

A Review on the Factors that have Driven E-Commerce in Modern Day Business

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Abstract-E-Commerce has advanced quickly in a very short span and is changing the face of business. It deals with carrying out business transactions with the aid of Internet through linked computer systems of host, buyer and the vendor. Due to its low time consumption and ease of usage, E-Commerce is gaining wide acceptance and popularity. There are many factors that govern the working of these systems. The aim of this paper is to throw light on some of the major elements that have worked as background processes in driving E-Commerce as a major tool in modern day business.

Keywords: E-Commerce, Consumer Behavior, Online Business, Recommender Systems.

I. INTRODUCTION

Due to its robustness and rapid development, many major business firms have incorporated e-commerce as an indispensable part. It comprises of the linkage between the vendor, buyer and the host through computer systems. The paper briefs some of the major factors and issues concerning the E-Commerce domain.

The paper is organized as follows. Section II deals with a detailed review of the key factors of E-Commerce. Issues pertaining to E-Commerce are briefed in Section III. The applications of E-Commerce are discussed in Section IV. The paper concludes in Section V.

II. KEY FACTORS OF E-COMMERCE

A. Dimensions of E-Commerce

The various dimensions of E-Commerce as stated by Kalakota and Whinston [1] are:

- 1) Communications standpoint: E-commerce enables the transactions through telephone lines, computer networks, etc.
- 2) Business perspective: E-commerce focuses on computerization of workflow in business transactions.
- 3) Online viewpoint: E-commerce enables the consumer to sell or buy information and commodities on online services.
- 4) Service outlook: E-commerce lays stress on enhancing the quality of commodities, service speeds, cutting down service costs and to ease the job of both the management and the consumers.

B. The E-Commerce data

The data obtained in E-Commerce is basically divided into three major categories, viz. structure data, user data, usage data and content data. The designer's view of the content organization in a site is represented by the structure data. The details of page views and user sessions are termed as usage data [2]. The group of relationships and objects that are conveyed to the user is the content data. User data basically comprises of the information of the registered users, their feedback, transaction details like visit history, user interests, past purchase details, etc.

Whatever is done while surfing the net provides information to the companies. This paves a path for the organizations to collect the data from the below mentioned sources [3]:

Time data: It tracks the amount of time a user spends in exploring the product, site, etc. which interests him.

Psychographic data: It comprises of the behavior, attitude, beliefs, liking of a user towards a given product.

Shopping chart: It gives the details of where the customer left the order unfinished and where the purchases were made.

Access data: It keeps track of the time between the last and the next access to the same URL.

Clickstream data: It is the path traversed by the user while browsing the sites and following the links. It can be used to manipulate the popularity and number of page views of a particular site.

C. Data mining in E-Commerce

Data mining and knowledge discovery is the search for novel, interesting and useful patterns in data on which the companies can base their business decisions [4].

With the growing usage of E-Commerce sites, tremendous amounts of data are being generated and extracting useful information from it is a very difficult task. Leading players like Flipkart, OLX, Zabong, Amazon, Quikr, eBay, Zovi, Fashionara, Lenskart, Magicbricks, etc have huge databases of services, products and the history of the transactions carried out by the consumers.

Various useful patterns can be drawn from these large data sets. This data is usually tremendously large. The useful patterns can be the customer's shopping habits, needs, wants, feedback, budget, etc. This data helps the companies to enhance their services and make necessary amendments which boost their business. Consumers as well as the companies are benefitted by this.

Currently, this is accomplished with the aid of the powerful data mining algorithms. Popular among them is the K-means algorithm [5]. A detailed review can be found in [6]. Another well-known data mining algorithm is the WEBSOM (web based self-organizing map). It organizes documents into two-dimensional map according to their content rather than by keyword.

Data mining techniques are also used by the companies to assess the optimum period for maximum sale of a product [7]. This ensures effective management of their retail store.

Web log files are used by data mining techniques to study the consumer's viewpoint of a particular product, since the data in the web log files illuminate what the consumers are seeking from the site. This information from the log files is used to determine what enhancements or changes can be included in the network or the servers to increase the productivity of the services provided. It involves assessing the answers to the following questions: 1) Are the consumers shopping purposefully or simply browsing? 2) Is the place of shopping home, hotel dialup, workplace or any other? 3) Are the consumers buying a product with no familiarity or with prior knowledge?

D. Recommender Systems

Another advent of data mining techniques is recommender systems which are built using statistical tools and knowledge discovery techniques. These are deployed in almost all the E-Commerce sites. They extract information of the goods that are of interest to the consumers. They then serve the consumers with the purpose of recommending the products during live transactions [8].

These systems accomplish the task of simulating a salesperson or adviser in E-Commerce. They communicate directly with the users and help them to shop satisfactorily. They develop user relationships effectively and thus aid in increasing the sales volume. Many E-Commerce companies like Amazon, eBay, etc. make use of recommender systems to render personalized service to their users.

There are three components of recommender systems [9]:

Recommendation methodology module: It is the core functionality of recommender systems. This module deals with the task of processing the inputs to generate the output. The system performance is determined by this module. It consists of various recommendation algorithms.

Input module: It deals with collecting and updating user information. This data is gathered from individual groups or users. The data comprises of user ratings, browser record, comments, user purchase history, editor's recommendation, keywords, etc. Different recommender systems take different information and in turn create different recommendations.

Output module: This gives the recommendation to the users after the system processes the inputs.

Classification of Recommender Systems:

Feature-based Recommender Systems: They create a list of recommendations based on commodity features. It is basically like a search engine. Users can shoot their desired features and seek appropriate results.

User Relativity Recommender Systems: Here recommendations are created by searching neighbours nearest to the current user based on the ratings of the neighbours and their purchase history.

Non-personalized Recommender Systems: This recommendation is generic and is independent from other users. The recommendation provided is identical to the users. It is based on sales ranking, average comments by other users or editor's recommendation.

Commodity Relativity Recommender Systems: Here the recommendations are created based on the commodity relativity.

E. Consumer behavior

Consumers are the core of any business, since their part is crucial in driving an organization's revenue. Companies lay more attention in relishing and retaining existing customers along with attracting new customers. The main intention here is to maintain a lasting relationship with them. The study of consumer psychology is important for making necessary amendments from the company side. Rigorous research is being carried on to automate the process of acquiring consumer perspective of the services rendered. The process becomes an

overhead when done manually. This is either accomplished using data mining techniques or through Brain-Computer Interface [10]. This nurtures the quality and the presentation of the product. An approach to predict user behavior in this regard has been proposed as in [11]. This involves path traversal patterns of previous users and extracting knowledge from the purchase data which helps in the prediction of traversal behavior and purchase. The study of the user behavior based on the navigation behavior is proposed as in [12]. Here, the Web Usage Miner (WUM) is used to assess the success of a site that is reflected in the user's behavior. This also provides indications of how the site can be improved.

F. Neuro-marketing

The study of brain's responses like assessment of user behavior towards a particular product has emerged as a new technology termed as Neuromarketing [13]. It also includes the identification of which type of advertisement has greater influence on the consumer's mind. The technology deals with the application of the cognitive science and neuroscience to the field of marketing. There have been tremendous applications in the field of neuro-science which have been capable of assessing almost all the neurological activities in the human brain. The acceptance of neuroscience in the field of marketing is curtailed due to a few factors. Firstly, it seems to be a non-feasible approach from the business perspective. Secondly the non-awareness of the equipments like the electroencephalography (EEG), positron emission tomography (PET), magnetoencephalography (MEG), functional magnetic resonance imaging (fMRI), etc. are causing hindrance in its applicability in the field of marketing [14].

G. Easy-to-use user interfaces

Interfaces play a major role in alluring a consumer since the consumers are least bothered about the complexity of the processes running in the background. There are many principles for the design of human-computer interfaces that are vital for designing E-Commerce sites [15]. They are:

Personalization: The users should be provided with the provision to customize the interface as per their requirements.

Support: User should be assisted in real time transactions.

Visibility: Impart clear visibility to the objects on the site and easy to control.

Feedback: Either visible or audible feedback should be provided to all user actions.

Accessibility: All the objects must be easily accessible at any point of time.

Reversible: Render reversibility to actions so as to avoid errors on the user side.

Simplicity: The design of the interface should be as simple as possible.

Four E-Commerce sites (two computer stores and two clothing) were studied by the IBM Ease of Use Group [18]. Few of the common design problems encountered were:

- 1) Poor advice on the items that remained in the shopping list.
- 2) Poor help provided in the procedure to add items to the shopping list.
- 3) Difficulty to buy second item.
- 4) Less clarity about what stage users required to log in/register.
- 5) Difficulty in using the drop down menus.
- 6) Less pictures of clothes on the site.
- 7) Plenty of tiresome security messages.
- 8) Empty page was produced on clicking the wish list with the words 'log in'.
- 9) Seven clicks were required to navigate from home page to the product in one site, whereas only four clicks were required to navigate in another site.
- 10) Long list of items took a considerable amount of time to scroll down.

H. Technical aspects

Network infrastructure: Network topology is the lower layer module in E-Commerce architecture. Examples include Hypertext Transfer Protocol (HTTP), Network protocols, network management issues like Quality of Service (QOS), Transmission Control Protocol/Internet Protocol (TCP/IP).

Technical components: It comprises of different Internet technologies. For example, markup languages, such as Extensible Markup Language (XML), Standard Generalized Markup Language (SGML), and programming languages like JAVA are the common Web software development tools. Other examples of Internet technologies include the common object request broker architecture (COBRA), etc.

III. MAJOR ISSUES

Privacy: There are chances that the personal information may be gathered without authorization and hence many people are concerned with privacy. The consumer's concern of privacy is increasing due to the availability and sophistication of data mining algorithms and tools.

The data collectors should inform the consumers as to what sort of data is being gathered and in what way will it be used. Furthermore, the data-collectors should inform the users with a way to limit the use of personal information.

Fraud: This issue mainly concerns the consumers, for instance, whether an online company exists really or not?

Security: Security usually deals with encryption methods like the usage of public and private key cryptography. Other technologies used to provide online security are Secure Electronic Transactions (SET), Secure Sockets Layer (SSL) and Cookies. Digital signatures and passwords provide individual security. Security from hackers against internal and external attacks in ensuring network security is rendered by proxy servers, firewalls, Virtual Private Networks (VPN), etc. Hence these technologies are important to avoid loss of data to preserve external and internal services [16].

Trust: It deals with the exactness in what a trading party says and what he does actually [17].

IV. APPLICATIONS

E-Commerce has brought a renaissance in modern day business. It has introduced newer strategies in marketing, expanded assortment of products, enhanced consumer managements and effective operations. It finds tremendous applications in electronic funds transfer, financial exchange between buyers and sellers which is done by using smart-cards, e-cash, electronic checks, credit/debit cards, etc. Even online banking is possible irrespective of the location of the consumer. Online news, magazines, newspapers, etc. are a part of online publishing. Virtual classrooms and online education have made distant training and education possible these days. Online shopping malls are a major part of E-Commerce which are gaining wide acceptance these days, which use the Internet to sell company services and products. Electronic auctions are also performed these days.

V. CONCLUSION

The paper dealt with studying some of the major factors like data mining, technical aspects, consumer behavior, applications, etc. which are crucial for understanding the success and worth of E-Commerce. The success rate of any E-Commerce site largely depends on the kind of user-interfaces provided; hence a detailed study of them is done. Also the newer add-ons to the E-Commerce like the Neuro-Marketing and the issues that need lots of focus on making E-Commerce more robust are also discussed. Due to the rapid developments in IT field, E-Commerce will definitely take over a major part in modern day business.

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