The Google search engine provides services at their fingertips and browsing E-Commerce websites at home. Social media has also changed the scenario of E-Commerce with improved business communication in trading the products and services.

E-Commerce grows at the rate of 20% with usage of smart phones. The cost of setting physical store is more expansive than online services. Many startup E-Commerce companies achieved competitive advantage with development of mobile technology, faster internet access and availability of cheaper devices.

E-Commerce Analytics designed to analyze huge amount of data in order to retrieve the actionable insights. Business Analyst performs vital role in E-Commerce for getting more opportunities by overcoming the challenges. The role of analyst in E-Commerce domain is to analyze and report the changes to the E-Commerce managers. Business Analytics analyze the change of business needs, predict the impact of change on business environment, track web analytics, advertising campaign results, search engine results and branding across a website.

This paper focused the role of Business Analytics in E-Commerce with innovative direction. The rest of paper is organized as follows. The Section 2 explains the review of literature. Section 3 explains the taxonomy and overview of E-Commerce spectrum. The Section 4 states the various types of Business Analytics and its roles in E-Commerce. The Opportunities and Challenges of E-Commerce Analytics discussed in Section 5. Finally, concluded with discussion in section 6.

2. REVIEW OF LITERATURE

Over the years many researchers and theorists identified the vital role of information technology in Commerce. In recent, it is enhanced with additional features using Data Analytics attain the competitive advantage. A numbers of theorists and researchers have worked on various issues in E-Commerce domain.

Dr. Subhash Masanappa Suryawamshi. focused on recent trends of E-Commerce industry in India with its challenges, opportunities.

Goyal. D. P distinguished E-Commerce and E-Business. He highlighted the business opportunities and challenges of E-Commerce in taxonomy.

Abdul Gaffer Khan discussed various benefits of E-Commerce and its competitive advantage. The author highlights some challenges in perspective of stakeholders.

Vivekananth..P. et al. compared the various Data Analytics methods used in text analytics, social media analytics, audio analytics and predictive analytics. They focused on contrast issues with comparative analysis.

Sabarmathi.G et al., proposed the research plan for patient health care system. She suggested innovative methodology to integrate the Data Analytics for effective health care modeling.

Siddhardha.K et al., presented paper on Big Data Analytics and its role in industry and individual applications. The authors highlighted the various challenges, limitations and tools involved in big data analytics in detailed manner.

Their developed taxonomy can be benefited to extend the knowledge in certain domain for discussion and to achieve quality service

3. THE TAXONOMY AND OVERVIEW OF E-COMMERCE SPECTRUM

The "E-Commerce" application has become a popular business term which is one of the brainchild of information technology in trading products and services electronically. E-Commerce is the subset of E-Business. The E-Business includes E-Commerce with front and back office applications.

Internet has been the major driven force for the wide expansion of computer applications in the business environment. Many business organizations irrespective of size benefited with E-Commerce by making the transactions electronically. The stakeholders gain features such as universal standards, customization, global reach and social networking with rapid growth of E-Commerce

As part of trading products through E-Commerce, it encompasses other activities such as developing, marketing, delivering, paying and servicing the products. The E-Commerce broadly includes the following functions.

- Provide the product description though catalog.
- Defining the customer requirement through the search option and comparison.
- Perform the purchase transition though electronic payment systems.
- Delivery of the products with various logistic services such as couriers, road, and airways.
- Provide the customer service after sales.

Apart from the above, it reduces the transaction costs, improves the customer service and establishes coordination between stakeholders such as manufacturers, suppliers and customers.

A. Classification of e-Commerce

E-Commerce classified into different types based on various perspectives such as Business to Business(B2B), Business to Consumer(B2C), Consumer to Consumer(C2C) and Business to Government(B2G).

B. Area of Applicability of E-Commerce:

E-Commerce used in various business areas such as retail, wholesale, finance, manufacturing and marketing etc.

Retail and Wholesale business: Most number of E-Commerce applications involved in retail and wholesale in online mode. E-Commerce provides the services such as selling, cataloging, and shipping products at the consumer doorstep. The cybermall provides virtual space for multiple buyers and sellers through web browser. Various companies perform wholesale trading of products through E-Commerce applications.

Finance: The financial institutions provides the effective financial services using E-Commerce such as depositing, withdrawal, transfer the money to other accounts, order for checkbooks, demand drafts, pay the bills through e-Banking etc. Stack trading is another part of E-Commerce application which provides news, analytical Charts, company profiles and analysis of trading.

Manufacturing: E-Commerce platform provides the supply chain operations of the company that can perform an electronic exchange of trading of market information with back office operations of inventory control. These applications can speed up the flow of raw material and finished products among business community with reduction of inventory cost.

Marketing: E-Commerce used in marketing for customer behavior, preferences, buying patterns, needs through the web. The information used for price fixation, product enhancement, negotiations, and promotions in marketing.

Bidding and Auctions: Direct selling of products among the customers in C2C through electronic auctions. Bidding allows buyers to place a bid for a
Product/Service. Ex: Quote the price for seat booking in airline & premier tatkal of train

C. Infrastructure of E-Commerce

Infrastructure of the E-Commerce classified into two types such as Hardware and Software.

Hardware: E-Commerce hardware consists the web server configuration with sufficient storage and processing capability for smooth execution of E-Commerce transactions. Sometimes the companies acquired these services from the third parties on lease base. There must be adequate hardware backup to avoid the transaction failures and hazards.

Software: The E-Commerce software classified into following parts.

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Web-server Software: Server enabled operating system, which provides services such as security, retrieval of web pages, sending of web pages, tracking, web site development and webpage development.

E-Commerce Software: It is host software of E-Commerce. It contains various functionalities of Commerce. Ex: Catalog Management, Product Configuration, Transport shipping Cart, Transaction processing and Web traffic Data Analysis.

D. E-Commerce Payment Systems & Security

There is main threat for E-Commerce with electronic payment systems over internet. The computer criminals capture financial data through online, and then consumers become suspicious on their money transactions. Today, E-Commerce provides electronic payment systems with more security mechanisms such as user identification, password, encryption, and digital certification. Apart from that, Internet provides Secure Socket Layer (SSL) protocol to safeguard the payment transactions. It works above the TCP layer of OSI model and other protocols like Telnet, HTTP. But it clearly understood that there is no absolute security on the internet.

Some of the Electronic payment is as follows.

Electronic Cash: Electronic cash is similar to the hard cash that can be used for online payments. The financial institutions provide net banking facility to the customers for online payments.

Electronic Wallets: Electronic Wallet is computerized stored value that holds the credit card information. It is most convenient approach to purchase products at online.

Cards: Cards are more flexible for online buyers. The credit card, such as visa, master card has predefined spending limit. Debit card is another form of payment on the internet. Debit card works as cash or personal cheque, which have magnetic strip to withdraw the amount by swapping process.

The E-Commerce websites give the various options for payment transactions.

E. The various Phases of E-Commerce Trade Life Cycle Model

E-Commerce Trade Life Cycle consists various phases of the following

Searching for the Item: Customer search for the required product at supplier's home page. They can search the product with description in product catalog option.

Product Selection and Negotiation: After searching required product, the customer fulfills the quotation form with entering product code and no. of items required.

Product Purchasing: The customer submits online purchase order to the supplier. In this phase customer can choose the mode of payment. The various security measures can be incorporated on the internet for safeguard the money transactions.

Product Delivery: The logical products such as software and multimedia products can be downloaded through internet after online payment. However, the physical products cannot be delivered through traditional methods like road, air and courier. Product delivery either by company or it may be outsourced with third party.

After the Sales Service: This phase belongs to service and maintenance of the product relevant with product usage, repair service under warranty can be obtained from the websites.

4. THE VARIOUS TYPES OF BUSINESS ANALYTICS AND ITS ROLE IN E-COMMERCE

Technology is an integral part of human life, there is no exception for business. It makes reality in providing effective results in business sector. Data Analytics can retrieve many insights from E-Commerce for effective decision making.

The different frameworks gather the customer data and implement innovative business strategies, which enhance the business profits and its understanding. There are various types of analytics to analyze and predict the business data is as follows.

A. Types of Business Analytics

Descriptive Analytics: The Descriptive Analytics analyze general characteristics of previous customer purchase history and mine the insights such as purchase behavior, interests, capacity and involvement. It is useful to take the strategic business decisions. Premier business organizations use descriptive analytical tools for effective decision making.

Diagnostic Analytics: Diagnostic Analytics can analyze the past data for specific purpose and determine why certain things are happened in the form of exception report. Ex: Finding the reasons for sales down fall and expenditure increased in the particular month.

Predictive Analysis: Predictive Analytics finds the inferences on current data of business in order to make the predictions [2]. It ensures insights and predicts the future course of action based on present data of the business. Prediction based on the large datasets has been complex task with traditional systems. Business Intelligence programs can process and compute the data streams at large extent with social media content, experiences, daily business activities and feedback reports of the stakeholders.

The analytics identifies customer purchase behavior and implement the various strategic methods such as giving loyalties, rewards and privileges. The Machine Learning algorithms used in predictive analysis to make effective decisions in the business.

Prescriptive Analytics: Prescriptive Analytics allows to analyze business insights, then provides suggestions, advices and alternatives to make the business as more effective. This analytics suggests suitable decisions based on collected data from different sources, which make greater impact on business system. It also provides the insights to the respective stakeholders of business system for better adaptive techniques-based insights.

Since, we cannot confidence on machine completely, and human invention, is also taken into consideration for possibilities. The extensive research is needed in the area of prescriptive analysis towards the problem.

B. The Role of Business Analytics in E-Commerce

E-Commerce is a dynamic industry because of rapid changing technology and analytics makes the E-Commerce as smarter than earlier. Business analytics plays vital role in E-Commerce for effective market strategy and overcoming the risks. E-Commerce industry mainly targeted to make user experience on their website and analytics focuses on finding the insights. Ex: Amazon, E-bay using Predicative algorithms in the real time business environment in the form of recommender system. The business analytics performs vital roles in the E-Commerce industry.

Supply Chain Management: The customers prefer online shopping for purchase of items within better price in convenient manner. This is possible with only robustness of the supply chain management. It manages the product data from warehouse to customer. Data Analytics effectively manages E-Commerce in significant portion of inventory data and optimize transportation of delivery in minimum cost. The relation between supply and demand is tricky, the analytics plays vital role in forecasting the futures sales.

Merchant Analytics: E-Commerce performs extensive analysis for merchants to get new business models and fix right price for their goods. Analytics for E-Commerce can determine the future trends based on many factors such as frequency of transactions, season, demographical and category of products and so on. This type of analytics is can outlook the future sales.

Marketing Fraud Detection: In business environment frauds not always from the merchant side, sometimes customers also make false claims in frauds. The analytics plays vital role in the fraud detection based on customer behavior. E-Commerce integrated with predictive algorithms can warn when fraud transaction is detected. E-Commerce business can send a notification to the customer for the express of approval before processing the transaction.

User Experience Analytics: The software teams work on creating user friendly architecture of the website for searching the products across website, ordering the searched products etc. They design layout of the website for customer flexibility. Various customers refer the E-Commerce website in different perspectives. E-Commerce Analytics assess the user behavior for design user friendly website based on customer privilege

Recommender Systems: E-Commerce recommender system suggests products to their customers. It recommends products based on top sellers on a site, demographics of the customer and analysis of the past customer behavior as prediction for future. The recommender engine provides contribution of analytics to E-Commerce. Someone clicks on product; then other products are recommended for purchase in addition to their original purchase. It increases the average order value by recommending other products with original.

Product specific analytics: E-Commerce Analytics find out the satisfaction rate of customers for a product among other products and predict for the future sales. It helps to maintain the stock inventory of the products for sales in forthcoming period.

Customer Sentiment Analysis: The role of Sentiment Analysis in E-Commerce over the long period. Machine learning algorithms help to automate, and time saves in giving accurate outcomes. Social media is best platform for data analyst to perform customer sentiment analysis. It provides the negative or positive opinion towards the item brand. This feedback is a precaution to improve the business.

Predict the optimum price of the product: In the E-Commerce, the price of the product fixed based on the demand of the product, market availability and competitors' price of the same product. The Predictive Analytics can analyze the product trends, price, and determine the optimum price of the product to improve the business profits.

Online marketing analytics: E-Commerce companies spending more money in online marketing campaigns as part of marking strategy for attracting the customers. The online marketing teams works on bidding for sales ads on internet websites. These analytics can measure the ad clicks, spending time of visitors on the site, channel data and promotion effectiveness. The online marketing analytics measure these metrics to predicts return on investment and forthcoming marketing strategy

The E-Commerce stakeholders such as senior managers get insights about business objectives and product managers get insights about product sales, optimum profit through E-Commerce dashboards across the organization.

5. BUSINESS OPPORTUNITIES AND CHALLENGES OF E-COMMERCE

The E-Commerce can motivate new business models with innovative features. Information technology has provided significant opportunities for business improvement. Apart from opportunities there will be certain challenges and threats to the E-Commerce.

Data Security and Privacy: Security is foremost important for every technology. There is no exemption for E-Commerce Analytics from third party applications.

Elimination of Data inconsistency: The data gathered from various sources of the domain and stored at single site. There may be a possibility of data inconsistency. There is need of robust tools to eliminate data inconsistency and redundancy.

Reorganization of Business process: In order to implement E-Commerce applications, business firms required to redesign the business processes and functional scope. The Business firms well defined with policies and procedures in transparent manner for sharing the data with other business firms.

Legal Problems for e-Commerce: Biggest challenge for E-Commerce is the handling of legal issues relevant with email contract, the role of electronic signatures, copyright laws etc. The internet is wide area network which connect the heterogeneous countries with different legal systems which arises legal implications.

Managerial Opportunities: The E-Commerce provides many managerial opportunities such as to reduction of transaction costs, the customers and suppliers can exchange business communication without intermediaries and proper communication and coordination between stakeholders.

6. CONCLUSIONS

The E-Commerce reduced the gap in between manufacturer and consumer with the innovation of E-Commerce applications. The major threat of E-Commerce, that intruders capture crucial data of payment transaction due to lack of security. The intruders escape from crimes with weakness of cyber laws. The role of constitution is to formulate robust legal framework for protection of E-Commerce intellectual property, privacy, consumer protection and rights etc. On other hand the governments should frame the universal legal system and enforce law and order against cyber criminals across the globe. There is a need of in-depth research in the area of E-Commerce security and privacy in perspective of Analytics, we cannot confidence on machine completely, and human invention, is also taken into consideration for possibilities. The extensive research is needed in the area of prescriptive analysis towards the problem.

REFERENCES

Abdul Gaffar Khan, "Electronic Commerce: Study on Benefits and Challenges in an Emerging Economy", Global Journal of Management and Business Research: Economics and Commerce, Vol.16(1). 1, 2016.

Bindu. M.G.," A Survey on Big Data Analytics: Challenges and Opportunities", International Journal of Computer Science and Information Technologies" , Vol. 9(4), 2018.

Naveen Kumar, "E-Commerce in India: An Analysis of Present Status, Challenges and Opportunities", International Journal of Management Studies, Vol.5, Issue.2, April,2018.

Subhash Masanappa Suryawanshi, "E-Commerce in India – Challenges and Opportunities E-Commerce", International Research Journal of Multidisciplinary Studies, Vol. 3(3), March,2017.

Elen Geanina Alaru et al, "Perspectives on Big Data and Big Data Analytics", vol. 3(4), 2012.

Goyal.D.P "Management Information Systems – Managerial Perspectives", Macmillan Publishers-3rd Edition, 2010.

Sabarmathi.G et al," Big Data Analytics Research Opportunities and Challenges: A Review", International Journal of Advanced Research in Computer Science & Software Engineering, Vol. 6(10), Oct,2016.

Siddardha.K et al, "Big Data Analytics: Challenges, Tools and Limitations", International journal of Engineering and Technical Research, Vol. 6(3), Nov 2016.

Shahriari et al, "E-Commerce and it Impacts on Global Trend and Market", International Journal of Research - Granthaalayah, Vol.3(4), April,2015

Vivekananth. P. et al, "An Analysis of Big Data Analytics Techniques", International Journal of Engineering and Management Research", Vol. 5(5), Oct 2015.