5-2009

Gathering Customer's Demand Data through Web 2.0 Community: Process and Architecture

Yide Liu
Beihang University, yide@sem.buaa.edu.cn

Shaobo Ji
Carleton University, sji@business.carleton.ca

34. GATHERING CUSTOMER'S DEMAND DATA THROUGH WEB 2.0 COMMUNITY: PROCESS AND ARCHITECTURE

Yide Liu
Beihang University
yide@sem.buaa.edu.cn

Shaobo Ji
Carleton University
sji@business.carleton.ca

Abstract

It's one of the most critical tasks for businesses to keep track customer's responses to their products and services in this competitive business environment. With the emergence of Web 2.0 communities and social networking websites, a relatively new media in personal communication and knowledge sharing websites, firms can leverage this additional channel to their advantage by implementing a system to monitor and collect customer's response data. The purpose of this paper is to introduce a data collection process and a system design architecture which can be used for such purpose.

Keywords

Customer demand, Web 2.0 Communities, Online customer data collection

1. Introduction

As the Internet moves into the Web 2.0 age (Hildreth, 2007), individual consumers can not only communicate, collaborate and share their personal experiences, opinions, and suggestions about a particular firm's products and services, but also, and increasingly, take collective action for and/or (often) against a particular firm (Shirky, 2008). On one hand, firms are facing the "grass-root" reactions about their products and services over time, often within short period of time, good or bad. On the other hand, firms can take advantage of the new channel and effectively gather information from the Web 2.0 communities to improve their products and services. Customer feedbacks from Web 2.0 community have become an important source of

knowledge for the firms. As such, many conventional firms have extended their customer management approach by moving towards a customer-oriented approach (Parasuraman, 1998), identifying customer demand and collecting online data have become one of the important determinants of business success. Through Web 2.0 communities and online customer comments about its product and service, a firm can gather important and timely data, and hence improve and innovate and gain competitive advantage. Many firms prepare customer communities, such as a knowledge base and FAQs, in advance of customer visits (Yang et al., 2009). Instead of having a few people controlling the threads on traditional Internet forums, Web 2.0 communities allow anyone to express their ideas and thoughts. These could be support communities such as those for technical support or training support (Nardi et al., 2004), or groups of customers who already knew each other such as a group within a university or a social club (Chau and Xu, 2006).

One of the main tasks in mining customer demand data in Web 2.0 communities is to discover the information, such as customers' problem and suggestions, then provide this information to a particular department related to the product or service so as to improve customer service and product quality. These Web 2.0 communities can help firms to reduce cost, gain access to new research results, and acquire key technological components of a new product. Practically, it is an important first step for firms to monitor and collect customer demand data online before processing and utilizing the information. Theoretically, this phenomenon poses an important and interesting research questions from organizational management perspective since the Internet and Web 2.0 technologies provide organization with the opportunity to not only gather customer's demand information through online sources such as blogs, user community, and wikis but also to communicate with its customers interactively and instantly, e.g., getting instant and interactive feedbacks through such social networking websites as Facebook, Flickr, and MySpace. We believe that the Web 2.0 technologies have expanded and will continue to expand organizational boundaries in its relationships with its customers as we have witnessed the similar phenomenon when the Internet and e-commerce became a technological source of power since mid 1990s when many organizations applies the technology in managing their relationships with the suppliers and business partners. For the purpose of this paper, we are interested in providing partial solutions to the following research questions: (1) What are the structural properties of the demand of customer on the Web 2.0 community? (2) How can we design a system to monitor and collect information from Web 2.0 community? To answer these questions, we propose a framework for the acquisition of customer demand on the Web 2.0 community. It considers current practice for customer feedback collection over the Internet. Firstly, we propose a definition of customer demand and discuss its effective on firm's operation. Secondly, we review the current practices for customer demand data collection across the Web 2.0 community using real case studies. Thirdly, we propose a process model and a customer demand data collection system for customer interest and activity analysis.

The paper is organized as follow. In Section 2 we review the related works on Web 2.0

communities and customer demand management followed by the discussion of customer demand data acquisition and the role such activities played in facilitating information gathering in Web 2.0 community. Next, we describe a framework to explain how to collect customer demand data on Web 2.0. In section 3, we present an on-line customer demand data collection system architecture. We conclude our paper in Section 4 by making recommendations for future research work.

2. Acquiring demand data from Web 2.0 community

While there are many definitions of what customer community is, for the purpose of this study relating to Web 2.0, we define it as "a web-based publication that allows users to add content periodically, normally in reverse chronological order, in a relatively easy way" (Chau and Xu, 2006). Keeping a close relationship by engaging customer has always been a main marketing objective. For many firms, marketing has evolved from marketing a product or service to marketing a feeling (Bernoff & Li, 2008), and having the customer experience the product or brand in such a way that the customer remains engaged with that experience. This creates a challenge for firms whose promotional strategies must incorporate a new reality where the customer often desires a connection with the firms or the brand on his or her own terms, and frequently co-creates the experience. Communicating with the customer involves using the many tools available to the firm, and targeting them in an integrated manner so the message remains focused, differentiated, and relevant. While traditional media such as TV, radio, print, and bill-boards have become less effective, new tools have emerged to supplement that media, e.g., Web 2.0 (Singh et al., 2008).

The concept of "Web 2.0" began with a conference brainstorming session between O'Reilly and MediaLive International (O'Rrilly, 2006). Web 2.0 communities have become increasingly popular in the past few years. Web 2.0 is a combination of business processes, principles and technology that enables customer participation and collaboration-is an online juggernaut, a phenomenon with far-reaching implications for marketers (Mason et al., 2007). In general, Web 2.0 includes the following four types of applications (Hildreth, 2007): Blog, Podcast, RSS, and Wikis.

- Blog: Short for "Weblog", a blog is a Web journal that lets users post comments or news. Often, they also let readers post feedback.
- Podcast: An audio or video file distributed over the Internet through RSS or another syndication feed.
- RSS: Really Simple Syndication is a technology that lets users subscribe to feeds that deliver wiki or blog updates or even more general information such as traffic alerts.
- Wiki: A collective Web page that allows users to post or link content without having to use HTML.

In the early days, Web 2.0 communities were used mainly for web pages where useful resources or knowledge were periodically logged and posted by others (Chau et al., 2006). At that time the communities were mostly maintained by hand (Blood, 2004). With recent advancement of Web technology (Zeng et al., 2008), the nature of Web 2.0 communities have changed and many communities contain various types of content (especially personal ideas) posted by users. Users often make a record of their activities and express their opinions, feelings, and emotions through writing blogs or making comments on wiki (Nardi et al., 2004). Many users consider writing on the communities as an outlet for their thoughts and emotions. There are also communities created by companies now. For example, skype.com, an online telephone service provider, has launched a huge community contains Knowledgebase, Troubleshooter, User Guides and other forms. Problems, skills, or comments from customers can be showed on the community. One of the most important features in Web 2.0 communities is the ability for any user to write a comment on a community entry. On most company community hosting sites, it is very easy to write a comment, in a way quite similar to replying to a previous message in traditional discussion forums. The ability to comment on communities has facilitated the interaction between companies and their customers. On some controversial issues, like those related to products design problems, it is easy to find a topic with thousands of comments where a group of customers exchange ideas back and forth on the matter. The main features of the Web 2.0 community for the firm include: products and services, technology, news & events, customer service and assistance, and Frequently Asked Questions (FAQs). (Table 1)

Table 1 : Features of the Web 2.0 community

Contents	Description
Products/Service	List main products and services
Technology	Provide information and discussion
News & Events	Provide and update news releases for the products and services; updated news; new announcements; hot topics; what's cool/hot; etc.
Customer service	Answer customer's questions; providing necessary help; etc.
Customer ideas	Provide feedbacks about the company, its products and services, or other related matter.

As many firms trying to use IT to bridge the firms with their customers, Web 2.0 community acts as a catalyst that enables a more flexible arrangement in the customer demand data collection, the existence of Web 2.0 community can be a strong enabler in influencing the degree of demand information gathering from customers by engaging in networking activities through satisfaction building and feeling exchanges.

Customer demand can be broadly classified into explicit demand and tacit demand (Lei, 2004). Sometimes customer can show what they need clearly, that is explicit demand. Explicit demand can be easily identified and shared through electronic or other media, such as suggestion on the product of service, comment on the product or service, even the feelings of the customer. Tacit demand on the other hand is demand that resides in humans, such as beliefs, hunches, insights, intuition and values. Firms need to use advertisement or other ways to translate tacit demand into explicit demand. The transformation of explicit into tacit, or tacit into explicit, happens through the processes of socialization, externalization, combination, and internalization.

While the effectiveness of the customer demand management process largely depends on how well a company manages its resources, identify and understand what the customers need is a valuable asset. Furthermore, new demand from customers is particularly important to firms, demand acquisition from customers can enhance the firm's performance. For example, Hewlett Packard's capture-evaluate-analyze-improve (CEAI) solution, as HP is a company which always seeks to improve the quality of both its products and the service, the "voice" from the customer through the web community, blogosphere, even emails. HP uses CEAI solution to gather and analyze customer feedback across the Internet (Guo, 2006). HP captures through feedbacks from customers including the details on Internet bulletin boards, forums and blogs, then evaluates the behavior of employees who are in charge of getting the customer feedbacks, after that, HP does an in-depth analysis based on the records at the first step, tries to find out the reasons that lie behind customer satisfaction ratings and improves existing products, or develops new ones to meet customer needs.

The task to acquire demand information is not trivial since there are vast amount of customer demand data on the Web 2.0 community. Firms have to meet the challenges such as unavoidable errors and delays in the acquisition processes. Three possible reasons account for the challenges in customer demand data collection:
- Misunderstanding: misunderstanding in customer demand is not acceptable in customer side (Lemon et al., 2002). Misunderstanding can cause product errors and service delays. Hence, avoiding misunderstandings is necessary whenever possible.
- Customer feedback diversification: customer inquiries and problems can vary widely (Stein et al., 1995). On-line customer demand acquisition processes must resolve numerous questions.
- Internal barriers: a single person or department in an firm typically cannot handle all customers' feedback alone. Hence cross-departmental collaboration and communication are essential to customer service (Lancioni et al.,1995 ; Sawy et al.,1997). An on-line customer demand acquisition system should assist firms in overcoming internal barriers.

To handle the various opinions of on-line customers, a framework is required to guide firms identifying the fundamental patterns to control the customer data collection process. Shown in

Figure 1, we propose a process that consists of three stages: data identifying, data analysis, and data integration.
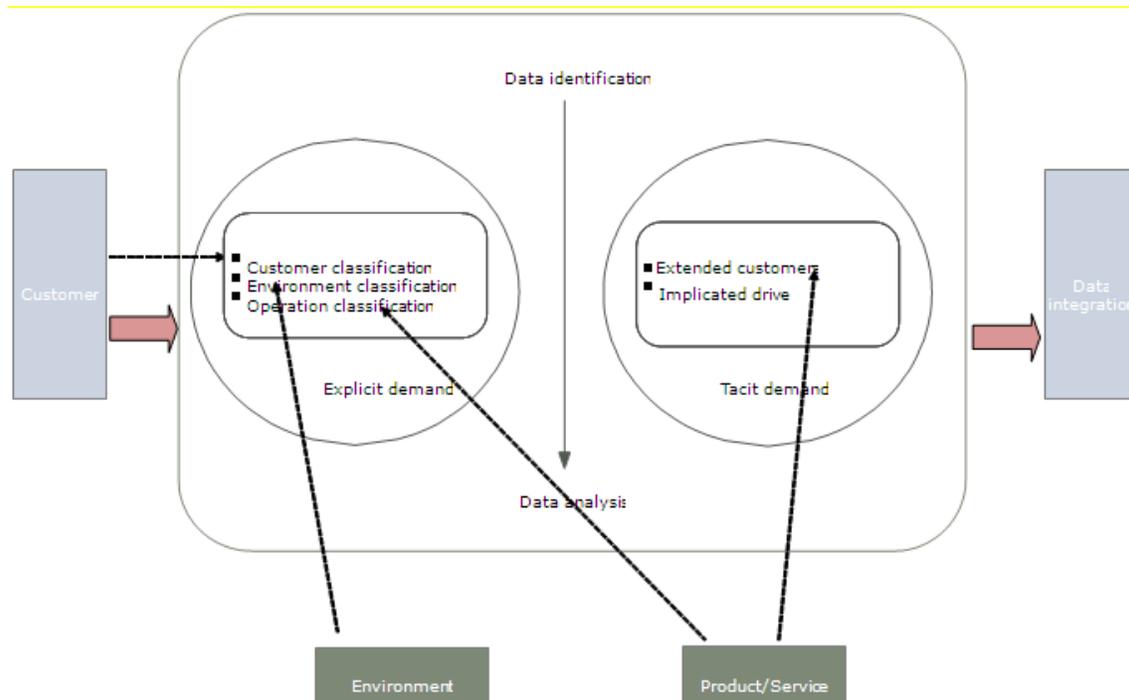

Figure 1 On-line customer data collection process

These components are explained in detail below:

- Data identification: a customer shows some ideas and suggestions about the product or service on the web community and the firm identifies the demand.
- Data analysis: firm analyzes the feedbacks on Web 2.0 community after data identification, and the feedbacks are classified into explicit and tacit categories.
- Data integration: the result of data analysis such as feedback and customer data are converted into information and knowledge.
- Customer classification: firm analyzes the feedback timely based on customer classifications, understanding the root causes of satisfaction or dissatisfaction.
- Environment and Environment classification: Environment here means time, location, weather and other conditions when customers use the products. Environment classification can also help understand the root cause of satisfaction or dissatisfaction.
- Operation classification: the process of a customer enjoys the product or service can be divided into several actions or operations, firm can focus on the patriarchal behavior, actions, operations so as to under customer demand better.
- Extended customers: firm considers not only who use the product directly, but also those who are related to the product or service.

■ Implicated drive: firm can indentify and analyze the demand that resides in humans, such as beliefs, hunches, insights, intuition and values.

■ The component of the product expresses the exact design and the way the service is experienced by its customers. It explains what the specific benefits are and how the customer might be contributing.

3. Data acquisition on Web 2.0: process and architecture

We present a solution for managing on-line customer demand acquisition processes which consists of the process and the system design architecture. The process deals with the collection patterns for customer feedbacks online based on different data types. The system architecture deals with system components and their internal relationships in fulfilling the task of customer demand data acquisition on the Web 2.0 community.

3.1 Data collection process

To handle various requirements of on-line customer services, firms have to deal with various forms of data including blog text, wiki text, or some other forms. Generally speaking, these data can be divided into two types, structured data and unstructured data. Data from customer satisfaction survey, customer table are structured data, customer comments on blog and wiki are unstructured data.

■ Structured data: structured data can be collected and stored in database easily. The collection pattern is simple. First customers fill in the forms online then the data can be received. It is also easy to identify the data, because the forms are unitized by firm, customer just provide the data following the firm's requirement, such as customer name, customer phone number, customer comments, etc.

■ Unstructured data: Unstructured data can be seen as all the useful information from Web 20 community, including text, images, audio, video, etc. So the data collection work for unstructured data is complicated. The task typically includes resource discovery from the web community, document categorization and clustering (Chen et al., 2003), information extraction from web pages. These data have to be searched out by firms first it is necessary to extract useful information from the search result, before storing them in a database. The information will be categorized and sent into the knowledge of the enterprise. Figure 2 shows the process of unstructured data collection.
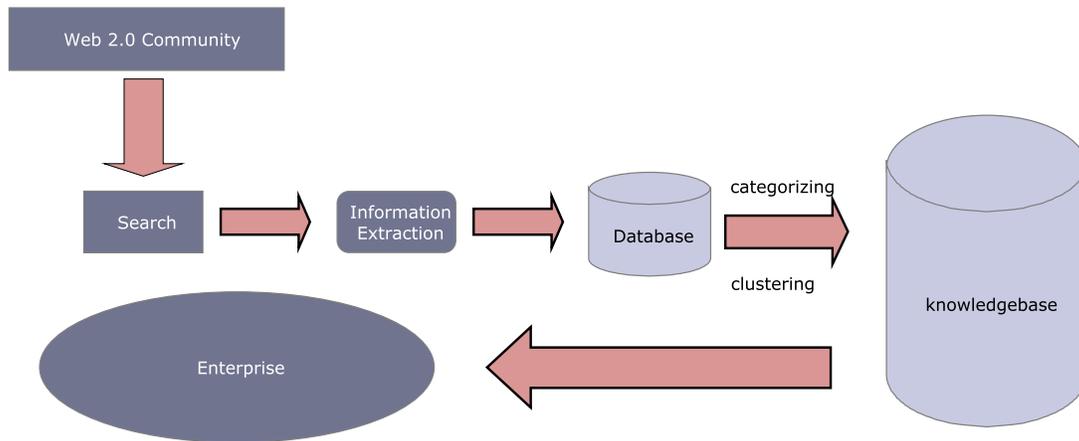
Figure 2 Unstructured data process

3.2 Proposed system architecture

To support the collaborative on-line customer data collection process, we propose a customer data collection system architecture (Figure 3). The system is proposed to handle data discovery, analysis and integration.

Data identification and discovery

Data identification and discovery is first needed to get the information from the Web 2.0 community. Similar to general Web searching, this step should connect to the community hosting sites. After the content being searched, the information is extracted into the database. However, instead of extracting all data, this step only extracts useful information, e.g., customers' suggestion, customers' complaints or just some simple sentences to show whether they like the product or not. The firm can indentify the valuable customer feedbacks online based on customer segmentations. These feedbacks can be seen as basic data of customer demand and these can be analyzed.

Data analysis

Data integration is a major component in the system. In this step, we propose two types of analysis: content analysis and social group analysis. The goal of content analysis is to understand the meaning of customer's demand data. This include the related information such as product information, marketing information and customer profile from CRM system or calling center, which can be used for customer classification, environment classification and operation classification. Social group analysis is to identify the relationship among customers in Web 2.0 community. In these communities, customers subscribe to or post comments to each other's topic frequently.
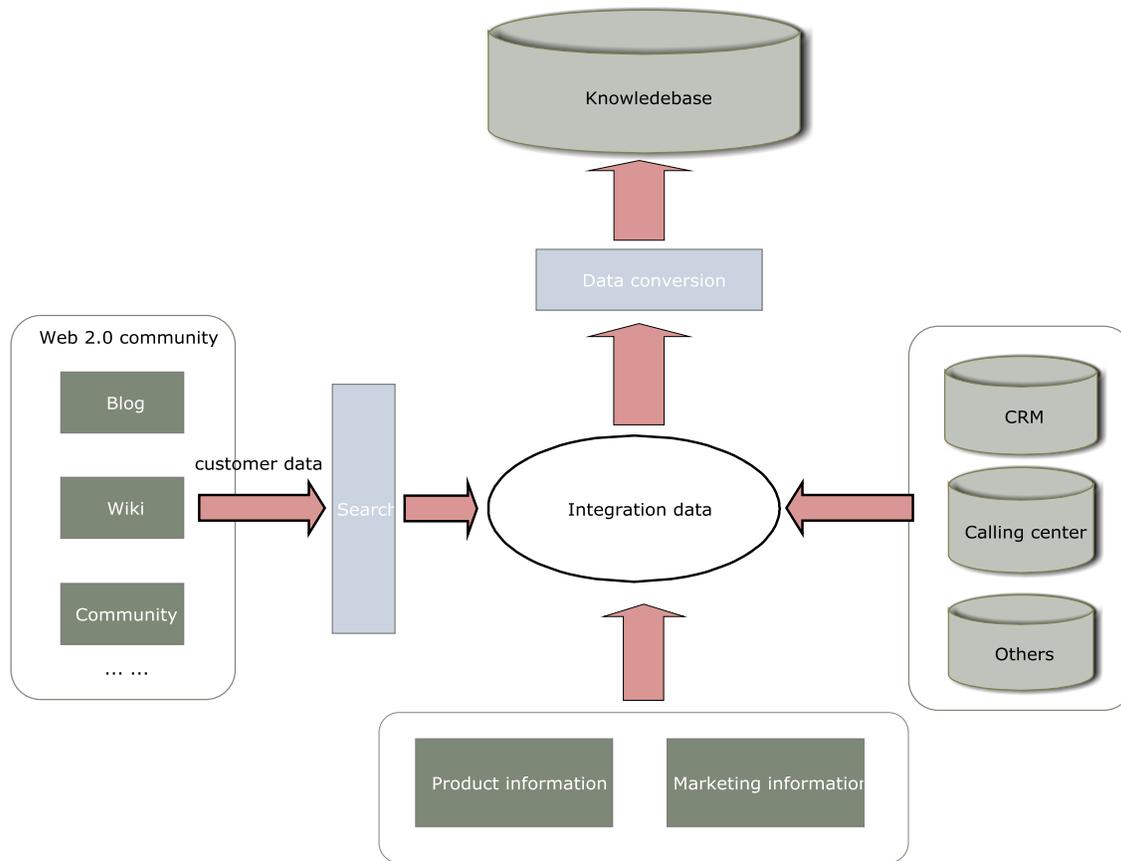
Figure 3 System architecture for customer data collection

Data integration

After data has been indentified and analyzed, it is necessary to integrate the information. Firm can put the integrated data into a knowledgebase. Employees can use the knowledge to acquire, retain, maintain, search, and retrieve the knowledge of the product or service. Firm can also use the knowledgebase to provide related knowledge of their product on the Web 2.0 community for client to read.

4. Conclusion

Web 2.0 communities and data resided in those communities imposes new challenges and opportunities to businesses. Firms can deploy a business process to collect, analyze, and integrate data from Web 2.0 communities and design a system to acquire and process data from Web 2.0 communities for the purposes of improving customer satisfaction and product innovation. Our proposed processes and system architecture can be used as a starting point for discussion.

We believe that much can be learnd from what's already been there in the real world where a growing number of consulting firms have already started offering Web 2.0 data services and a

growing number of firms, e.g., Fortune 500 firms, have expanded their corporate websites by adding Web 2.0 features or have actively been involved in business intelligence activities by engaging themselves through social networking websites.

References

Bernoff, J. and Li, C. (2008) Harnessing the Power of the On-So-Social Web. MIT Sloan Management Review, 49(3), pp. 35-42.

Blood, R. (2004). How blogging software reshapes the online community. Communications of the ACM, 47 (12), pp. 53-55.

Chau, M. and Xu, J. (2006). Mining communities and their relationships in blogs: A study of online hate groups. International Journal of Human-Computer Studies, 65 (1), pp. 57-70.

Chen, H., Fan, H., Chau, M. and Zeng, D. (2003). Testing a cancer meta spider. International Journal of Human-Computer Studies, 59 (5), pp. 755-776.

Hildreth, S. (2007). Web 2.0 goes corporate. Strategies & Tactics, 28(7), pp. 27-31.

Hoegg, R., Martignoni, R., Meckel, M. and Stanoevska-Slabeva, K. (2006). Overview of business models for Web 2.0 communities. Proceedings of GeNeMe, pp. 23-37.

Lancioni, R. (1995). The reporting relationship of customer service: where does it belong in an industrial company? Industrial Marketing Management, 24 (1), pp. 19-26.

Lei, Q. (2004). The Research of Consumer's Demands Discernment and Cultivation. Unpublished doctoral dissertation, Guangxi University, Nanning, China.

Lemon, K.N., White, T.B., and Winer, R.S. (2002). Dynamic customer relationship management: incorporating future considerations into the service retention decision. Journal of Marketing, 66 (1), pp. 1-14.

Leung, T.K.P., Wong, Y.H., and Wong, S. (1996). A study of Hong Kong businessmen's perceptions of the role "Guanxi" in the People's Republic of China. Journal of Business Ethics, 15(7), pp. 749-58.

Mason, R., Rennie, F. (2007). Using Web 2.0 for learning in the community. Internet and Higher Education, 10 (3), pp. 196 - 203.

Nardi, B.A., Schiano, D.J., Gumbrecht, M. and Swartz, L. (2004). Why weblog. Communications of the ACM, 47 (12), pp. 41-46.

Nevo, D., Wand, Y. (2005). Organizational memory information systems: a transitive memory approach. Decision Support Systems, 39 (4), pp. 549-562.

O'Rrilly, T. (2006). What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software. Communications & Strategies, 65(1), pp. 17-37.

Parasuraman, A. (1998). Customer service in Business-to-Business markets: an agenda for research. Journal of Business and Industrial Marketing, 13(4/5), pp. 309-321.

Ramasamya, B., Gohb, K.W. and Yeungc, M.C.H. (2006). Is Guanxi (relationship) a bridge to knowledge transfer? Journal of Business Research, 59(1), pp. 130-139.

Sawy, O.A.EI and Bowles, G. (1997). Redesigning the customer support process for the

electronic economy: insights from Storage Dimensions. MIS Quarterly, 21 (4), pp. 467-483.

Shirky, C. (2008). Here comes everybody: the power of organizing without organization. New York, NY: The Penguin Press.

Singh, T., Veron-Jackson, L. and Cullinane, C. (2008). Blogging: A new play in your marketing game plan. Business Horizons, 51(4), pp. 281-292.

Stein, E., Zwass, V. (1995). Actualizing organizational memory with information systems. Information Systems Research, 6 (2), pp. 85-117.

Tsang, E.W.K. (2002). Learning from overseas venturing experience; the case of Chinese family businesses. Journal of Business Venturing, 17(1), pp. 21 - 40.

Yang, H.L., Liu, C.L. (2009). A new standard of on-line customer service process: integrating language-action into blogs. Computer Standards & Interfaces, 31(3), pp. 227-245.

Zeng, J.P., Zhang, S.Y., Wu C.R. (2008). A framework for WWW user activity analysis based on user interest. Knowledge-Based Systems, 21 (3), pp. 905-910.