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Business 2.0: A Novel Model for Delivery of Business Services

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Abstract—Web 2.0, regardless of the exact definition, has proven to bring about significant changes to the way the Internet was used. Evident by key innovations such as Wikipedia, FaceBook, YouTube, and Blog sites, these community-based Website in which contents are generated and consumed by the same group of users are changing the way businesses operate. Advertisements are no longer ‘forced’ upon the viewers but are instead ‘intelligently’ targeted based on the contents of interest. In this paper, we investigate the concept of Web 2.0 in the context of business entities. We asked if Web 2.0 concepts could potentially lead to a change of paradigm or the way businesses operate today. We conclude with a discussion of a Web 2.0 application we recently developed that we think is an indication that businesses will ultimately be affected by these community-based technologies; thus bringing about Business 2.0 – a paradigm for businesses to cooperate with one another to deliver improved products and services to their own customers.

Index Terms—Web 2.0, B2B, data analysis, business analytics

I. INTRODUCTION

Web 2.0 is a term used to describe an era, where the latest technologies provide facilities for users across the world to be the author of content, as long as they can access to the Internet and have their own personal computers or hand held devices as writing tools. The phrase Web 2.0 emerges from a conference brainstorming session between O’Reilly and MediaLive International back in 2004 [10, 15]. Similar to the version-numerals control for software upgrade, Web 2.0 is perceived as an improved version of the “conventional” Web, where the Web is argued to had transformed from an information silos of individual Websites to an interlinked computing platform, which function as a localized software accessible by users throughout the world, with even the need of minorities can be well accommodated. Thus it does not invent new technology, but rather changes the way developers would create their applications due to the increased number of Web users from variety of educational and cultural background. Instead of having an IT-personnel acting as a Webmaster to administer a Webpage, participation and contribution on Web 2.0 can be conveniently achieved by the virtual community who do not need to have any sound technical IT knowledge. It gives the community a freedom of voice which could not be achieved a decade ago, more access to wide variety of information and knowledge in a speed faster than local news media, and a community network built by the community themselves.

One of the key characteristics of Web 2.0 is the idea of having User Generated Contents, also known as Consumer Generated Media. Wikipedia for example, gains all the benefits of user generated contents by allowing anyone with internet access to create a Wikipedia entry or edit an existing one. When Wikipedia founder Jimmy Wales started the idea of having an online general-content encyclopedia called Nupedia, he and his staff, Larry Sanger used one year to write up only 21 articles on limited topics such as atonality and Herodotus. However, after adopting a collaborative writing and editing software tool called Wiki [7], Wales opened the authorization of contents authoring to the public. Within one month of launching the new Wikipedia, it quickly gathered 600 articles and after a year, 20,000 [11]! Wikipedia shows that it is often difficult for one or two person to generate entries which need vast amount of information and knowledge, but this goal can be easily achieved when there is a group of people who are willing to share their knowledge.

From Wikipedia, we can see that with the use of the right software tool for content creation, more non-IT users have been able to contribute in order to produce useful, informative and creative contents on the Web. Other than Wikipedia, we also have other forms of UGC applications such as social networking Websites like MySpace and FaceBook, and blogs such as BlogSpot and LiveJournal. These Websites provide easy to use templates, hidden technical difficulties, online tutorials and help topics for users to create their personal profile on the Internet. Their profiles can either be accessed by public, or open to view only by specified members. Through the use to these Web application, more users are able to express themselves either in text, picture, audio podcasts or in video forms, expressing their opinions on current issues, connect to peers, express personal interests and hobbies, link to fellow bloggers and thus causing network effect.

The use of RSS and atom feeds for Web contents aggregator and syndication, have accelerated growth of Web
2.0 by keeping users updated with the latest Web contents. Now before the break out of an event on a published newspaper, we could have received the latest updates from Web 2.0 news portals and bloggers would have started voicing out in reflection of latest news events. Citizen journalism, as shown in the over 6500 photos received by British Broadcasting Corporation from public viewers after Buncefield oil depot fire disaster, have thus shown a good example in this aspect [9].

Behind these inventions sits another driving force of Web 2.0: Unlimited download and upload from broadband service providers, and low or no cost virtual storage. These available hosting services boomed from megabytes a decade ago to the current gigabytes limit have encouraged users to upload their personal videos and photos on the Web. Example sites include Flickr and YouTube. The emergence of these sites also encourages folksonomy, where the use of tagging on individual uploads has further facilitated information searches on the Web.

Having these available resources and the given environment, we are strongly inspired that Web 2.0 is not only for social networking, recreation and individual pleasure. We believe that it has the potential to unleash potential powerful application in businesses. Thus this paper looked into the current use of Web 2.0 in businesses and the capability of Web 2.0 to serve as a virtual platform for business to business operations. We will see that the Internet is no longer confined to the conventional wisdom of using click streams to obtain customers' preferences nor for displaying information for customers in the form of business to customer. We will then proceed with a business 2.0 model that we have built for use by different companies in textile industry. After all, business is all about making the most use of available resources within a given environment to maximize corporate values and profit gains.

II. RELATED WORKS

Up to date there is only sparse use of the term “business 2.0”. Business 2.0 is used as title of a print magazine by Time Inc. which was closed down earlier in 2007 due to declining advertising revenues. It is also used in CNNMoney.com as title of an online magazine. Some .com Websites are being labeled as Business 2.0 through recognizing the ability of utilizing the Web for business operations such as analyzing click streams of their online users.

We have accumulated here, related use of Web 2.0 in business which we regard as “real Business 2.0”, as opposed to conventional business operations, in order to show the difference after an organization have adopted Web 2.0 technology.

A. Clicks and Mortar vs. Bricks and Mortar

Conventional sales and purchase are done through bricks and mortar methods. Thus these retailers face a challenge in keeping inventory both in-house and in warehouse; as physical storage requires huge space and local storage is often costly. As a solution, most retailers would avoid obtaining items which are less popular. They would focus on popular and latest products as these items would sell quickly and thus bring better and quicker profits. In contrast, practical Web 2.0 companies such as Amazon.com and NetFlix would be able to focus on hard to find and less popular items as these companies are able to store their inventories in remote storage areas with a much lower storage cost, while maintaining inventory count on their online purchasing Websites. By getting rid of the problem of physical storage location, these companies are able to sell more varieties of items and thus reaped the benefit of the Long Tail effect, where total sales of infrequent items (the long tail) are more than items from high-frequency items under statistical distribution analysis [2]. In addition, customer satisfaction would be increased since more customers' preferences can be accommodated and retailers are able to reach out to more potential customers from the entire Web.

B. Online Auction vs. dot-com Shopping Cart

The boom of e-Commerce has then encouraged inventory purchase via the Internet. Most companies would have a shopping cart on their Websites which allow customers to make transaction online through the use of credit cards. Companies display product information on the Web, allow options to choose and compare from different options, then allow customer to keep or discard items in their shopping cart. By the end of browsing, customer will be led to checkout their chosen items, and transaction can then be made, for example, dell.com. Besides allowing customers to make purchase online, new generation of online purchase allows users to bid on items and even sell their own items as a registered users as well, for example ebay.com. Thus all users are buyers as well as sellers. Users are also allowed to write comments about buyers or sellers that interact with, which will serves as a trustworthiness measure of the user.

C. User Generated Content vs. Information Display

From eBay, we can see that selling on Web 2.0 is not an exclusive activity for vendors, Web content contributed by users are significant to the growth of the online business as well. Amazon.com for example, beside having to generate main contents such as adding publisher-supplied data and images, also allow customers to generate and annotate these entries. Surprisingly, after ten years, Amazon became the primary source of bibliographic data on books, a reference source for scholars, librarians and public consumers [10]. These benefits of using Web 2.0, is similar to the way wikis developed. The more users contribute to the contents, the more valuable and extensive it becomes.

D. Google AdSense vs. Media Advertisement

Advertisement brings in revenue by increasing the brand name of a product. Thus conventional mass media became a target for companies to display their products information through broadcasting on television, radios and public poster. However, today, this profit generating business no longer belongs only to the conventional media. Now anyone with a Web space can sell ad space online, and even blogs can
subscribe to Google AdSense, a program which matches ads with site contents, which will then brings in revenue to bloggers on a per-click or per-thousand-impression basis. One of the foremost example of online advertising business is Jason Calacanis’ Weblogs Inc., which has attracted big advertisers such as HP, Google, Audible, Suzuki for offer from three figure deals up to give figure deals, based on a menu of sixty-five blogs having broad blogs categories such as gadgets at engadget.com, travel at gadling.com, parenting at bloggingbaby.com, video games at joystiq.com [6]. Blogs became a target advertising space because they can reach larger audiences regardless of physical location, and more frequent updates of up to 20 to 30 times a day which traditional media would not be able to offer. In 2005, his conglomeration of 85 sites was sold to AOL for a reported $25 million, has further motivated the blogging-for-bucks phenomenon [13].

E. Live Chat vs. Phone Support

Standing on the idea that the Web allows businesses to increase the instant interactions with customers, many companies have adopted the Web as service platforms for their customers. Besides having product and service descriptions, contact methods, online purchase options and access to online help topics on Websites, live chat for example, is used to replace the conventional sales person by having an online sales person who can chat and interact with customers through “chat box” applications and even remote access to desktop for technical helps. As Paul Sloan reported on CNN Business 2.0 Magazine, Erik Asarian, a real estate broker in Park City, Utah, installed a live chat box from 2006-2007, and credits it with adding $12 million in sales [12]. Many companies have also adopted instant messaging as intranet staffs communication method. By substituting phone calls with instant messaging, companies saved enormously especially on outstation and conference calls.

F. Direct Customers Opinions vs. Statistics

Before the rise of e-Commerce, market analysis would be done by displaying products on the street, and then obtain public reviews through accumulating public opinions. This method is then developed to statistical results collection through online polls or by analyzing click streams through the use of statistical and data mining software. Today, companies are encouraged to create their own blogs which would then allow staff members to generate new ideas and then obtain peer reviews through blog comments. GM for example, runs new concepts by readers at the site http://fastlane.gmblogs.com, and then invites readers to give comments. They believe that by providing a space for customers to interact, they will be assured that customers will interact [16]. The best products can be produced by combining and selecting the best ideas from among the consumers and blog and comments are perceived as the easiest way of getting direct customers opinions. In addition to obtaining ideas from staffs and customers, blogs would also help by improving customer loyalty, allow companies to react quickly to negative events (such as how politicians would utilize), influence customers by reflecting company's culture, values and priorities, and thus increase company and brand profile.

G. Interlinked Computing vs. Information Silos

One of the best examples for showing the distinction of interlinked computing platform is by looking into online banking and bill payment these days. While Internet users were still doubt about security of having online transaction a decade ago, online banking has further developed as a platform for interlinked bill payments by allowing customers to choose to pay and view all bill invoices from different service offering companies such as phone bills, internet bills, energy bills and even magazine subscriptions through the use of BPAY service. All these companies have unique BPAY code which is a unique code associated to each customer. These customers can choose to view bills online or make payment through online banking by inserting BPAY code and amount to be transferred on the date chosen. Thus a bank which cannot interchange information with other related systems are viewed as silos, and are perceived as inconvenient to customers.

III. BUSINESS 2.0

Even though Web 2.0 has been used in few aspects as described in the previous section, we notice that Web 2.0 components have yet to be applied extensively in businesses to achieve the ultimate goal of associatively, collaboration, sharing and creativity between businesses. Here we propose a model for Business 2.0 based on the following characteristics. The aim of our proposal is to present a model where these characteristics are all exhibited.

- Efficiency and effectiveness of model increase as the number of users increases.
- All users make contribution to the model, whether by adding or editing Web contents, or by using the model.
- Model is platform free. Thus application is stored and shared from Web servers where all users can access as long as they are connected to the internet.
- Model is service oriented, instead of selling products to users. With the model in hand, users should be able to make full use of the service offered to gain individual profits.
- Model should be able to meet requirement of all users, offering service to both high-amplitude population as well as low-amplitude population.
- Model is able to reach to wide population regardless of physical location of users.
- As there might be selfish users who would use the model without contributing, model should be able to make use of these users through other methods.
- Users who create the contents should have control over data by setting authorization on created content. Authorization can be opened for view and
modification by public, or only by registered users.

- As losing competitive advantage is primary concern of businesses for sharing data online, model should be able to counter this lost of insecurity concern by having ultimate advantage of using model more than disadvantage of sharing data with other companies.

- Version control is implemented and log is kept in order to minimize risk of having data being modified purposely by users who have improper intention. If data corruption occurs, model is able to rollback to previous revision.

- Users should be able subscribe to receive alerts when content is modified or when new content is created.

A. Proposed Model

Our model is based on a real Business 2.0 example created for the textile industry to predict the pilling propensity of wool knitwear. Pilling is defined as the process of garment forming entanglement of loose fiber into a ball shaped agglomerations when surface of fabric is exposed to mechanical actions which cause abrasion on its surface [14]. This posts serious problems to the wool industry because pilling happens all the time during daily wear, laundering and drying. Thus, a good prediction tool enables a designer to make adjustment before committing real resources to produce the knitwear. Support Vector Machine, a text classification model which classifies records by maximizing margins on a hyperplane, was chosen as the data mining tool responsible for the prediction [5].

There are two components involved in development of the Pilling Propensity Prediction Tool (PPPT). The first component is the .NET interface that renders the user interface on the Web browser for interaction with the database. The second component trains, tests and deploy the prediction module of pilling records using SVM which runs at the backend. Both components are placed on the server to facilitate access through the Web.

When PPPT is used for the first time, a user supplies a set of records with 17 attributes values required by the application where each record has an expected pill rating. Upon receiving training records from users, the application trains its models files which is used to classify records into their respective pill classes. A user can test results by providing an unseen record to check what PPPT gives as a prediction. If the test record happens to be misclassified, a correct pill rating is entered to retrain the SVM model files by making adjustment on the separation margins. After training and testing, PPPT accepts unseen production record for real time prediction. When PPPT is used for subsequent prediction, users can use the prediction model directly by supplying model with unseen testing records. If prediction is inaccurate, model is again being justified through retraining using the correct pill rate values until PPPT is able to give accurate prediction.

Knowing that pilling poses a serious threat to wool industry and it is yet to be avoided, PPPT project was initiated by the wool industry and Deakin University who intended to build a prediction model for use by companies and non-profit organization involved in wool knitwear production. However, currently one of the biggest challenges that we face while building PPPT is the lack in number of records for training model files for each pill ratings, rate 1 - 5. Wool data records are limited as each set of record requires data to be kept from initial process of obtaining wool fibers, to final stage of recording pill rating by going through physical pill testing. Thus the number of records that we have in hand is not enough to cover dimensionality of input data. We know that sharing and collaboration with other industry users would help to increase the number of records in database for training, and by doing so, increases the prediction accuracy of the model. Hence PPPT is built with the intention to be shared among industry users.

To initiate the sharing, PPPT is placed on a Web server and is first supplied and trained with real industry data from [1]. These trained models would be used as a global model for sharing between all registered users. Then users from the industry are welcomed to register an account online, log in and start making prediction using the ready made global model or start utilizing their own space. If prediction accuracy of global model is unsatisfactory, users will get to submit their own training data and train models according to data in hand within their space. Here, a set of new model files only belong to current logged in users will be created. These model files would be used for testing and users are allowed to choose whether to open prediction capability of their private trained models to public. Upon submitting training data, users’ records will be captured and used to re-train the global model so that the underlying database for the global model will be increased, and changes made will be stored in log files for revision control.

Prediction accuracy can be improved as the number of users increases, as more training records will be supplied to cover all dimension of input data. This is similar to how other Web 2.0 pioneers like YouTube, eBay and Google Earth work, where application improves as more users use the application, contributing to the network effect. Thus all users who are registered to use the model would gain the benefits of using PPPT by working together to obtain a shared prediction tool for pilling prediction.

B. SWOT Analysis

SWOT Analysis is performed in order to analyze the strengths, weaknesses, opportunities and threats of our proposed model [3].

Strengths

- Resources are available to start a business 2.0 model (PPPT tool in our case)
- We have a set of ready trained models for companies to do initial testing
- Users have the options to authorize whether public users can view and update their training models
- Version control and change log allows roll back to previous correct version if models are being modified with improper intention
Weaknesses

- Lack of records in current models do not give sufficient confidence for users to believe in prediction ability of PPPT
- Privacy will be a concern to most users if users are not willing to share their data with the global model

Opportunities

- There is a demand for an online prediction tool by the industry
- Lack of training records is a challenge faced by other companies and collaboration is desired if there is a party who is willing to take the initial start up role
- Minimal investment is required by other companies for using PPPT: a personal computer and internet connection
- Technology required for starting business 2.0 is readily available e.g., free development platform
- Prediction accuracy improves as the number of users increases thus it can benefit all parties who participate
- Success in prediction will encourage economic growth
- Increasing customers' satisfaction will increase sales and profits for all parties; from wool growers to wool knit wears retailers
- Increase effectiveness and responsiveness by preventing organizations to repeatedly solving the same problems [8]

Threats

- Sabotaging by supplying incorrect data
- Individual holding unique information might be reluctant to share because they are not willing to let go their perceived competitive advantage [4]
- Free rider problem where users only use global model without sharing their own records
- There will not be intellectual property claim as global data will be used for training global models and no individual users will be able to claim copyrights on PPPT

IV. CONCLUSIONS

To stay competitive in the fast evolving world, businesses need to know the way to use available resources within a given environment to maximize corporate values and profit gains. Features of Web 2.0 has emerged just a decade ago and in fact, the term "Web 2.0" emerged just 4 years ago, and before everyone could have accepted it, it has been used widely on the world wide Web. Thus in this paper we proposed a business 2.0 model which aims to brings together associatively, collaboration, sharing and creativity of the business world. We argue that Web 2.0 is not only suitable for social networking, and we have pointed out some sparse use of Web 2.0 in current business operations. To analyze the feasibility of business 2.0 model, we have utilized the business planning analysis method, SWOT analysis.

From the SWOT analysis, we found that the main problem of business 2.0 is actually related to the unwillingness of users to get involved in sharing and collaboration, which would then hinder its growth. Knowing that unity always supersede individual performance, having business 2.0 would facilitate growth of business in all aspects. Furthermore, with the abundant low cost resources around, it doesn't take much investment for a company to start a business 2.0. The sample model PPPT that we described here is just one of the possible use of business 2.0 and there is always new market opportunity, for example a business 2.0 platform for telecommunication companies to share customers database on a platform in order to prevent fraud case, or a platform for customers to choose and combine different products from different companies into one product, perhaps by using mash-up technology. We can also use PPPT for prediction in other industries since SVM, the data mining model underlying our prediction processes, is proven to give high accuracy in text classification and regression.

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