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## **Business and Cyber----Emerging Innovations towards Sustainability**

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### **Abstract**

*In the present era of the emergence of innovative websites, it is essential to stay competitive in the business world. The most prominent features of the cyber competitiveness in business, comprise of the testing of usability and regular evaluation of websites. These features constitute the examining of the pulse of the websites. The fulfilment of the mission, along with the requirement of any improvement in layout or any change in format, become clear in this fashion. The tandem of the website and the business organization are ensured. The requirement to address the issues of design, on an immediate basis, as and when received from the customer, is also met. The accurate representation of the three building blocks of page anatomy, location and structure in the website, are needed to be ensured. The salient features include the personalization of the websites and a quick loading time, that play a key role in the infrastructure, for addressing of the needs of the users. The websites need to be easy to navigate, and require to be made as inviting as possible. The three most important criteria, for a website to be successful, are scan-ability, objectivity and conciseness. The result of meeting the three criteria, lead to a distinctive, well-written, pleasantly interactive, thoroughly tested and easily navigable website*

### **Key Words**

*Competitive, evaluation, innovative, navigable and personalization*

## **Introduction**

The evaluation of websites in e-business implies the consideration of navigation quality, content, graphic identity and functionality. The major cyber tactics are performance and usability. The managing of website traffic is a major feature of website evaluation. An extensive competitive research is needed to be made by the designer, for a detailed assessment of the kinds of websites, the competitors are having. It is necessary for the websites to be revisited periodically, for assessing the changes made by the competitors, and the actual requirement of the business websites. The most important aspect is to consider how any change might fit into the already existing website.

## **Research Objectives**

The major objectives of the research are to :

- a) Establish the role of the administrator of the business website
- b) Establish the factors that make a business website stable
- c) Establish the salient features in the management of traffic in a business website and the content of a business website
- d) Establish the major criteria of evaluation of business websites
- e) Establish the relationship between the color in the business website and the perception of the customer
- f) Establish the salient features that make a business website stable

## **Research Methodology**

### **A) The Psychological Relationship with Color**

One of the major design elements in a business website is color. The goals, personality, as well as values of a business website are demonstrated by the color. The main reasons of the instability of color in a business website, are the differences in gamma and the color space, created by the monitor and the operating system. The measure of the gamma comprise of the compression and the expansion of the light and dark shades, along with the brightness and the darkness of an image. Filters are used by most operating systems for promoting color stability. An assessment of the strain caused by the colors, in the eyes of the customers, is needed by the designer.

Table 1

Relationship of e-Business Psychology and Major Colors

<b><u>Major Colors Impact on e-Business Psychology</u></b>	
Red	Red color draws attention and should never be used as background in e-business websites. The color tends to overtake other colors on the page and needs to be used as accents
Blue	Blue color represents order, stability, security and technology. The color is the second most important color in e-business websites.
Black	Black color is used to signify death and mourning. The color serves as background color for photographs and makes people appear thinner.
White	White color symbolizes cleanliness and purity. White pages always print the quickest
Grey	Grey color signifies futurism, intellect, modesty and sadness. The color is the easiest to see with the eyes.
Brown	Brown color represents reliability, endurance and comfort. This color is liked by men.
Orange	Orange color represents vitality, energy, balance and economy.
Purple	Purple color symbolizes arrogance and cruelty. The color also signifies royalty, wealth and intelligence.
Yellow	Yellow color is utilized for representing legal matters and augmenting concentration. The color attracts attention and symbolizes optimism.
Green	Green color represents growth and youthfulness. The color symbolizes economic stability and money.

B) Relationship of Class Differences, Culture, Age and Gender with Color

The educated and elite classes of people have penchant for names like azure, taupe and so forth. The working classes of people from industries, prefer the colors that have basic names like red, green and blue. There is a significant role of culture as well. The white color is used

for weddings in the West, whereas it is the color of funerals in the East. The adults use subdued colors, whereas young children are attracted by brighter and more solid colors. Furthermore, females are attracted by warmer colors, like red and orange, but males are attracted by cooler colors, like, green and blue.

C) Color Blindness as well as Impaired Vision

There are problems in perception, leading to the decrease in the visual effect of certain combinations of color, for people with color blindness and impaired vision. These cause huge traffic with dubious results. The most common problem among color-blind people is the red-green color perception deficiency. However, there is accurate perception of shades of blue and yellow colors, along with white and black, by the color-blind people. It is therefore necessary that the e-business websites use black on white or white on black.

D) Geometry and Gender Difference

The e-business websites provide different conclusions from different genders. A triangle signifies power and excitement, in the eyes of males, whereas, it signifies threat and danger in the eyes of females. For the males, a circle is rated low in preference. However, for the females, a circle signifies warmth and tenderness, and is rated high in preference.

Table 2

Geometry and Gender Difference

Consumer	Visibility	Retention	Preference	Association
Triangle--Male	High	High	Low	powerful
Triangle--Female	High	High	Low	forceful, danger
Square--Male	Low	Low	High	solid, predictable
Square--Female	Low	Low	Low	brittle, hard
Circle--Male	High	High	Low	feminine, weak
Circle--Female	High	High	High	tender, warm

## E) Evaluation of e-business Websites

- a) **Website Classification** : There are five categories for the evaluation. In first category, only essential information is offered. In second category, more detailed information and options are offered, that allow inputs from customers. In third category, buttons and links are offered for customers, along with the use of color and video for greater interaction. In fourth category, personalization of websites is offered, along with the use of multimedia and workflow tools. In fifth category, highly advanced and customized services are offered, along with the facility of making online purchases.
- b) **Website Consistency** : A similarity in the design and layout of the pages of the website is needed, and a specific theme is required for the attraction of the customers.
- c) **Central Focus** : A primary focus is needed for every website, that signifies the primary activity of the organization.
- d) **Website Outlook** : The outlook of e-business websites needs to be professional, and include accurate grammar with neatness and spelling.
- e) **Personalization of Websites** : The e-business websites, that require a high grade of personalization, need to use cookies. The one-on-one interface enables the tracking of the visits of the customers, along with their responses and preferences.
- f) **Color Effect** : A definite psychological impact is made on the customers, by the color and the general layout of the websites. There needs to be easy navigation, with careful placement of the pictorial contents. It is needed to have minimum text on a page, with a lot of white background.
- g) **Website Speed** : A website is rated to be fast, if a page could be navigated within a second, and it is rated slow, if the navigation requires more than eight seconds.
- h) **Services on Offer** : Some unique services need to be provided by any e-business website, along with contact information, for customer follow-ups.
- i) **Security** : A high rating on the security scale, would require digital certificates and firewalls, along with Secure Sockets Layer (SSL), for processing of transactions.
- j) **Services of Support** : The links to ancillaries, that perform unique activities for the e-business customers, are needed for an effective website.

- k) Website Content : The content needs to include updated information, with interactivity, freebies and fun. The requirement is to have original content, well-organized and edited, in a consistent and attractive format.
- l) Website Shape : The shape is a source of motivation and inspiration to the customers. A triangle signifies power as well as energy, a rectangle signifies order, and a circle symbolizes wholeness with feminine features, like warmth and love.
- m) Website Scalability : A high rate on scalability is achieved by using a simple structure with frames and Extensible Markup Language, supported by a design, that involves easy maintenance.
- n) Typeface : An appropriate and careful choice of typeface is needed to be made for an effective e-business website. The Sans Serif typeface expresses warmth and friendliness, and a Serif typeface is elegant and conservative. These choices are appropriate, for clear and legible screen-fonts.

### **Findings and Contribution**

#### **A) The Process of Personalization of an e-business Website :**

The essential requirement of the process is the mining of the data of the website, and a mere software package or tool is insufficient. The requirement of making the process operational is to extract, evaluate and combine the data, that originate from multiple sources, and finally integrate the available results into custom-facing channels. The four key steps for the operationalization of the process of personalization are :

- a) Artificial Intelligence : In order to decipher all preferences of the customers, as available from the collected data, the analyses of the website are based on techniques of Information Technology and packages of business intelligence.
- b) Customer Interaction : There is a requirement of the e-business websites, that the customers complete the survey forms, intimating of their preferences. The intimations provide the necessary information about the dislikes, likes, as well as other preferences of the customers.

- c) Interaction Personalization : The framing of the regulations of personalization of the websites of e-business, that are integrated in the personalization engine of the website of e-business of the e-merchant, is based on the results of Artificial Intelligence.
- d) Data Integration : The process of Extraction, Transformation and Loading (ETL) is always activated, and remains unique to the requirement of the e-merchant. The clickstream data of the customers, that are captured during every visit of the customer, and comprise of lines of code, stored in a file, are retained in a repository of information, that identifies the customers.

B) Different Approaches to Personalization of Websites :

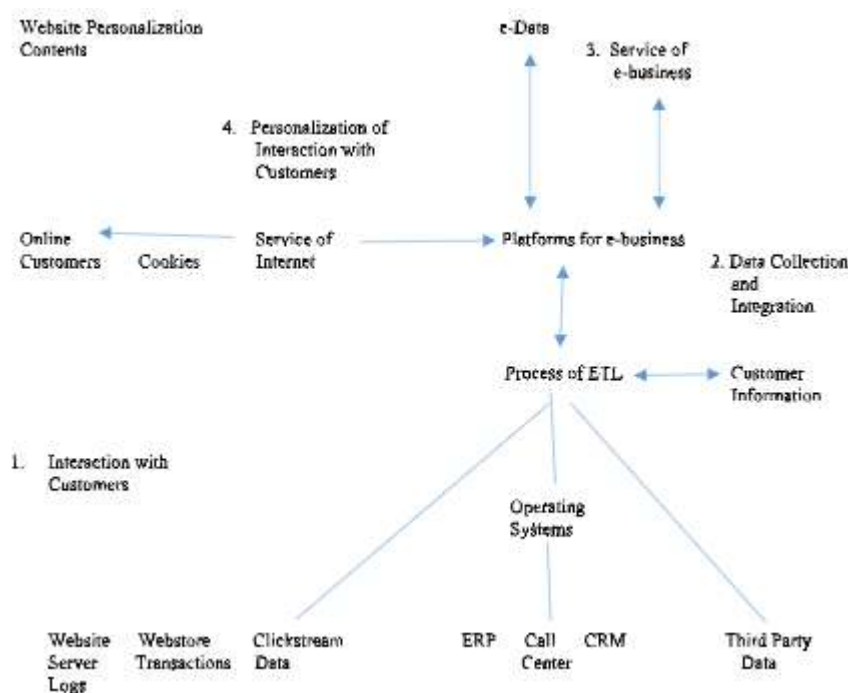


Figure 1 : Process of Personalization of e-business Website

- a) Collaborative Filtering Software : The collaborative filtering software keeps a track of the movements of the customers across the websites, and interprets the interests of the customers. It is useful for making comparisons of the data gathered about customers with similar interests. The software is used for tracking their length of stay, as well as viewing their habits and data.
- b) Cookies : The cookies transfer the information of the visit of the customers to the browser of the customer. These comprise of bits of text file or code, that are embedded in the memory of the browser of the user, and enable the identification of the customer, on return to the website.

- c) Neural Networks : This technology adjusts the preferences of the customers, after acquiring of the same, from the behavior of the customers on the website, using probability algorithms of statistics, for implementing personalization, based on the actions of the customers.
  - d) Personalization Based on Rules : Personalized information of the customers is stored in the profiles of the customers, in the databases, by the segment of the users. These segments are generated by rules of e-business, that allow the classification of the customers using the website.
  - e) Personalization Based on Check-Boxes : This process allows the customers to choose specific interests on a check-list, that enables the e-business website, to make the display of the data. This is a user-controlled process that is not as obvious as the cookies.
- C) Usability of e-business Websites : The usability of e-business websites is evaluated through churning, that is the measure of customer's dissatisfaction in terms of online products as well as interface design, and switching cost, that is the time taken to switch to another website. There is no measure of compensation for a website of poor design, and as such, churning is about bad or good experience of a customer of e-business. In order to promote the frequency and the loyalty of the customers visiting the website, they need good experience, and the contrast between the behavior in an online store and physical store, is dependent on switching costs. The usability of e-business websites is further evaluated, through measures of efficiency, reliability, supportive nature, engaging, customer-friendliness, and consistency. The other measures include the ease of navigation, ability of identification of the brand, making the text scan-able, focus on content, encouragement of feedback and restraint on hype. The crucial factor for maximizing customer loyalty, is the fostering of trust through the design of the website of e-business.
- D) Testing of e-business Websites :
- a) Tools of Testing : The testing is needed to be made in consideration of the expected performance with expected loads, the security features of the website, downtime for the server, and the expected speed of connection of the customers of e-business. The tools of testing are automated, and have features to validate and verify the pop-up windows, hyperlinks, and the integrity of applications of text placement. The types of tools of testing vary from performance and load test tools, to Java test tools, to log analyses tools, and to the tools of website



management of e-business. The applications as well as the logging applications, running on the server side, are tested by the automated tools. These tools also test the interactions among TCP/IP communication, Internet connections, HTML pages, applications running in the websites and firewalls.

- b) Usability Testing : The usability and the reliability of the websites of e-business are ensured by the introduction of some innovated features. When a back-up system is provided, the system supporting the website is annexed to another system that swings into action when the original system fails. When a disk-mirror is installed, the addition or replacement of hardware becomes possible, while the system is operative. The system hardware is then made fault-tolerant, to keep the system running, even during the shutdown of the Central Processing Unit (CPU), by introducing a specially designed operating system. In order to ensure that the applications are self-contained, and there is sufficient space in hard disk for handling the unexpected surges of traffic, those are provided with dedicated servers. In order to ensure the integrity, maintainability and the reliability of the website, the responsibility for providing technology and hardware, needs to be assigned to a single vendor.
- c) Management of Image and Color : The colors that are designed for the e-business websites, should match with the goals of the e-business, and it is needed to have enough contrast between background and text. The images designed for the e-business need to be of the appropriate size, and placed in the right location in the website. If these criteria are not complied with, there could be dissatisfaction among the customers, due to the delay in loading of the pages.
- d) Satisfaction Testing : Feedback is invited from the customers of the e-business, for making opinions about vital features, like, logo, homepage, as well as perception of color, navigation, appearance and layout. The faults received from the feedback, are assigned to the software developers, who could fix and retest, with necessary investigations, such that the same problems are not triggered in future.
- e) Design Features : A memory cache is set aside for the storage in Random Access Memory (RAM), and by default, on hard disk, of every recently used image. The browser recognizes the name of the file, and pulls the image straight from the cache, boosting the performance of the website, and reducing the time of the download. The smooth navigation of the website is maintained by the links and the cross-links. However, it is necessary to minimize these in number, for ensuring the high speed of the website.

- f) Readability : Black type on a white background is the best combination for readability. The layout of text when combined with graphics, color of background, font size as well as type, and length of line are the most important factors, that contribute to readability.
  - g) Server and the Website : The speed of the servers and the network connections affect the efficiency of a website of e-business. The server software is needed to be revisited from time to time, for testing the website against competition for overall speed and performance. The nature of the traffic handled by the website, the status of the server of the ISP, and the bandwidth used, are needed to be reviewed periodically.
  - h) Image Optimization : The optimization of images in websites of e-business is made either in Graphics Interchange Format (GIF) or Joint Photographics Experts Group (JPEG) format. The former is the most suitable for smaller graphics, that need to appear bright and crisp, and is handled by all graphic browsers. The latter is the most suitable for scanned photographs, that display various colors in bit-mapped graphics format, and require compression to smaller file sizes. This format is not handled by older browsers, and is unable to handle sharp edges or large areas of solid color well.
- E) Classification of Cyber Crimes in e-business :
- a) Access : Similar to criminal trespass, if one intentionally makes access or uses, without the consent or knowledge of the owner or possessor, whole or any part of a computer network or computer system, to commit any cyber crime, it is known as unauthorized access.
  - b) Cracking : Cracking signifies the cracking down of network security. The crackers cause damage intentionally, by secretly entering into the security system. They are mostly programmers, who have special knowledge about computer systems, and they use their skills, to steal credit card numbers, flow virus and cause trouble in software by breaking into network security. So the crackers cause dangerous harm to the computer system, security system, and break the cyber systems.
  - c) Theft : Cyber theft comprises of the theft of information or identity, that is similar to date of birth, name, Social Security Number (SSN), password, as well as credit card number. Identity theft might be committed due to careless sharing of personal identities and information, during intentional or dishonest stealing of personal information from home or any public place. Sometimes, there is careless handling of credit card and other confidential document, that

provide information to others about security number, card number and password, that may be accessed by potential criminals, who access the document and commit identity theft. The victims of identity theft, most of the time, do not realize that their identity has been stolen, and possibly at the time of further financing, they realize from lender, that they do not have sufficient fund or credit limit, that makes them ineligible for further financing.

- d) **Cyber Terrorism** : It is a kind of cyber threat made to users through new technology, or making the technology a target by the terrorists. It is also a national as well as international challenge. Net-War is a type of warfare or cyber terrorism in which one nation attacks other nations through Information Way (I-Way).
- e) **Virus Flow** : Human agents flow programs through computer networks, such as, virus, Logic Bombs, Worms and Trojan Horse, that cause, deletion, damage, alteration, and destruction of cyber systems, cyber networks and cyber databases. The cyber criminals deal with three type of virus, namely, boot-sector virus through hard disk that is executed when the computer first starts and affects the cyber memory; macro virus through operating system that infect cyber files containing data; and file infectors through games and spreadsheet programs. The flow of virus has three main characteristics, that are, propagating by modifying another program including itself, propagating at as many different places as possible as a self-replicating program, and propagating by an unknown act of any user of the system, in which it exists.
- f) **Hacking** : It is associated with the act of obtaining unauthorized access to data field or computer program in a cyber system, and then modify, alter or delete any cyber program or attempt to do so. Unauthorized usage of computers or cyber database or network or system, belonging to other users is a crime. So the theft of credit card, or committing sabotage or espionage or fraud, after making unauthorized access to the computers of victims is cyber crime.
- g) **Fraud** : Cyber fraudulence is any fraudulence committed through computer, cyber network, cyber systems or Internet related communication. An access made in an unauthorized manner to commit fraudulence is treated as double crime in cyber space, where one is the unauthorized access that is similar to criminal trespass, and the other is the commitment of fraudulence. Internet fraudulence could be committed through posting of messages on online bulletin boards, websites, junk mails, e-mails, as well as spamming, that are very difficult for the victims to identify from actual facts. Illegal access or usage of cyberspace, for causing wrongful loss to others, intentionally, by any alteration, input, suppression or deletion, in the computer program, cyber database, cyber system or software, are treated as cyber fraudulence.

- F) E- business and Cyber Fraudulence : The fraudsters use cyberspace as media, as the accused can never be recognized by the victims. Cyber fraudulence in business are the most pervasive forms of white collar crime. A few prominent modes of cyber fraudulence have been brought to light :
- a) Identity and Password Fraudulence in Cyberspace : The offenders in cyberspace pretend that they are good friends of victims, and convincingly approach the victims, such that they could make access to their personal information. The information are then used to commit cyber fraudulence, by way of fraudulent banking transactions of credit card, debit card or accounts.
  - b) Fraudulence on the Ground of Urgency : The fraudsters emphasize the urgency of any event, with some statement or advertisement, that displays scope to win an award, on instant investment by the victims
  - c) Fraudulence in Credit Schemes : A common way to commit cyber fraudulence in business is to offer instant financial assistance, in lieu of some service charge or fees.
  - d) Fraudulence in Electronic Mail and Internet : This type of fraudulence comprises of mass e-mailing for charity purpose, as well as, seeking donation for victims of disaster or similar calamities. However, this is a fraudulent way of spreading cyber virus, to affect the operation of the computer, to allow fraudsters to make access to the cyber systems of the victims, for making fraudulent transactions.
  - e) Fraudulence in Excitement : The victims are attracted to colorful websites and get excited at the displayed schemes of e-shopping or e-banking or cyber marketing. These schemes are mostly misleading, and the victims become subjects of fraudulence, in their excitement.
  - f) Fraudulence by False Representation : It is easy in cyberspace to make false representation and claim, that authorization has been delegated on behalf of the victims, and that the offenders have been authorized to make access to the personal identity and commit cyber fraud in e-business.
  - g) Fraudulence in Cyber Lottery Schemes : Cyber fraud is committed in another way, by means of investment in lottery tickets or similar schemes, to make an opportunity to win prizes, that is also known as cyber gambling.

h) Fraudulence in Cyber Travel Schemes : Cyber travel schemes that involve cyber tele-funding, as well as telemarketing, and e-shopping, with misleading information on offers of vacation, that induce fraudulent transaction, are also ways for committing fraudulence in e-business websites.

### Implication

A) The management of content in e-business website comprises of assembling contents, publishing contents and removing contents from the website. An effective control is needed to be exercised over version control, content security and visitor approval. The management further promotes the integrity and the reliability of the website, and augments focus on navigation, performance, easy availability, scalability and security. An inefficient management would affect the website with serious problems of clutter and waste.

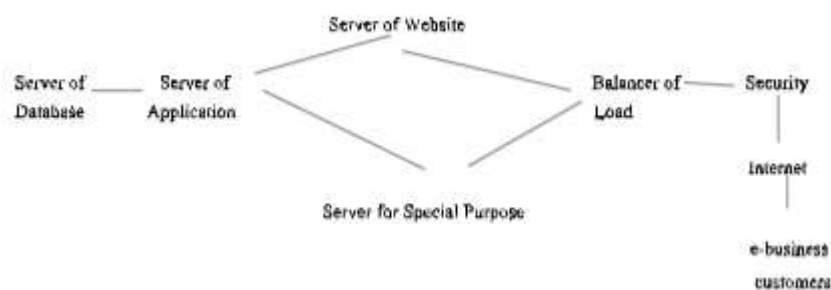


Figure 2 : Process of Administration of e-business website

B) The management of traffic in e-business website comprises of declaring the impact on productivity, inventory turnover and sales, along with the controlling of the volume of business, in the website. The most common tool for management of traffic in e-business websites is the statistical report of usage, that is generated by the ISP. The picture of the monthly physical count with graphic representation of the total hits, total pages, total visits, along with the total kilobytes and usage could be stored. The speed of browsing and the reliability of the numbers need to be judged. The pattern of the usage and the speed of the navigation, need not be similar. The customers need to receive the sought information at the quickest possible time, for the improvement of the perception of the website.

C) The administration in e-business website needs to maintain a high level of performance and integrity at all times, by way of good control over the technology-based elements. The slowing down of the website, caused by surge in traffic, might impair the success of the website. The decrease of performance of the website, discourages the customers to make further visits, and thus repels the regular customers. In addition to the surges in traffic, the complex technology

and infrastructure, like front-end servers, middle-tier application servers, back-end databases, as well as special-purpose servers, increase the stress of website administration. The administrative functions in e-business websites normally include :

- a) Usage of specialized services for regular checking of URLs from different coordinates around the Internet for the improvement of the performance of the Internet. Usage of obtained statistics for gauging the effect of the gravity of congestion, distance and traffic.
- b) Provisioning for high-volume simultaneous users by way of using enough servers, as well as adding low-cost servers, for ensuring smooth handling of the net traffic in the website.
- c) Provisioning for sufficient power and good quality components for application servers. Adopting a batch approach to save CPU time, and leave real time for end-user traffic, thus avoiding the overloading of servers.
- d) Provisioning for a co-location service to enable the websites to instantly accommodate a high surge in website traffic, by relying on additional bandwidth, through adequate Internet connections. Enough bandwidth in the websites, expedites the website traffic.
- e) Provisioning for technically sound client-server technology for distribution over low-cost machines, for supporting the websites. Ensuring the improved and augmented usage of the database server, for expeditiously meeting the challenge of rising website traffic.
- f) Provisioning the ensuring of the continuity of technology-based environment, stability, integrity and viability, by the monitoring of server-to-server switching infrastructure. Preventing the slowing down of the system due to CPU-intensive encryption, by the provisioning of special purpose servers.

## **Conclusion**

The administration in e-business websites needs to have complete control on the performance and the integrity of the websites. For this purpose, it is necessary to have a tight grip over the technology-based elements of the e-business websites. The administration needs to address the problem of manpower, in addition to financial issues and budgets. To manage the high technology, it is necessary that a highly skilled and trained manpower is available round the clock. There is a daily increase in the demand for the usage of the website of e-business. The challenge is to meet the demand of the required manpower at the budgeted financial package.

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