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Users' Behaviors: The Heritage of Digital World

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Abstract

In the advent of information era, not only digital world is going to expand its territories, it is going to penetrate into the traditional notions about the meaning of the words and also valorize new concepts. According to Oxford Dictionary, the word "heritage" is defined: The history, tradition and qualities that a country or society has had for many years and that are considered an important part of its character. In order to present how emerging patterns, as the consequences of technology development, are going to be considered as the new concept of heritage, we follow four steps.

In the first step, we present the convergence of Information, Communication and Technology (ICT) and a concise history of its convergence. In the second step, we argue how convergence has culminated in emerging patterns and also has made changes in digital world. In the third step, the importance of users' behaviors and its mining is surveyed. Finally, in the fourth step; we illustrate User Generated Contents (UGC) as the most prominent users' behaviors in digital world.

Keywords

Users' Behaviors; Digital Heritage; Digital World; The ICT Convergence; Data Mining; UGC.

SUBJECT CLASSIFICATION

Computer Science and Human Behavior.

TYPE (METHOD/APPROACH)

Our approach for this survey is all based on different studies in the field.

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INTRODUCTION

For ages, countries and their cultures have been known by their landmarks, traditions and all they have had through their history. Nowadays, in digital world, countries are going to be popularized based on their approaches to the technology development. There are some questions to clarify how the meaning of heritage has been redefined. Wondering if China would reminiscent of just the Great Wall or its space stations in Moon, Mars and its achievements of sending human into space (Chinese_space_program)? Would people name Brazil by "Jogo Bonito", Coffee, and Amazon Rainforests or as a country among BRICS countries (BRICS), developing or newly industrialized countries with fast-growing economies that has a noticeable influence on global issues (bric-countries-brics) , (BRICS)? Would Nordic Countries be known by Vikings or as the provenance of telecommunication while its share is more than half of the telecommunication's shares in the world, Nokia's and Ericson's shares (Samsung)? Would Taj Mahal introduce India or India would be known by its great application developers? Supposedly, the next generation would not recognize China by the Great Wall, Nordic Countries by Vikings, Brazil by Joga Bonito, Coffee and Amazon Rainforests and India by Taj Mahal except from movies, epics and video games. Memory institutions such as museum care very much whether the documents and/or data they publish will be accessible in 50 years from now (Athanasios Drigas, Lefteris Koukianakis, 2010). For instance, new galleries start to digitize their collections they produce huge data bases with modern agent-oriented methodologies (Athanasios Drigas, Lefteris Koukianakis, 2010).Hence, technology and its development is what a country will leave for its people and also for the world.

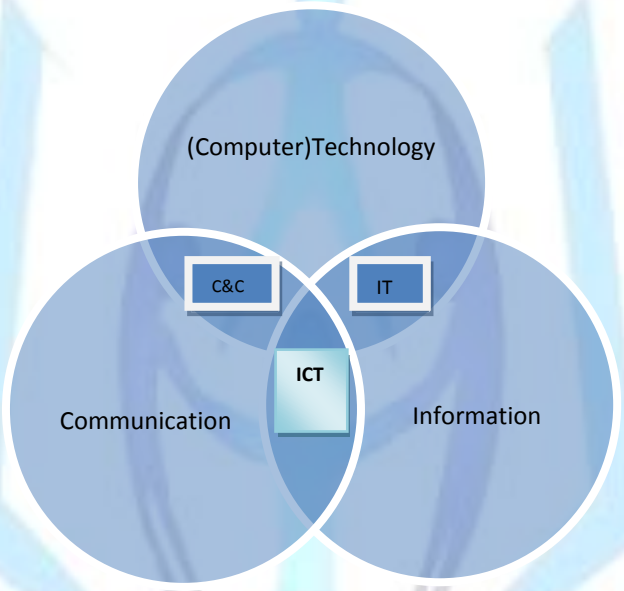

Fig 1: The Convergence of Information, Communication Technology (ICT)

As shown in Fig. 1, the convergence of three realms -Information, Communication and Technology (Computer) - has made the term ICT.

In theory e-culture comprises all process of expression and reflection in the digital domain. That also includes, for instance, communities that share a certain lifestyle, interests or ideas (Athanasios Drigas, Lefteris Koukianakis, 2010). ICT within the cultural domain creates what is commonly known as e-culture. The need to create an e-culture environment arose from the undeniable fact that the cultural heritage of a nation defines a nation and therefore should be disseminated to all, regardless of their location and their disability (Athanasios Drigas).

In modern society where digital heritage prevails, the most objective and interactive area which has engaged users is ICT. The interaction of users and the most various human activities created the term e-services (Paul Andre, Abigail Sellen, m.c. schraefel, Ken Wood, 2011). In this paper, special attention is given to the role of user's engagement in ICT domain.

E-services are being developed in the channel of the technology. They have changed the way people communicate, both in their personal and working lives. The interplay between web technology and the effect it has on human behavior at the personal organizational and societal level is studied by web science discipline (Schreiber), (Athanasios Drigas, Lefteris Koukianakis, 2010) .

STEP 1 - THE CONVERGENCE OF INFORMATION, COMMUNICATIO AND TECHNOLOGY

Information and communications technology (ICT) is often used as an extended synonym for information technology (IT), but is a more specific term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information (Information technology).

The term ICT is now also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system (Sallai, 2012).

The term Info-Communications is sometimes used interchangeably with ICT. In fact Info-Communications is the expansion of telecommunications with information processing and content handling functions on a common digital technology base (Sallai, 2012).

The phrase ICT had been used by academic researchers since the 1980s, but it became popular after it was used in a report to the UK government by Dennis Stevenson in 1997 and in the revised National Curriculum for England, Wales and Northern Ireland in 2000. As of September 2013, the term "ICT" in the UK National Curriculum has been replaced by the broader term "computing" (Information and communications technology).

Communication networks were designed to carry different types of information independently. Radio was designed for audio, and televisions were designed for video. The older media, such as television and radio, are broadcasting networks with passive audiences. Convergence of telecommunication technology permits the manipulation of all forms of information, voice, data, and video. Telecommunication has changed from a world of scarcity to one of seemingly limitless capacity. Consequently, the possibility of audience interactivity morphs the passive audience into an engaged audience (Blackman, 1998).

Telecommunications convergence, network convergence or simply convergence are broad terms used to describe emerging telecommunications technologies, and network architecture used to migrate multiple communications services into a single network (Technological convergence). Specifically this involves the convergence of previously distinct media such as telephony and data communications into common interfaces on single Today, we are surrounded by a multi-level convergent media world where all modes of communication and information are continually reforming to adapt to the enduring demands of technologies, "changing the way we create, consume, learn and interact with each other" (Jenkins, 2006).

The historical roots of convergence can be traced back to the emergence of mobile telephony and the Internet, although the term properly applies only from the point in marketing history when fixed and mobile telephony began to be offered by operators as joined products. Fixed and mobile operators were, for most of the 1990s, independent companies. Even when the same organization marketed both products, these were sold and serviced independently (Negroponte, 1995).

Convergence in this instance is defined as the interlinking of computing and other information technologies, media content, and communication networks that has arisen as the result of the evolution and popularization of the Internet as well as the activities, products and services that have emerged in the digital media space (Technological convergence).

STEP 2 - CONVERGENCE AND EMERGING PATTERNS

Changes in customer behavior include emerging patterns, added patterns, perished patterns and unexpected patterns. Emerging patterns imply the same customer behaviors that exist in different periods of time with trend (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang).

With the help of four cases we exemplify some emerging patterns as the consequences of users' behaviors.

Case A- *Users' repetitious usages has been adding and removing words to dictionaries.*

It is undeniable that plentiful usages of a word intensify its possibility for being added to dictionaries. Inevitably, the words will be saved for the next generation as well as all other words which have been saved for us. Moreover, a rare usage of a word makes it obsolescent and increases its potential for being removed from dictionaries through history. So, users' behaviors about a single word as a weak signal carry the potentiality of leaving a legacy for our descendent.

In 1906 Xerox was found. The first field of their production was photographic paper and related equipments (Xerox at a Glance). Gradually, it has enhanced its fields of researches and production into printers, scanners and so on. The word "Xerox" is an example among several other words such as Google, Ringtone, Spyware, etc., which has been added to dictionaries because of wide range of repeated usages. It has been used as a synonym for "photocopy". The origin dates back to 1950s and it has been used both as noun and verb and it is a coined name based on XEROGHRAPHY, according to LONGMAN Dictionary.

Case B- *Technology development fosters users' trends to take advantages of objects differently.*

As well as mobile technology has developed, numerous manners have been set. Once users could make phone calls and transfer short messages by mobile devices. So, the sense of having someone always in contact established a new trend of sharing whatever we feel. The first form of sharing our impression was via phone calls and messages. Today the ease of taking photos by mobile devices and capturing videos with high quality shifted the trends to share images and videos instead of speaking about an event or texting about that. Technology development has embedded camera lenses into the mobile devices but it simply has changed the users' behaviors from keeping feeling inside into sharing their impressions in

social media and publicizes it. Technology development has ameliorated the functions of lenses in mobile's camera, as a weak signal it has motivated users to share their feelings and depicted events around them. Consequently, it has developed the culture of being self-reporter and as the legacy it has saved many images, relevant videos and stories for the next descendent. For instance, development of technology plus an invented invitation for citizens to catch whatever that is happening around them in "I-report by CNN" (iReport) and other programs have kept users more vigilant about happenings.

Case C- *Technology development values user's nostalgia.*

Human's inclination to maintain their connection with others had set when people tried to imply what they had meant. Then, writing letters have kept them aware of the points that they needed to be inform about. Remembering past with gusto is a precious sense that technology development has facilitated it. Not only has it made it possible to remember, but also to use it in a new format. Technology development has preserved memories that have not been faded away. There are many devices that let users to carry their memorable videos, images and data. Moreover, various applications have developed to change the old format of data into new versions. Among numerous examples of nostalgic functions, sending letters with stamps attached to envelope and signature at the end, is reminiscent of memories from past. Reminiscence is a powerful human trait, not just to able to provide a brief smile or moment of delight, but value in terms of maintaining a sense of who we are, or identify, and developing social bonds (Paul Andre, Abigail Sellen, m.c. schraefel, Ken Wood, 2011).

People have credited their letters by stamp and signature in order to prove the context as well as their presence. Emerging technologies have changed the field of communication and also authentication. Once using a stamp and sign a letter were all a sender needed to do to identify his/her correspondences. Later, the trends of sending emails instead of letters made a need for digital authentication. Digital signature is the reminiscent of hand written signature and stamps.

Signing a letter, attaching a stamp and proving who you are cause to feel confident when you want to send someone a letter and officially prove that you are in authority. Digital signature has provided with the same function as well as stamps and signature, you are the owner of your digital signature and the receiver will be sure about the identity of the sender. As a weak signal, users' trends about sending emails instead of sending letters and also the difficulties of sending letters, such as distances, the urgent need to answer the letters and etc., not only has changed the way of communication, but also has changed the way of authentication. New ethics, symbols, new culture in writing and new form of authentication are what we will leave for next group of users.

Case D- *Users' behaviors in socialization and providing contents.*

User's participation in providing contents is as efficient as student's participation in conversations in classes. Engaging users to disseminate knowledge (Rosta Farzan, 2013) will end in socialization. Although students and non-scientist are not educated sufficiently, they are eligible to participate in all fields that they are cognizant about. Their participation makes them confident enough to speak about what they have observed or found in the realm of their studies. Technology development is going to change user's position in providing content. Not only they are considered as a consumer, they are believed to be content providers.

Inevitably, users are engaged in providing contents and many businesses by mining users' trends have improved their productions. Consequently, users' behaviors about contents plus their participation in providing contents can cause many changes in the knowledge and productions that will be left for future.

In the last step, the augmentation of UGC value, we broadly speak about the value of User Generated Contents.

From past to now, users' reactions have caused the deletions and increments of culture's practices. By the presence of technology, it has been highlighted because users are being more active in producing and distributing what they need. Therefore, the answer to their requests is what will be left for next generation. It means that the next descendent will know us by what we leave for them and that thing is technology. Preservation has become a matter of keeping access rather than keeping objects. We believe with the advent of digital media, a new and complex environment has come into being. Not only the media are new, the contents and the means of distribution have also changed dramatically. In addition, new players- among users as well as creators of information- have entered the stage (Lusenet, Digital heritage for the future, 2002).

Customer behavioral data are generally the most effective predictive data in customer relationship management (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang).

The importance of users behaviors' clearly has shown the value of emerging patterns. Therefore, the latent consequences of emerging patterns have needed to be studied. We believe that Traditional forecasting methods are no longer suitable for these business situations (M. Nikhita, J. Ashwini, P. Amritha, M.N. Lakshmi, 2011).

Mining the vast amount of public content on the web may open up untapped potential for connections to our past. The field of Human-Computer Interaction (HCI) has tended to study and design for reminiscence linked to personal media such as photos and videos we create or amass ourselves (Paul Andre, Abigail Sellen, m.c. schraefel, Ken Wood, 2011).

STEP 3 – MINING THE EMERGING PATTERNS

In the digital world, new type of materials have come into being- multimedia materials that combines different types of content, websites that combines file with various types of content on different servers at different locations in the world (Lusenet, Digital heritage for the future, 2002).

The fast business growth has made both business community and customer face a new situation. Due to intense competition on the one hand and the customer's option to prefer from a number of alternatives, the business community has

realized the essence of intelligent marketing strategies and relationship management (Sonal Tiwari, Deepti Razdan, Prashant Richariya, Shivkumar Tomar, 2011). Currently, businesses face the challenge of a constantly evolving market where customer needs are changing all the time. In such a situation, change mining can enable market analysts to better understand changes in customer needs and how those needs change (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang)

With the explosive growth of information sources available on the "www", it has become an important tool for users in order to find, extract, filter and evaluate the desired information and resources (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012) on the other hand; the advent of data mining has enhanced the customer behavior prediction accuracy. The mining of users' behaviors is being done by client behavior pattern recognition system based on web log files mining (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012).

Mining changes for customer behavior is useful for satisfying customer needs in dynamic business environment. At present, Internet technologies have seamlessly automated interface processes between customers and retailers, retailers and distributors, distributors and factories and factories and their myriad suppliers. Change mining can extract further value from customer, product and transaction databases (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang).

Data mining is a stage in knowledge discovery in database (KDD) (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang) where they seek to derive information about their customers' requirements (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012). Data mining techniques have mostly been adopted to generate predictions and describe behaviors (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang).

Change mining is appropriate in dynamic business environments, and evolves extensive human interaction. The proposed approach for mining changes in customer behavior can assist managers in developing better marketing strategies (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang).

In the digital market, attracting sufficient online traffic in a business to customer website is vital to an online business's success. The changing patterns of internet surfer access to e-commerce sites pose challenges for the internet marketing teams of online companies. For e-business to grow, a system must be devised to provide awareness and exploration to purchase commitment. Such knowledge can be discovered by synthesizing a large volume of web access data through information compression to produce a view of the frequent access patterns of e-customer (Irene S.Y. Kwan, Joseph Fong, H.K. Wong).

The concept of web mining describing the process of web data mining in detail: source data collection, data pre-processing, pattern discovery, pattern analysis and cluster analysis (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012).

Web content mining (WCM): related to uncovering of useful information from web contents, including text, image, audio, video, etc. Research in web content mining encompasses resource discovery from the web, document categorization and clustering, and information extraction from web pages. Web structure mining (WSM) studies the web's hyperlink structure. It usually involves analysis of the in-link and out-links of a web page, and it has been used for search engine result ranking. Web usage mining (WUM) focuses on analyzing search logs or other activity logs to find interesting patterns (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012). Data may be collected from a) web servers, b) proxy servers, c) web clients (Sonal Tiwari, Deepti Razdan, Prashant Richariya, Shivkumar Tomar, 2011).

Knowledge obtained from the web usage patterns would be directly applied to efficiently manage activities correlated to e-business, e-services and e-education (Sonal Tiwari, Deepti Razdan, Prashant Richariya, Shivkumar Tomar, 2011).

Marketing managers can develop long-term and pleasant relationships with customer if they can detect and predict changes in customer behavior. [p.9] Data mining techniques have been adopted to predict customer behavior (Mu-Chen Chen, Ai-Lun Chiu, Hsu-Hwa Chang).

Knowledge management is the key to business learning the technologies that support knowledge management in e-business are data warehousing, data mining, the Internet and document management systems (Irene S.Y. Kwan, Joseph Fong, H.K. Wong). These characteristics imply the need to measure to behavior of the web-based system and its users.

STEP 4 – THE AUGMENTATION OF UGC VALUE

Internet marketing is the process of building and maintaining customer relationship through online activities to facilitate the exchange of ideas, products, and services that satisfy the goals of both parties. It is concerned with using the internet to create intense and profitable relationships with their customer. Indeed, internet marketing has recognized that e-customer advocacy, reactions to stimulated transactions, and sensory, cognitive and emotional experiences are all crucial in building an understanding of customer experience in the design of appropriate marketing for securing customer relationships (Irene S.Y. Kwan, Joseph Fong, H.K. Wong).

We discuss the importance of UGC from two points of view:

1- Producers: Practitioners who play the main role in producing contents.

2- UGCs' Users: Recommender Systems and Firms (Businesses).

Producers: Practitioners who play the main role in producing contents

Production of UGC can be done in two ways. The direct way which users directly produce contents, such as their participation in online communities while they edit, write or make comments about content. The indirect way is when they rate. The rating in both methods – single component or mostly argued multi-components method- is valuable enough to be the basic of studies.

In the sever competition in an e-commerce market; any information related to customer behavior is awfully precious to merchant. A most important challenge of e-commerce is to understand customers' wants, love and value orientation as much as possible, in order to make sure competitiveness in e-commerce era (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012).

Web mining can be used to find obvious data which have potential value (Mahendra Pratap Yadav, Mhd Feeroz, Vinod Kumar Yadav, 2012). It attempts to determine useful knowledge from secondary data obtained from the interactions of the users with the web (Sonal Tiwari, Deepti Razdan, Prashant Richariya, Shivkumar Tomar, 2011).

As well as from former research, we know that a lot of users are not satisfied with simply being passive consumes, but rather want to be active procedures. We will therefore need a new approach and methods to be able to evaluate this user trend; we need to move from easy-to-use to easy to participate/produce/ co-create (Marianna Obrist, David Geerts, Petter Bae Brandtzeg, Manfred Tscheligi, 2008).

E-commerce data are classified as usage data, content data, structure data, and user data. Usage data contain details of user sessions and page views. The content data in a site are the collection of objects and relationships that are conveyed to the user. Structure data represent the designer's view of the content organization within the site. Structure data also include the intra-page structure of the content represented within a page. The user data may include demographic or other identifying information on registered users, user ratings on various objects such as pages, products, or movies, past purchases or visit histories of users, as well as other explicit or implicit representations of users' interests (M. Nikhita, J. Ashwini, P. Amritha, M.N. Lakshmi, 2011).

Wikipedia is a great example of an online community that has been studied by researchers. The main core of these studies is the importance of users' interactions. For instance, a study entitled "what motivates Wikipedia's?" suggested fun as important aspect in explaining why people contribute UGC. Another study of more mainstream users of UGC found there main barriers to user participation: 1) lack of interesting people or friends attending, 2) low quality content, and 3) low usability (Marianna Obrist, David Geerts, Petter Bae Brandtzeg, Manfred Tscheligi, 2008). Another study presents Wikipedia as an appropriate research platform to study how to engage university students to contribute to an online production community while at the same time providing useful educational experiences to the students involved. Although they are not themselves domain expert in a scientific discipline, their course work provides them with relevant subject knowledge in a domain, their access to academic libraries and their library skills potentially makes more up-to-date scientific knowledge more accessible to them compared to less well-connected members of the general public (Rosta Farzan, 2013).

User's rating provides information about the quality of the items as well as about the tats of the user who gave the ratings. Most recommender systems have been designed for single - valued ratings, i.e., for each pair (user, item) we have one rating indicating how much the user liked the item (Nachiketa Sahoo, Ramayya Krishnan, George Duncan, Jamie Callan, 2012). However, sometimes there are multiple components to a rating. By rating multi-component aspects of an item, users provide more information about their preferences. Then variation in different user's component rating while they seemingly agree on their overall impression of the item can be informative. Similarly, a movie could be rated for its plot, acting, visual effects, and direction. When such things are available from users, it is plausible that a recommender system could be designed that makes use of these component ratings and produces better recommendation for the users. For instance, consider two users, u1 and u2, who have given the same overall ratings to the movie, m1. But, they differ in how they rate in how they rate the components of the movie. U1 likes the plot of the movie, whereas u2 likes the direction of the movie. Without the component ratings we would have concluded that users would not particularly like any movie similar to m1. But, the component ratings tell us more. They suggest that u1 might like other movies that have a story similar to m1, and u2 might like a movie that has been directed by the same director with a similar style. Therefore, if we can effectively use the information in the component ratings, we should be able to find more relevant items for the users (Nachiketa Sahoo, Ramayya Krishnan, George Duncan, Jamie Callan, 2012).

Because e-customer learn fast and want web sites that are hidden by their needs, the historical analysis of customer behavior will help to identify current preferences (Irene S.Y. Kwan, Joseph Fong, H.K. Wong).

In e-commerce, the current challenge is determining how to design responsive web site infrastructure that provides a sustainable competitive advantage through a better understanding of target customers (Irene S.Y. Kwan, Joseph Fong, H.K. Wong).

UGCs' Users: Recommender Systems and Firms (Businesses)

Human-Computer Interaction (HCI) has seen a movement to address a broad range of human values and experience. Recent work in HCI to understand what people would like to remember of their past has also shown a desire to capture broader aspects of the world and society (Paul Andre, Abigail Sellen, m.c. schraefel, Ken Wood, 2011). The aim of these studies is to discover hidden patterns and business strategies from their customer and web data.

Recommender systems are increasingly used in online communities, e.g., shopping sites, subscription service sites, and online meeting places. The recommendations are generated from the collection of user preferences, yet they are personalized to each user. Recommender systems are especially useful when the user has too many choices to explore- they assist the users in discovering items that will appeal to them. From the retailer's perspective, recommenders systems may be used to target advertise items to its customer. A merchant at an online marketplace can use a recommender system to induce demand for less-known items in the system. Online storefronts are not the only places where recommender systems can be used. There are communities of users with common interests who use recommender systems to find new items that they might enjoy. The development of such services suggests that recommender systems are important tools for mining collective user preferences to help users better navigate large choice spaces. Product

recommendation systems may have been explored in marketing science as well (Nachiketa Sahoo, Ramayya Krishnan, George Duncan, Jamie Callan, 2012).

If we could better understand what users do and do not value, and why, we could :1) derive design implications for better tools or automatic filters, and 2)developed insight into emerging norms and practice to help users create and consume valued content (Paul Andre, Michael S. Bernstein, Kurt Luther, 2012).

This can provide the framework of an e-customer behavior (eCB) model that can be used to discover e-customer profiles which identify the significant dimensions of on-line behavior and identify web pages that trigger behavior changes (Irene S.Y. Kwan, Joseph Fong, H.K. Wong).

Marketing research has begun to investigate how these forces (individualization, information and interactivity) can be utilized to create long lasting relationships with customer. The need you understand the target customers of internet marketing has become obvious recently (Irene S.Y. Kwan, Joseph Fong, H.K. Wong).

Fans and consumers are able to participate in the creation and circulation of new content. Some companies take advantage of this and search for feedback from their customers through social media and sharing sites such as Youtube. Besides marketing and entertainment, convergence culture has also affected the way we interact with news and information. We can access news on multiple levels of media from the radio, TV, newspapers, and the internet. The internet allows more people to be able to report the news through independent broadcasts and therefore allows a multitude of perspectives to be put forward and accessed by people in many different areas. Convergence allows news to be gathered on a much larger scale (Technological convergence; 1).

CONCLUSION

In this paper we tried to present the importance of Users' behaviors in digital world. What we studied is the core of business strategies and a key input to recommender systems. The deeper it is studied, the better decisions can be made. The best knowledge is driven from the study of users behaviors' which has received from their engagement. Users' behaviors once can be supposed as a weak signal while it has the potentiality to make butterfly effects. Today business decisions are based on users' preferences and that is the kind of data that we will leave for next generation. The movement from easy-to-use to easy-to-co-creation is clearly obvious for both businesses and customers.

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