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Evaluation of E-commerce Websites Using AHP Decision Making Process

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ABSTRACT

In last few years, online shopping has become a prevalent part of the widespread consumer's shopping experience. The consumer now has the facility to purchase anything online. And it also has transformed the shopping behavior of the consumers. So, it becomes essential for the retailers to boost shopping experience of the customers by well-organized transaction and eye-catching website. Achieving proficient online retail business depends on high quality websites which are favored by prospective customers. Assessing e-commerce websites quality can be considered as a multi criteria decision making problem because of its complex structure including qualitative and quantitative factors.

The purpose of this study is to find out the key factors that affect the success of online retail business and to evaluate ecommerce websites based on web related attributes. In this empirical study a set of criteria and factors are presented being considered relevant for e-commerce evaluation are used. A ranking algorithm is proposed, based on AHP technique to judge the effectiveness of e-commerce websites. The proposed methodology is applied on some famous Indian's E-commerce websites to judge their effectiveness on customers' experience.

KEYWORDS : E-commerce, AHP, Customers experience, Online shopping.

1. Introduction

The physical store is limited by many elements, such as working time, water and electricity fee, store range fee and so on. This makes physical shop work more difficult for earning profits.

E-Commerce is clarified as a medium for buying and selling of products and services via internet. The shopping will not be restricted at the time and location through e-commerce, so more and more people prefer to purchase and browse on virtual store, instead by physical. In the past decade, e-commerce via the internet has substantially affected the business world and will continue to be important.

Internet has provided a convenient and effective channel for distributing information and services (Kim et.al, 2006). E-commerce includes buying, selling, vendor-managed inventory, production management, and logistic. E-commerce has become an important tool for companies all around the world. Therefore, many researchers have focused on factors that effects quality of e-commerce websites.

Achieving a consummate online retail business depend on high quality websites which are preferred by prospective customers. In this empirical study a set of criteria and factors are presented being considered relevant for e-commerce evaluation are used. A ranking algorithm is proposed, based on AHP technique to judge the effectiveness of e-commerce websites. The proposed methodology is applied on some famous Indian's E-commerce websites to judge their effectiveness on customers' experience.

2. Objectives

The objective of this study is:

- •To observe the effectiveness of E-Commerce websites quality on the basis of customer's experience
- To evaluate the top e-commerce portal on the basis of some selected attributes.
- To find out the customers preference ranking of the selected websites on the basis of customers response toward it.

Assessment of websites is to be done by figuring out various key attributes which are considered important for evaluation of websites. And then on the basis of this key attributes AHP is to be applied to find out the final priority ranking of websites.

3. Literature review

3.1 E-commerce

The Internet has been advanced from a basic apparatus of communications into aenormous and interactive market of products and services involving over 240 million users worldwide (Guo& Shao, 2005). The Internet has the prospective to directly sell products and services to customers, to provide an electronic aid for communications and to process business transactions such as orders and payments.Nowadays it becomes popular practice among businesses to sell their product or service directly to customer over the internet. Even many firms are only having online outlets. E-commerce is no longer just an option now but it becomesa necessity for enterprises aiming for better performance.

E-commerce can be described as "any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact" (ECOM, 1998). It refers to business activities involving consumers, manufacturers, service providers, and intermediaries using computer networks such as the Internet (Adam et.al,1999).

Online shopping started at 1994 by Pizza Hut. In the same year a German company Inter shop Communication launch its first online shopping site and after that Amazon in 1995 and e bay in 1996 (Gomathi,2015). Now online shopping becomes so popular that itbecomes an integral part of our regular life. There are number of websites providing any number of goods and services. The E-commerce portals provide goods and services in a variety of categories. To name a few: attire and accessories for men and women, health and beauty products, books and magazines, computers and peripherals, vehicles, software, consumer electronics, household appliances, jewelry, audio, video, entertainment, goods, gift articles, real estate and services.

Past research revealed that E-commerce is varyingsignificantly. Thus, managing an online businessbecome challenging. With the growing popularity of online shopping worldwide, web sales will surely have effect on the overall growth of a business. In order to be successful, it has to be ensured that products are as cheap in a web shop as purchased from traditional channels (Miyazaki and Fernandez , 2001). In the recent years, e-commerce has malformed selling and buying behavior of the people.Now customers are become selective as they have knowledge about their right and numerous alternatives for shopping. In order to develop a successful and profitable web shop, understanding customers' needs become essential.

India is showing tremendous growth in the e-commerce. Undoubtedly, with the middle class of 288 million people, online shopping shows unlimited potential in India. India's E-commerce market was worth about $3.8 billion in 2009, it went up to $17 billion in 2014and to $23 billion in 2015. (Assocham, 2016).

3.2 Analytical Hierarchy Process (AHP)

The Analytic Hierarchy Process is a multicriteria decision-making technique letting decision makers to model a complex problem into simple hierarchical structure which consists of goal, objectives (criteria), sub-objectives, and alternatives. It is a systematic decision making method which includes both qualitative and quantitative techniques. It is being widely used in many fields for a long time. It was developed by Thomas L. Saaty in the 1980 and has been extensively studied and refined since then. AHP is used to determine relative priorities on absolute scales from both discrete and continuous paired appraisals in multilevel hierarchic structures (Saaty, 1976).

The name of AHP explains its application logic (Silva et. al., 2009):

Analytic: It helps in the measurement and synthesization of a series of factors involved in complex decisions.

Hierarchy: Hierarchy is the easy-going way of finite intelligence to undertake a complex situation.

Process: A process is a series of activities, modifications or functions that leads to an end or result.

AHP consists of four phases: Structuring the problem and model building; pair wise appraisals and measurement of collected data; Calculation of normalized priority weights of individual factors; evaluating the priority weights and deriving solutions to the problem. AHP is an effective decision making method particularly when subjectivity exists and it is very appropriate to solve problems where the decision criteria can be systematized in a hierarchical way into sub-criteria (Tuzmen and Sipahi, 2011).

Various past researchers enumeratethe advantage of using AHP as; itprovides a general viewpoint of complex relationships; preserve the consistency in comparisons (Uncu, 2003); it issimple and easy to use (Chiang & Li, 2010); it is flexible and powerful tool for handling both qualitative and quantitative multi-criteria problems. (Dumitrachea, 2010).

Along with various benefits some researchers also describe some weakness of this method: AHP considered as time consuming because of its complex mathematical calculations and number of pair-wise comparisons that increaseswhile the number of alternatives andcriteria increases. It involves re-evaluation of alternatives when the number of criteria or alternatives is altered (Dumitrachea, 2010).Chance of inconsistency for the decision makers can arise because of the difficulty in reaching consensus when especially there is high number of levels (Uncu, 2003).

3.3 Applications of AHP.

AHP can be applied in a wide variety of situations with problems of multiple criteria, including priority definition, supplier-selection decisions, facility-location decisions, marketing evalua tion,forecasting, risks and opportunities modeling, cost-benefit allocation,choice of technology, plan and product design (Silva et. al., 2009; Chan & Chan, 2010) in more than 30 areas, including marketing, management, finance, education, public policy, information, medicine, and sports (Chiang & Li, 2010).

In literatures many researchers use AHP for solving various decision problems. For instance, Chiang and Li (2010) evaluate the factors influencing the consumers' channel attitudes for the products like book/CDs, electronics and fashion products using AHP. Min and Min (1996) utilizes AHP and competitive gap analyses to make competitive benchmarking in order to identify the position of Korean hotels in terms of service performance. Brad used AHP in1986 as a multi-objective methodology for selecting sub-system automation options (Brad, 1986).

Min and Min (1996) utilizes AHP and competitive gap analyses to make competitive benchmarking in order to identify the position of Korean hotels in terms of service performance.Bragliaused AHP for analyzing multi-attribute failure mode analysis (Braglia, 2000), and Ceha and Ohta used AHPfor assessing of air transportation network (Ceha and Ohta, 1994) and Ghodsypour and Brien applied AHPwith linear programming for supplier selection problem (Ghodsypour and Brien, 1998).

AHP is used in many fields, such as planning; selecting the best alternative; solving conflicts; and optimization problems with other techniques, such as linear programming, fuzzy logic, quality function deployment. (Vaidya and Kumar, 2006).

Steuer and Na(2003) revealed that there were about 18 articles studying the AHP combined with finance simply, whereas Vaidya and Kumar (2006) found that there were 150 articles investigating the AHP combined with general applications. The wide applicability is due to its simplicity, ease of use, and great flexibility.

3.4 AHP application in E-commerce evaluation

Many researchers alsoapply AHP to evaluate e-commerce website. For instance Aydin & kahraman use AHP for evaluation of website quality; Mazandarai (2010) for analysis and comparison of website for online advertising. Hsien Hsu et al. applied AHP to evaluate the required and consider factor of E-commerce platforms; Yu et al. (2011) use AHP along with TOPSIS to rank B2C e-commerce website in e-alliance. Kong & liu, proposed fuzzy AHP to evaluate the success factor of E-commerce.

4. Methodology

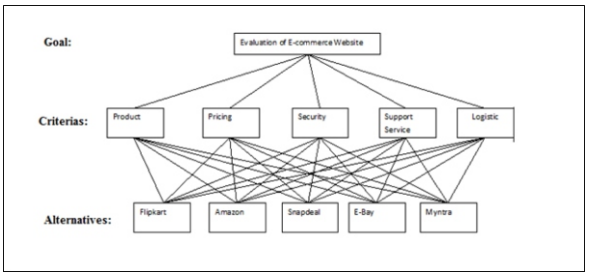
In this research, the primary data were collectedthrough questionnaires that have been distributed to consumers who are online users. The structured questionnaire is used in collecting the data for the study. The questionnaires were designed properly in order to get the maximum accuracy of information and the maximum understanding to the respondents.

Then on the collected data AHP process is applied to achieve the goal of the current study

For comparing the websites, at first five main criteria's to evaluate the websites are selected which are considered necessary for evaluation. The selected criteria's are:

- **Product:** At the time of purchasing the quality, variety and availability of products are the most important factors that have effect on the purchasing decision of the customers.
- **Pricing:** Discount price, offers, coupons, promotion pricing and Delivery charges etc.
- **Security:** At the time of online shopping customers share their confidential information and they expect from the retailer safety and security of the same.
- **Support service:** Phone support, chat support, 24*7 services; customer's feedback and complaints window
- **Logistic:** flexibility in shipping, easy tracking, possibility of change in venue, Speedy delivery,and fast delivery options, Easy Return and money back guarantee.

Then on the basis of selected criteria five top Indian E-commerce websites are evaluated and compared by structuring the decision problem into three level hierarchies viz: Goal, Criteria and Alternatives. Overview of this process is shown in Figure 1 below:



After structuring the goal in hierarchy AHP process is applied to find the priority ranking of E-Commerce portal.

4a. AHP application for Evaluation of E-Commerce website

a) At first step a pairwise comparison of all selected criteria is done to find out the priority value which determines the priority of one factor over the. Table 1 shows that product is considered as most important factors with highest priority value 0.436.

Table 1

Pairwise comparison for all Criteria						
Criteria	Product	Pricing	Security	Support Service	Logistic	Priority vector
Product	1	5	7	1	3	0.4365
Pricing	0.2	1	5	1	1	0.1757
Security	0.14	0.2	1	1	1	0.0856
Support service	1	1	1	1	1	0.1769
Logistic	0.33	1	1	1	1	0.1252
	CI=	0.163007932		CR	0.145542796	1

b) Then pairwise comparison of selected e-commerce websites is done for each selected criteria's. Table 2-5 shows the pairwise comparison of websites on each criterion's.

Table 2.

Pairwise Comparison for "Product"						
Product	**Flipkart**	**Amazon**	**Snapdeal**	**E-bay**	**Myntra**	**Priority vector**
Flipkart	1	1	2	5	7	0.317942
Amazon	1	1	3	5	7	0.355839
Snapdeal	0.50	0.33	1	5	7	0.207787
E-bay	0.20	0.20	0.20	1	7	0.08755
Myntra	0.14	0.14	0.14	0.14	1	0.030882
	CI	**0.120753**		**CR**	**0.107816**	**1**

Table 3

Pairwise Comparison for "Pricing"						
Pricing	**Flipkart**	**Amazon**	**Snapdeal**	**E-bay**	**Myntra**	**Priority vector**
Flipkart	1	1	1	1	1	0.2
Amazon	1	1	1	1	1	0.2
Snapdeal	1	1	1	1	1	0.2
E-bay	1	1	1	1	1	0.2
Myntra	1	1	1	1	1	0.2
	CI	**0**		**CR**	**0**	

Table 4.

Pairwise Comparision for "Security"						
Security	**Flipkart**	**Amazon**	**Snapdeal**	**E-bay**	**Myntra**	**Priority vector**
Flipkart	1	2	2	3	4	0.3616
Amazon	0.5	1	1	4	4	0.2454
Snapdeal	0.50	1.00	1.00	5	3	0.2453
E-bay	0.33	0.25	0.20	1.00	1	0.0736
Myntra	0.25	0.25	0.33	1.00	1	0.0741
	CI	**0.036068**		**CR**	**0.032203**	

Table 5

Pairwise Comparision for "Support Service"						
Support service	**Flipkart**	**Amazon**	**Snapdeal**	**E-bay**	**Myntra**	**PRIORITY VECTOR**
Flipkart	1	1	3	5	2	0.3339
Amazon	1.00	1.00	3.00	4.00	5.00	0.3557
Snapdeal	0.33	0.33	1.00	1.00	2.00	0.1161
E-bay	0.20	0.25	1.00	1.00	3.00	0.1167
Myntra	0.50	0.20	0.50	0.33	1.00	0.0775
		CI	**0.08024**	**CR**	**0.071643**	

Table 6

Pairwise Comparision for "Logistic"						
Product	**Flipkart**	**Amazon**	**Snapdeal**	**E-bay**	**Myntra**	**PRIORITY VECTOR**
Flipkart	1	2	4	5	5	0.4328
Amazon	0.50	1	5	3	3	0.2966
Snapdeal	0.25	0.20	1	2	2	0.1137
E-bay	0.20	0.33	0.50	1	2	0.0892
Myntra	0.20	0.33	0.50	0.50	1	0.0677
		CI	**0.05860**	**CR**	**0.052323**	

a) On the basis of priority vectors obtained from pairwise comparison of each websites on each factors we move forward to do comparative evaluation of each website and give ranking to them. Table 7 shows the final priority ranking of selected websites, which depict that flipkart is the most efficient e-commerce website followed by Amazon and snapdeal.

Table 7. Final priority table

	PRODUCT	**PRICE**	**SECURITY**	**SUPPORT SERVICE**	**LOGISTIC**	**FINAL PRIORITY VECTOR**	**Rank**
	0.437	0.176	0.086	0.177	0.125		
FLIPKART	0.318	0.20	0.3616	0.334	0.4328	0.318	1
AMAZON	0.356	0.20	0.2454	0.356	0.2966	0.312	2
SNAPDEAL	0.208	0.20	0.2453	0.116	0.1137	0.182	3
E BAY	0.088	0.20	0.0736	0.117	0.0892	0.111	4
MYNTRA	0.031	0.20	0.0741	0.078	0.0677	0.077	5

5. Findings

Current study is on thecomparative evaluation of five Indian e-commerce portals on the basis of factors, product, price, security,.. etc. The result reveals that Flipkart (0.318) is highest of appropriate degree inall e-commerce platforms. Thus, the flipkart is the optimalplatform for the online consumers.Flipkart is considered as the most efficient e-portal as consumer gives more priority to product and as per the evaluation it can be said that customer has more trust on this site. While Amazon is next popular e-commerce portal followed by Flipkart. Product of Amazon are more prioritized over the flipkart products. But on overall basis Flipkart gain more popularity.

Our result shows that flipkart and Amazon are two main web portal which are more popular among the Indian consumers.

6. Conclusion

Online shopping plays an important role in day to day life. Many educated people are using online shopping sites for their regular shopping. Also due to very busy life of metro cities, consumers find it easier to buy online. Nowadays people live two lives: physical life and virtual life. Online shopping, whatsappchatting, face book, etc. are part of their virtual life.

There are many online shopping websites available; customer attitude and preference on purchase of products are influenced by various factors.

In this paper five leading website are compared on five criteria by using AHP. The result determine that customer give more priority to product quality and variety over other factors. It is clinched from the current study that flipkart is the most popular among the current customers. The result reveals that out of selected websites two are more popular among users and these websites have strength which

is commonly the demand of the users. These websites are more popular among the young generation. These top ranked websites have strong strength and usability such as user friendly navigation, security and flexibility which may be the reasons for attracting the customers and especially the younger generation. These aspects may have increased customers trust and build their confidence, as they are satisfied by their good experience with these websites.

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