

**Empirical Investigation of Web 2.0 Technologies for Social Commerce and  
Implementation of Social App Prototypes**

By

**Seo Yeon Yoon**

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uOttawa

School of Management  
University of Ottawa  
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## **Abstract**

Social commerce is a growing field due to the popularity of social media. Research on social commerce stresses the benefits of utilizing social media or Web 2.0 technologies for business because user contribution, participation and collaboration, which are characteristics of Web 2.0, fuel business vitalization.

Nevertheless, there is a lack of academic research on social commerce, and in what little research there is, the coverage is circumscribed. One of the challenges is conceptualization of social commerce due to various definitions made from researchers' different perspectives and different positions on social commerce. This also led to the limitation of scope of research. In addition, there is still a need for identifying technological features and business goals for social commerce.

Therefore, this research primarily encompasses establishing the concept of social commerce and identifying its implementation methods. To amount to those two primary goals, the research objectives are to understand the factors that affect social commerce implementation; to identify and investigate applicable Web 2.0 technologies that enable social commerce activities; and to investigate the business goals that can be achieved by social commerce implementation. Ultimately, the research aims to address methods of implementation.

Consequently, the achievement of this research is that first, the concept of social commerce has been established by refining several definitions from the literature. Second, social commerce activities and business goals were identified and categorized based on the marketing funnel concept and the new customer life cycle model. Third, applicable Web 2.0 technologies were identified from the literature and other functionalities were also seized from real cases. Finally, the concept of social commerce has been demonstrated by implementing selected various commerce applications.

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# Chapter 1: Introduction

## 1.1. Preamble

The rapid spread of social media and its popularity have made it a buzzword in present time. Millions of users are using social media services such as Facebook, Twitter and MySpace. Many organizations view this as a chance for new business applications (Liang & Truban, 2011; Bughin, Chui & Miller, 2009; Constantinides, Lorenzo & Gómez-Borja, 2008; Lee, DeWester & Park, 2008). This has led to the era of social commerce, which utilizes Web 2.0 technologies, or social media. Social commerce has rapidly and widely proliferated in recent years, and this phenomenon has been observed not only because social media is popular, but because user participation or collaboration, one of the core elements of Web 2.0, has a significant impact on business, particularly in sales and marketing (Amblee & Bui, 2011; Anderson, Brusa, Price & Sims, 2011).

Now, companies are moving beyond their corporate websites and taking part in social media to tap into available resources, because social media is being utilized to take the roles of R&D as well as marketing and promotion. More precisely, it is the users on social media services who are now taking on these roles. For instance, social media pages run by organizations could be among the places where the data for supply and demand is collected by allowing users to express what they like and how they like certain items. In addition to data collection, fan pages provided by social networking sites can be utilized as a means of user participation or collaboration, which reduces costs of promotion and advertising.

According to the literature, before making a decision to buy certain products, consumers search for product reviews, recommendations, and ratings provided by other shoppers rather than information provided by retailers or manufacturers. Because customers have access to too much information and too many choices due to the Internet (Dennison, Bourdage-Braun & Chetuparambil, 2009; Constantinides & Fountain, 2008), they spend much of the time on selecting the right items.

On the one hand, from this sea of information, customers should be able to verify or filter information to select the right items at a reasonable price, and on the other hand, user participation takes on the role of indirect promotion, at least from a corporate standpoint. By encouraging customers to recommend, share and like products, product information can be delivered to the users' friends and

colleagues who might be influenced to purchase the products. In fact, implementing Web 2.0 functionalities such as recommendations, sharing and liking through social media does not cost a lot or require complicated development or implementation processes compared to the investment in new management system devices and software. Instead, implementing the right methods in the right places with the right purposes is the critical part. For example, due to the popularity of social media, many users share their photos, videos and stories with their friends and even with the public through their own social media pages, but sharing these personal photos, videos and stories has nothing to do with organizations. In contrast, sharing photos and videos created for participation in corporate event could be a means of product promotion.

Social commerce is another way for major companies that have already utilized all necessary electronic means such as online shops, corporate home pages and special event online promotions to strengthen their strategies and to achieve their goals. Procter and Gamble, for example, adopt Facebook Pages as an implementation of social commerce for several of their brands, even though their products are being sold through countless on and offline retailers worldwide. They also have their corporate websites and brand websites, even websites for individual product lines. Still, some of their product Facebook pages also have the ability to sell products.

The goal of social commerce implementation for Procter and Gamble is not to increase sales volume, since sales volume on social media pages would not exceed that of offline and online stores. Instead, major enterprises such as Procter and Gamble use social media as a place for branding and marketing, according to Marsden (2011a). The examples Marsden provides are, first, Warner Bros., which uses a Facebook Page to sell special edition DVD sets that cannot be purchased in any other place, and Heinz which offers new products to its fans before releasing them to the public, although their regular products are still sold worldwide. The expectation of these kinds of special offers is that by giving the users who are called fans, these special privileges, the fans turn into advocates for the products and the brands (Marsden, 2011a; Leitner & Grechenig, 2008). On the other hand, for individuals and small organizations, social commerce can be used as a distribution channel which opens niche market opportunities with lower costs (Tedeschi, 2006). Social shopping sites could be examples of this.

The concept behind social shopping is to suggest items that are not easily exposed in large e-commerce sites or search engines due to the fact that the items offered through those e-commerce sites and search engines are highly likely well-known (McCarthy, 2007; Tedeschi, 2006). The content of social shopping sites is comprised of users' recommendations, and with these recommendations,

users of online shops can identify specific items they are looking for and something that they might be interested in but would not discover without the recommendations. Then, the recommended items are linked to retailer's sites, where the social shoppers can purchase the items (McCarthy, 2007). This could benefit small retailers by giving them a chance to expose and sell their products.

Likewise, social media or Web 2.0 technologies can be applied to small or large organizations and individuals to support their businesses by allowing users or customers to participate in social activities and to contribute content that can be both resources and stimuli for the business.

## **1.2. Motivation**

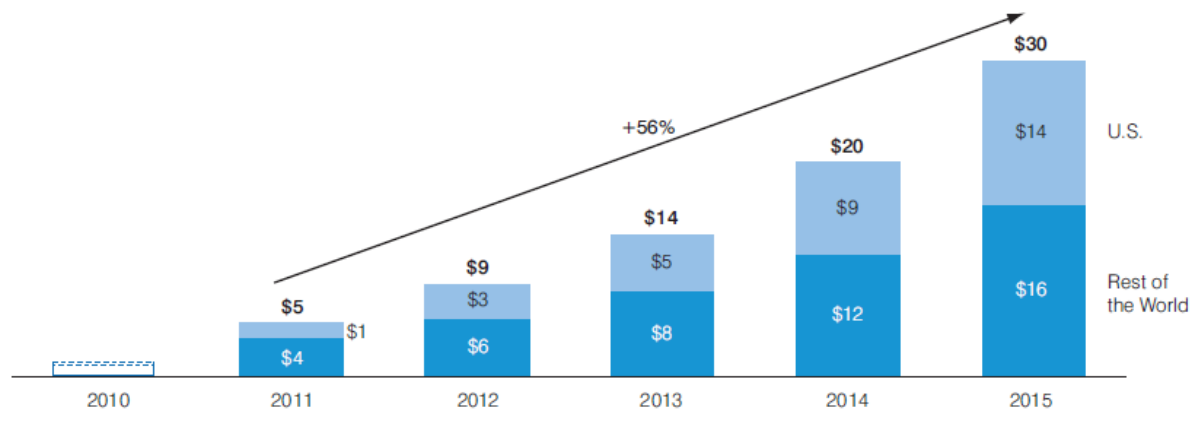
Social commerce can be thought of as social media plus e-commerce. There are examples of social media uses in business. Cook (2008) describes some of these uses: Hyatt's online service provides a place where users can discuss travel-related information, which can be rated by others. The users can gain information from that resource, and Hyatt can reduce the cost of hiring staff for the role. Unilever once sponsored a forum called Motherhood. The members of the forum shared their experiences and participated in activities. Unilever was able to enlarge its brand recognition through sponsorship. On the Threadless website, amateur designers can design and upload images of t-shirts they designed and users can vote on these t-shirts. The designers can gain recognition for their work and users can gain some sort of satisfaction when their items are displayed. From the company's point of view, it does not need to hire many R&D people so it can lower its human resources costs. In addition, this has the benefit of high inventory turnover because the t-shirts that are selected usually sell out (Cook, 2008).

In view of the examples above, the benefits of using social media are, first, saving costs of human resources and marketing, but most of the benefits result from users' participative behavior. In the Hyatt and Threadless cases, for example, because the users are taking roles as information staff at Hyatt and designers at Threadless, those two companies do not need to hire staff or designers to take the roles. The main point of these examples is that user contribution and participation are fueling the vitalization of businesses, and user contributions and participation materialize into e-commerce through the use of Web 2.0 technologies.

Likewise, Web 2.0 technologies enable several key factors such as user participation (e.g., user-generated content) (Parise & Guinan, 2008; Lee et al., 2008; Constantinides et al., 2008), wisdom of crowds (or crowd sourcing) (Leitner & Grechening, 2008; Kozinets, Hemetsberger & Schau, 2008; Glassey, 2012), online word of mouth (Amblee & Bui, 2011; Dellarocas, 2003; Trusov, Bucklin & Pauwels, 2009) and building relationships and trust (Liang, Ho, Li & Turban, 2011; Choi, Lee & Kim, 2011; Gefen & Straub, 2004).

These factors are crucial for organizations because recommendations and reviews of their products and services, particularly by trusted people, affect customers' buying decisions (Kim & Srivastava, 2007). Moreover, with the data collected from customers, organizations can analyze product preferences, discover any problems or potential problems on products, and gain ideas of a new product development (Hoffman, 2009; Kozinets et al., 2008; Bughin et al., 2009).

With these benefits, among major online shops such as Amazon and eBay it is hard to find online shops where there is no communication technology used. For example, Amazon and eBay provide functions that enable reviews, recommendations and ratings.



Note: Numbers might not add up because of rounding.  
 Source: Forrester Research; GP Bullhound; Euromonitor; Booz & Company analysis

**Figure 1-1. Estimation of social commerce market size (Anderson et al., 2011)**

As a matter of fact, in light of Wang & Zhang's research (2012), there are various forms of social commerce: e-tailers or online shops containing Web 2.0 functionalities such as recommendations, reviews and ratings (e.g., Amazon, eBay), blogs connected to online shops (e.g., the Treonauts blog),

social networks that contain a third party e-commerce application (e.g., P&G Pampers Facebook Page), a social shopping community that links to multiple online shopping sites (e.g., ThisNext, Polyvore), and group-buying websites linking to social networking sites (e.g., LivingSocial), etc.

Likewise, the forms of social commerce are various and analysts estimated that the social commerce market size is increasing (Figure 1-1). More than two billion dollars were invested in social commerce ventures in the U.S. in 2011 (Anderson et al., 2011), and organizations such as Procter & Gamble, Coca-Cola and Unilever adopted social commerce for branding by offering special products (Marsden, 2011a). These examples imply that many organizations and individuals are pursuing social commerce.

Despite the strong attention dedicated to it, there is a lack of research on social commerce and in what little research there is, the coverage of research on social commerce is circumscribed (Wang & Zhang, 2012; Constantinides & Fountain, 2008). According to the research of Wang and Zhang, one of the distinct challenges of research on social commerce is conceptualization, due to various points of view and positions toward social commerce, and conceptual ambiguities – definitions, scopes and other related concepts. For example, some academic research papers do not include the definitions of social commerce (Zhu, Benbasat & Jiang, 2006; Ganesan, Sundaresan & Deo, 2008). Some of them treat social shopping as social commerce (Leitner and Grechenig, 2007; Wang, 2009; Tedeschi, 2006), while others claim that social shopping is a subset of social commerce (Marsden, 2010), or social shopping and social commerce are different (Stephen & Toubia, 2010).

In additions to the conceptual ambiguities, unit analysis toward research on social commerce differs from one researcher to the next (e.g., units of social commerce from the technological aspect are regarded as websites, platform, channel or tools and functions; from the management aspect, strategies and services, and from peoples' aspects, behaviours, networks and communities, and the levels of analysis vary from organization level to system level).

Furthermore, from a technological aspect, most of test subjects used for academic research of social commerce are lopsided social shopping or online shopping websites (Olbrich & Holsing, 2011; Choi et al., 2011; Amblee & Bui, 2011).

In order to resolve these cumbersome aspects, perhaps, identifying various definitions, and understanding the differences and similarities between them should be initiated by considering different aspects: technological, managerial and peoples'. Moreover, to overcome lopsided

technological options, identifying and testing available technologies for social commerce should be also undertaken.

To sum up, this research focuses on establishing the concept of social commerce by refining various definitions of social commerce to resolve the ambiguities, and proposing implementation methods by identifying and investigating the Web 2.0 technologies that can be implemented as a means to enable activities to pursue social commerce.

### **1.3. Research objectives**

**First**, we aim to understand the factors that affect social commerce implementation by identifying the issues and needs of current e-commerce. **Second**, we intend to identify and investigate available Web 2.0 technologies and services being used for social commerce implementation. **Third**, we aim to propose methods of social commerce implementation which are geared towards achieving specific business goals. These research objectives will be attained by answering the research questions described below.

The following research questions help attain the **first research objective**.

- What are the distinctions between social commerce and e-commerce?
- What are the factors that constitute social commerce?

Liang and Turban (2011) state that “social commerce is a subset of e-commerce”. Because their research was motivated by the phenomenon in which Web 2.0 and social media influence e-commerce, resulting in social commerce, understanding what social commerce is and the factors that influence its implementation should be captured in order to identify the issues and trends in current e-commerce.

The **second research objective** will be attained by answering the following research question.

- What is the impact of implementing Web 2.0 technologies on e-commerce?

As stated in the previous section, Web 2.0 technologies support businesses in various ways both online and offline. McKinsey Global Survey (Bughin et al., 2009) lists Web 2.0 services such as RSS, micro-blogs, wikis, and podcasts. The benefits of Web 2.0 they list are, first, the multiplication of messages that organizations need to deliver to their customers and second, collaboration with customers and customers' various activities preformed for business. Some Web 2.0 services are not necessarily used for collaboration because each has different functionality and effects. Therefore, what and how to utilize them are the central issues. Subsequently, how the utilization of Web 2.0 impacts a business should be answered. For example the "Diet Coke and Mentos" experiment video clearly manifests these kinds of issues (Deighton & Kornfeld, 2011; Constantinides & Fountain, 2008).

The **third research objective** will be attained by answering the following research questions.

- What kinds of business goals, especially e-commerce, can be achieved using Web 2.0 technologies?
- What kinds of functionalities are required to perform activities that lead to achieve the business goals?

After identifying the available Web 2.0 technologies and their impact, the next step is to know which ones would be the proper means of achieving certain business goals. As in the aforementioned example, if a company is planning to promote a new product, then video sharing could be one of the means to achieve its business goal (i.e., promotion). If a company needs more fans or users of its products, offering a free online coupon that requires users to become members to obtain the offer could be one of the ways to meet this need. In order to put these ideas into practice, it is critical to know what kinds of functionalities are required to fulfil these goals.

Overall, a solid understanding of the concept of social commerce along with applicable web 2.0 technologies, social commerce activities and the achievable business goals will guide the foundation for social commerce implementation.

#### **1.4. Research contributions**

The contributions are as follows:

***Establishment of the concept:*** There are diverse definitions of social commerce suggested by various researchers and analysts who addressed the concept from various standpoints. This diversity has created the conceptual ambiguities mentioned in Section 1.2. Mitigating the ambiguities is a first step.

***Social commerce activities and Achievable business goals:*** Users of social media take part in social commerce activities, and these activities are accelerant of successful social commerce implementation. Consequently, this research must take into account the fact that understanding social commerce activities is an integral part of social commerce implementation. Thus, social commerce activities should be identified from the literature. Moreover, in a narrow sense, the business goals for social commerce are goals that can be achieved by facilitating social commerce activities using Web 2.0 technologies. Although they might not cover the goals of the whole enterprise (e.g., enterprise-wide network integration), departmental strategic goals such as building customer loyalty, promotion of new products or market research can be accomplished by pursuing social commerce. Accordingly, this research can provide different types of achievable business goals.

***Applicable Web 2.0 technologies:*** Web 2.0 technologies that are currently available, as well as other technological functions that support social commerce, can be identified from research with respect to e-commerce or social commerce. They can also be identified from real examples, such as organizations or individuals who utilize Web 2.0 technologies for commercial purposes, which could be regarded as a social commerce implementation. Thus, identified Web 2.0 technologies and any other available functions for social commerce can be introduced.

***Demonstration of the concept:*** The entire direction of this research, from reviews of definitions of social commerce to the provision of achievable business goals, leads to the final stage: a provision of the methods for social commerce implementation.

Therefore, this thesis will try to achieve the following goal: “what Web 2.0 technologies to implement and how to implement them to facilitate social commerce activities, all with the goal of achieving specific business goals”.

## **1.5. Organization of the thesis**

This thesis is organized as follows. Chapter 2 presents a review of the literature with respect to current e-commerce and social commerce in order to provide an understanding of the various aspects and issues of social commerce along with relevant technologies. Chapter 3 introduces the methodological approach followed in this research. Chapter 4 summarizes the social commerce activities and business goals synthesized from the literature, as well as Web 2.0 technologies from the literature and real cases. Chapter 5 demonstrates the concept of social commerce by developing prototypes of social apps that perform social commerce. These prototypes test the feasibility of creating social applications using selective Web 2.0 technologies, and the capability of such applications to perform social commerce activities. Chapter 6 summarizes and analyses the findings from the prototyping process. Lastly, Chapter 7 concludes by validating the research questions announced earlier in the thesis, and by discussing the limitations of this research and future work.

## Chapter 2: Background

### 2.1. Trends of e-Commerce

The Internet has spurred the reshaping of businesses and their strategies (Jachyra, 2009) as online transactions are available without having physical stores, and stakeholders are being managed through the Internet (Gerald & Efrim, 2009; Willis, 2004). In a narrow sense, e-commerce is an electronic way of buying and selling (Willis, 2004; Malucelli, Palzer & Oliveira, 2005). On the other hand, in a broad sense, e-commerce is not just selling and buying but includes managing the processes of stakeholders (Fingar, 2000; Zhu & Kraemer, 2002). Regardless of the scope, the most frequently cited benefits of e-commerce are cost reduction resulting from relatively less resource consumption (e.g., spatial, temporal, material and labour force) and data collection (Gerald & Efrim, 2009; Willis, 2004; Malucelli et al., 2005).

In the retail industry, for example, products are being sold in online shops, so there is no need to have a physical shop, equipment that is necessary for a store, or a lot of human resources for sales, operation and management roles. E-commerce firms also exploit data collected from their transaction records so they are able to know which products are the top sellers and who are the most loyal customers.

In the late 1990s, known as the dot-com era, many companies invested a lot of money on utilizing the Internet and e-commerce to follow the trends and their competitors, as they believed in the advantages of the Internet without thorough plans (Epstein, 2005). One of the pervasive e-commerce strategies was to increase sales by minimizing the profit margin for price competition in order to compete with brick and mortar firms to attract more customers (Filson, 2004). What this meant was that identical products could be cheaper in online shops than those sold off-line. Although this resulted in increased sales with almost no profit at the time, online retailers such as Amazon relied on this strategy, expecting long-term profitability (Filson, 2004).

However, online retailers are popping up every single minute, and their competitors are no longer limited to brick and mortar firms, but they include other online firms. Hence customers now have alternatives, as they can freely and readily move to another online shop if the offer does not satisfy them (Cao, Zhang & Seydel, 2005).

Nevertheless, e-commerce continues to evolve with innovative ideas, and e-commerce firms, particularly online shops, are aiming beyond direct sales of products and services. To survive severe competition, they aim to take competitive advantages that others do not have by utilizing collected data and managing the value chain and inventory. They strive to know what data to collect in order to measure the performance and the effectiveness against their investment (Zhu & Kraemer, 2002). Likewise, gathering and analysing data or information is internally and externally an integral part of the business.

A common example of data use in e-commerce is that Amazon can show a list of related items to a user who clicked on a certain item because it has collected transaction data over a long period of time. This allows it to analyze previous purchase history and other shopping behaviour of the purchaser by displaying related items, so shoppers have the opportunity to purchase other items as well if they are interested.

Long ago, when there were no online shops or Internet, people travelled a long distance to go to markets to buy goods that were unavailable in local stores. This was not simply because markets were places for selling and buying, but the markets were where they could interact, communicate with each other and gain information to make better purchase decisions and, further, better their lives (Locke, 2001). So to speak, markets are formed where there are a lot of people gathering. Perhaps, it could be a consequence of e-commerce evolution as social commerce has arisen. As the amount of social media users indicates, social media is the space where people gather. In the early stages of e-commerce, shoppers purchased goods and services through a couple of well-known online shops. Now, they want to communicate with companies and other customers and gain information through this communication (Kim, Ferrin & Rao, 2008; Sinha & Swearingen, 2001).

This present-day pattern seems as though it was inherited from the past (Locke, 2001). Online retailers started providing means of communication for customers to express their opinions with each other beyond selling, so the customers could express whether they liked the products they purchased and how much they liked them. In addition, customers could also discuss the products with each other. Before purchasing, they gain information from a discussion board to help them make purchase decisions. Customers' purchasing decisions are strongly influenced by their acquaintances, friends and family members. Thus, e-commerce firms are attempting to equip themselves with any available technology to support fast customer purchasing decisions (Kim & Srivastava, 2007; Sinha & Swearingen, 2001).

After purchasing, customers can provide answers for anyone who has questions about the product. One of the reasons for voluntarily providing product information instead of the firms is that people get tired of insufficient support from the firms (Dennison et al., 2009; Cook, 2008; Füller, 2010). Previously, product descriptions and explanations were provided by manufacturers and retailers through their websites, but often people were frustrated when they were unable to find the right answers through FAQ or Q&A, and sometimes the answers were not satisfactory. Now, people can hear frank versions of opinions about the products from actual purchasers without waiting or listening to automatic answers during a phone call. Many business organizations have utilized the Internet and other technologies to build their corporate websites to establish or enhance their corporate image, so that their websites can be used to deliver both corporate information and product information as part of a communication channel. It was unidirectional communication where the organizations deliver their messages only without receiving messages from customers.

According to a McKinsey Global Survey Results (Bughin et al., 2009), one of the biggest benefits of Web 2.0 technologies for organizations is that it invigorates interactions between organizations and customers. First, ideas for product development and new products can be obtained from user generated content by encouraging users to participate in organizational projects or events. As a result of the connection created from those interactions, it increases product and brand awareness and customer satisfaction because the ideas actually come from the customers; hence, it reduces costs of communication, travel and operations including advertisement (Bughin et al., 2009).

## **2.2. User participation and contribution**

There is much research dealing with user contribution and participation that supports businesses utilizing Web 2.0 technologies (Cook, 2008; Füller, 2010; Lee et al., 2008; Roser, DeFillippi & Samson, 2013). Cook (2008) gives examples from major companies by explaining how the companies pursue user contribution, what the companies and consumers gain from that, as well as why consumers contribute. Table 2-1 shows the taxonomy of user contribution proposed by Cook (2008). In the table, the researcher explains the purpose and the types of contribution, which is worth noting in order to understand the different types of contributions. First, there are *Passive* and *Active contributions*, which can also be intentional and unintentional contributions. *Passive contribution* is that users did not intend to provide something for companies, but their activities actually do contribute to the companies. An example of this kind of contribution is Amazon product

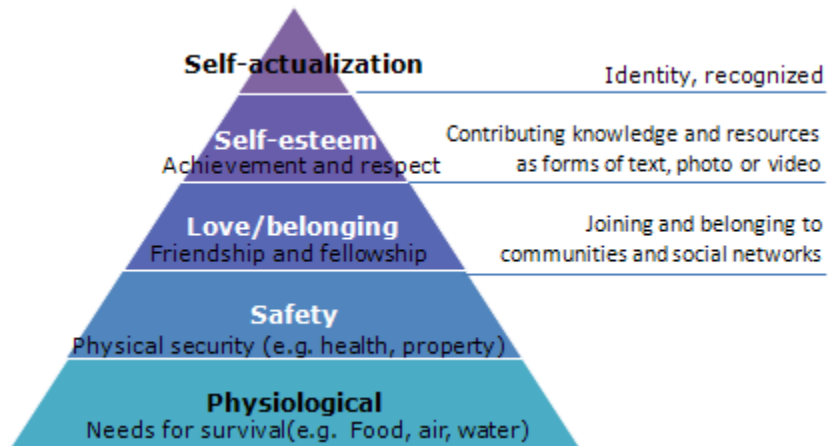
recommendations. Amazon can provide a list of related items or recommended items on the ground of users' previous purchasing records and behaviours.

**Table 2-1. A user contribution taxonomy (Cook, 2008)**

<b>User Contribution System</b>			
<b>Active</b>		<b>Passive</b>	
<b>Aggregates content</b>	<b>Aggregates stuff for sale</b>	<b>Aggregates behavioral data</b>	<b>Aggregates resources</b>
Opinion & ratings: Zagat guides Expertise : Wikipedia Software code: Firefox web browser Creative expression : YouTube Social connections & personal information: Facebook social network	Goods: eBay Advertising: Google's AdWords Services (and goods) Craigslist online marketplace	Buying behaviors: Amazon's product recommendations Web-linking behavior: Google's search engine algorithm Company behavior: Westlaw's PeerMonitor law firm database	Computing capacity: Skype Internet-based phone system Computer sensing capabilities: Honda's interNavi traffic information service

In this case, although the user does not intend to provide a list of recommendations, his or her previous shopping records were used and analyzed for this purpose. On the other hand, *Active contribution* is that users intended to contribute something for benefits or for free. For example, users fill up product information in online marketplaces such as eBay. The products and the categories on eBay are not filled up by eBay itself because users can fill in their own product information in order to sell their products. Google provides advertising tools such as AdWords, and it is the users themselves who advertise products or services and earn rewards from the advertisement. Another type of intentional contribution is user contribution without reward. Users contribute their opinions, ratings, information and expressions, such as content filled in by users on Wikipedia, video sharing on YouTube, and contributions of software source code to build software such as Firefox. These kinds of contributions do not offer any monetary reward, but users do so because of social reward, self-expression, reputation or altruism.

Users who contribute without a monetary reward can be explained by Maslow's Hierarchy of Needs as Fisher (2011) uses it to explain the most powerful motivation – the individual's identity.



**Figure 2-1. Maslow's Hierarchy of Needs applied to social activities**

Figure 2-1 illustrates Maslow's hierarchy of needs (1970) when it is applied to the behaviour of contributing activities in online communities, forums or social networks where there are acquaintances, friends and colleagues of contributors. When people have their physiological and safety needs met, their needs for love and belonging arise. After their needs for belonging have been achieved at a desirable level, people then want to achieve a level of self-esteem and self-actualization. Online communities, nowadays, are where people can obtain their need for love and belonging by joining communities and participating in activities. They care about how the community perceives their activities and behaviours. Participating in and contributing to a community and its members in order to express who they are and how they want to be recognized are a way of establishing self-esteem. This is a process of establishing and recognizing identity.

Füller (2010) also discusses consumer-created content that is used to develop, design, improve and test new product concepts and ideas in order to identify consumers' wants and needs, and to minimize failures. The researcher describes tools that allow consumers to contribute. Feedback, appreciation and naming to indicate accomplishment are tools with non-monetary incentives, while financial compensation, special offers, prizes and lotteries are monetary incentives that can provide motivation for consumers to contribute. In addition, his research categorizes consumers' motivations as intrinsic, internalized extrinsic, and extrinsic. Intrinsic motivations include intrinsic, playful tasks and curiosity,

internalized extrinsic consists of altruism-community support, making friends, self-efficacy, information seeking, skill development, recognition visibility; finally, extrinsic motivations are personal needs arising from the dissatisfaction of products or services and compensation.

Likewise, considering this research, the question as to why users contribute even without monetary reward may be answered. However, user contribution is one element of social commerce, but it does not mean that the behaviour of all contributing users is to pursue social commerce strategies. This is discussed in the section 2.5 (Social commerce).

### **2.3. Crowd sourcing (or the wisdom of crowds)**

Crowd sourcing is the sourcing of content such as texts, images, videos and sounds, and descriptive information such as links, comments, labels, keywords, dates, tags as well as labour, from the massive voluntary participation of online users (Glassey, 2012). The difference between the general term of outsourcing and crowd sourcing is that companies outsource ideas, knowledge and labour from third party experts at corresponding costs, whereas with crowd sourcing, sources are provided by multiple volunteers with various backgrounds who work on one task but are not necessarily experts; thus, there may be no or relatively low costs to use the sources (Howe, 2006; Leitner & Grechenig, 2008; Greengard, 2011). One of the well-known examples of this is Wikipedia, where many people contribute to the content of the web encyclopaedia.

This concept is applied to businesses, particularly in the Research and Development sector. Füller (2010) mentions the example of Swarovski holding, a watch design contest, inviting and encouraging designers and customers to participate as part of its product development.

According to Kozinets et al. (2008), the propulsion of crowd sourcing, also called wisdom of crowds or co-creation, is the basis of the concept of Web 2.0, as the participative and collective behaviours of people are applied to businesses where the outcome of their activities could be free resources that support a business. The researchers divide the contributing behaviour, especially of a consumer, into two different aspects: individual consumer creativity, which reflects self-expression and presentation, and collective consumer creativity, which is actually an enhancement of ideas triggered by previously established and developed ideas (Kozinets et al., 2008). Thus, collective consumer creativity has appropriate aspects of crowd sourcing in the business context.

In addition, Kozinets et al. (2008) also classify the different types of creative consumer communities where the members contribute to the content of any kind into Crowds, Hives, Mobs and Swarms. Crowds are the one being discussed in this work, as crowd sourcing is applied to business. They delineate that Crowds tend to have people in a community participate and collaborate on a project (e.g., an event held by Pepsico Frito-Lay encouraging people to create an ad campaign or Threadless resourcing designers by allowing people to post their own T-shirt designs).

On the other hand, Cook (2008) differentiates crowd sourcing from user contribution systems by using the example of Threadless. Threadless takes the position of managing the input and output by filtering the designs submitted before they appear on the web and manufacturing selected designs with its own expenses and time. This is clearly different from other cases such as the example of Pepsico Frito-Lay, since consumer-created ad campaigns are not filtered or re-created by the host companies and the companies do not usually spend time or expense on creations. Therefore, although there are aspects of a user's contributive behavior within crowd sourcing, perhaps crowd sourcing and user contribution should not be equated.

As previously mentioned, one of the drawbacks of using crowd sourcing is that the accuracy of the sources is not proven. This is because the sources are provided by multiple users, regardless of the user's expertise. Thus, the cost can indeed be high if the data obtained is faulty and it has to be discarded (Greengard, 2011). Greengard (2011) introduces one of the leading examples of crowd sourcing: a website platform that was used to indicate violence in Kenya after the presidential elections of 2007. When volunteers sent relevant reports by time and location, he found that the accuracy of information was the biggest and most indisputable conundrum and it is hard to be completely scrutinized, even with some restrictions placed on participants.

#### **2.4. Online word of mouth**

In addition to user contribution and crowd sourcing, another commonly mentioned topic when social commerce is discussed is word of mouth. Word of mouth has existed forever. The difference between the present and the past is that due to the evolution of the Internet and social media, the massive scale of bidirectional communication capability and power of controlling and monitoring the communication are strengthened, although there are also challenges (Dellarocas, 2003).

Regardless of the challenges, word of mouth has become one of the most significant factors of business. Word of mouth directly affects firms' brand images because once consumers positively perceive firms, they tend to think the firms are more trustworthy, professional and appealing (O'Cass & Carlson, 2012).

Amblee and Bui (2011) also found that products (digital products in their research) with consumer reviews sold better than products without reviews. In particular, the amount of reviews is important, although there was no clear indication that rating influences a consumer's purchasing decision.

E-commerce firms initially suffered from problems such as the fact that customers did not trust them and were not willing to buy because of the spatial separation between themselves and the firms. Customers' responses toward e-commerce firms and their products either alleviated or aggravated these problems (e.g., positive responses could alleviate the problems, and negative responses would aggravate the problems) (O'Cass & Carlson, 2012).

Whether they like it or not, e-commerce firms must learn how to deal with what each individual customer expresses about products and services, including the corporation selling the products or services. Customers share this opinion with people throughout the Internet regardless of the organization's will. Moreover, negative feedback from consumers can have not only adverse effects but also a favourable impact. Davidow (2003) contends that well-managed customer complaints render the negative perception down, as well as increase customer repurchasing rate. Furthermore, the researcher found that a clear statement of policy or procedure lessens the spread of complaints. One of the significant factors of word of mouth is a customer's perception with regards to the organization's response (e.g., whether the organization's response about the complaint is appropriate or not) (Davidow, 2003).

Therefore, the provision of a clear policy statement and proper venues for customers to discuss products, services and the organization is essential. Indeed, this is what most e-commerce firms offer. To use customer responses or feedback more effectively, e-commerce firms such as eBay utilize an online feedback mechanism to facilitate the establishment of reliability and promote collaboration in online marketplaces.

Dellarocas (2003, p. 1409) describes the impact of word of mouth as "brand building and customer acquisition," "product development and quality control" and "supply chain quality assurance.": Word of mouth has an effect on brand building and customer acquisition because it enables the acquisition

and retention of customers with lower costs but better effectiveness, product development and quality control, since customers can be better understood, and finally, supply chain quality assurance, as it supports organizations with an assessment of suppliers. However, at the same time, the challenges are that the readers of the opinions posted on the Internet have to have an ability to sort out the opinions that are relevant or reliable since the opinions are provided by strangers. These also can be interpreted as a competitor can manipulate opinions by pretending to be a customer providing negative feedback because users in online communities can change their identity as many times as they would like, since there are no restrictions. Second, feedback or reviews are voluntary actions for the public good and there are no strong benefits for the reviewers, although everyone who sees the review could benefit from it. In particular, customers of the middle majority who prefer to watch the early adopters could wait until the early adopters leave more information. These challenges should be considered, since they have effects on the e-commerce firm's reliability. Yet, these challenges could be relieved by pursuing social commerce, which utilizes Web 2.0 or social media where users are connected to their friends or acquaintances, so those users are more likely to care about their reputations and less likely to change their identities due to the connection (Liang et al., 2011; Amblee & Bui, 2011).

## **2.5. Social commerce**

Social commerce is a phenomenon, and organizations and individuals are plunging into it, relying on network power. The background of this phenomenon emerges from the idea that commercial activities can be spurred through social activities. Advertisements created by retailers or manufacturers are less convincing than recommendations from peers or acquaintances (Sinha & Swearingen, 2001). Product descriptions are not sufficient to answer all possible questions from customers. However, by providing functions that enable social activities such as reviewing, commenting, rating, and recommending; and functions that can create a forum around certain products where users can discuss and share tips, the products can enjoy better sales without expensive advertisement and without requiring human resources to answer customer questions (Dennison et al, 2009; Dellarocas, 2003). Thus, e-commerce giants such as eBay, Amazon, and Wal-Mart have attached functions such as reviewing, commenting, and ratings to their websites. These activities of reviewing, commenting, and rating spill over into social networking. Products and services are sold through social network sites such as Facebook and MySpace, where there are relationships between users because social networking sites can offer functions that can create, keep or make a relationships

better (Liang et al., 2011; Amblee & Bui, 2011). Unlike online shops where there is no relationship between users, the users of a social networking site are surrounded by friends, colleagues, or acquaintances. They are connected to each other and share stories, photos, videos and ideas through the network. These social activities and the relationships are significant because researchers have found that recommendations provided by friends or acquaintances are more reliable than those provided by unknown people (Sinha & Swearingen, 2001; Kim & Srivastava, 2007).

According to Wang and Zhang's research (2012), the term social commerce first appeared in 2005 when Shoposphere, one of Yahoo's services, provided features that allowed users to put comments and reviews of products on the Shoposphere. At that time, social commerce was perceived as a better way to attract people who trust reviews and ratings from peers more than online ads, because online ads could temporarily attract people, whereas user generated content could offer potential opportunities to find ways to make profits as long-term goals (Wang & Zhang, 2012). Besides the early stage of this concept, there are several attempts to define social commerce, and Table 2-2 summarizes the definitions by multiple researchers. First of all, Liang and Turban (2011, p. 6) define social commerce as "a subset of e-commerce that involves using social media to assist in e-commerce transactions and activities" although they claim that the definition of social commerce is still not standardized. Anderson et al. (2011, p. 3) also define it as "the merger of e-commerce and social media," and an IBM white paper (Dennison et al., 2009) states that social commerce is e-commerce using the power of word of mouth.

Furthermore, some research equates social commerce with social shopping (Tedeschi, 2006; Leitner & Grechening, 2007). Tedeschi (2006) introduces social shopping as a new category of e-commerce which is a composition of shopping and social networking activities in which people congregate and exchange shopping ideas through a social network. Leitner and Grechening (2007) also introduce social shopping in their early research as consumers' collaborating and shopping activities in social networks (or alike) for reciprocal effectiveness of crowds, communication and aggregation.

On the other hand, Stephen and Toubia (2010) contend that social commerce is driven by sellers while social shopping is driven by consumers, and in their definition, the characteristic of social commerce is that sellers do not need to be corporations but individuals who can sell through personalized online shops by providing links that lead to selling, and who will be paid commissions on sales.

In addition to this, there is another point of view as to how social commerce is inclusively perceived. Wang and Zhang (2012) briefly define that it is a form of e-commerce leveraged by social media that facilitates social interaction and user contribution which encourages commercial activities.

**Table 2-2. Definitions of social commerce from literature**

<p>"Social commerce involves using Web 2.0 social media technologies to support online interactions and user contributions to assist in the acquisition of products and services" (p. 5)</p> <p>"A subset of e-commerce that involves using social media to assist in e-commerce transactions and activities" (p. 6)</p>	<p>Liang &amp; Turban (2011)</p>
<p>"The merger of e-commerce and social media, as transactions are actually performed within the platform rather than at the retailer's e-commerce site"</p>	<p>Anderson et al. (2011, p. 3)</p>
<p>"Simply the concept of word-of-mouth, applied to e-commerce"</p> <p>"The marriage of a retailer's products and the interaction of shoppers with the content"</p>	<p>Dennison et al. (2009, p. 2)</p>
<p>"A form of commerce mediated by social media and is converging both online and offline environments."</p> <p>Exchange of ideas and products, a wide range of activities from getting ideas even after the transaction, and integration between online and offline commerce activities</p>	<p>Wang &amp; Zhang (2012, p. 18)</p>
<p>Using social media to encourage people to interact and contribute, so to catalyze buying and selling activities</p>	<p>Marsden (2011b)</p>
<p>"Forms of Internet-based 'social media' that allow people to participate actively in the marketing and selling of products and services in online marketplaces and communities"</p>	<p>Stephen &amp; Toubia (2010, p. 215)</p>
<p>"Social e-commerce, or social shopping is currently characterized by offering platforms where consumers collaborate online, get advice from trusted individuals, find the right products of a repository and finally purchase them"</p>	<p>Leitner &amp; Grechening (2007, p. 353)</p>
<p>"Social commerce is the synonym for the next generation online commerce and is significantly affected by a fast preceding social networking"</p>	<p>Leitner &amp; Grechening (2008, p. 322)</p>
<p>Various types of commercial activities such as sharing, selling, consulting and advising by users with respect to products and the</p>	<p>Liang et al.</p>

information through social media	(2011)
“Social marketplace – integration of social networks into online shopping community, allowing customers to seek out purchases from their friends or friends of friends”	Swamynathan, Wilson, Boe, Almeroth, & Zhao (2008).
Mutual support among consumers utilizing Web 2.0 technologies such as social media and user-generated content for better purchasing decision. “The concept of social commerce evokes the notion of a network of consumers with very strong ties (e.g., trusted friends), made possible recently with the widespread adoption of online social networks”	Amblee & Bui (2011, p. 91)
“Commerce activities mediated by social media” Using social media as an enabler for consumers to share any information for shopping	Curty & Zhang (2011, p. 1)

In addition to these definitions, Marsden (2011b) chronologically organizes twenty four different definitions made by researchers, consultants, and analysts specialized in social media and e-commerce in order to draw a conclusion regarding a comprehensive definition of social commerce: using social media to encourage people to interact and contribute, so to catalyze buying and selling activities. Wang and Zhang (2012) also list several definitions of social commerce from the academic literature; however, their definition of social commerce that was concluded from the literature is more inclusive. They delineate that the concept of social commerce could include the exchange of ideas and products, a wide range of activities from getting ideas even after the transaction, and the integration between online and offline commerce activities.

A lexical decomposition of the term could be interpreted as social commerce simply and literally takes two roles, as social and commercial activities. The Oxford Dictionary (2013) defines “social” as follows:

- social gathering
- relating to society or its organization
- relating to rank and status in society
- needing companionship and therefore best suited to living in communities
- relating to or designed for activities in which people meet each other for pleasure

Therefore, social activities are users' efforts to gather or to belong, and ultimately to be ranked, as an acknowledgment of status within a community due to one's efforts. Social activities occur by participation, interaction and collaboration within a community. However, in the context of social commerce, the social activities should be directly or indirectly related to or support commercial activities such as buying, selling and sharing any form of product or service information, and communicating with community members regarding the information rather than sharing personal stories and photos, which are irrelevant to the products or services. So to speak, social activities, which are supposed to spur commercial activities, are fulfilled by each individual user supported by Web 2.0 technologies and applications.

The lexical meaning of commercial according to the Oxford Dictionary (2013) is "making or intended to make a profit", so commercial activities can be simply buying, selling, promoting and advertising, all with the intend to make a profit. Activities that are not carried out with the intention to make profit may not be appropriate for the category of commercial activities.

There is also an inclusive approach to categorizing commercial activities. According to Liang and Turban's research (2011), commercial activities include marketing, advertising, rating (reviews and word of mouth), referring, recommending, information sourcing, transaction, CRM, Knowledge management, collaboration, and human resources. Marketing, advertising, transaction, CRM, knowledge management and human resources are directly or indirectly related to doing business, which indicates ways to make profits, but ratings, reviews, referring, recommendation, information sourcing and collaboration seem to be social activities done by each individual user. The researchers inclusively see social activities and commercial activities as a whole because rating, referring, reviewing and recommending products or services are part of promotion and advertising, thus this is a matter of how to differentiate lexical social activities and social activities within social commerce. In other words, the plain fact is that regardless of the categorization, when it comes to social commerce, social activities aim to support commercial purposes, although social activities themselves are purely gathering, belonging and being ranked in a community, as stated above.

In fact, organizations provide resources such as product information, photos and events for users' social activities and allow users to share information or photos and participate in the events. Users' intentions toward social activities are not necessarily to pursue commercial purposes, although some of the users participate in social activities for monetary rewards or prizes if there are any. From a user's point of view, the users share, rate, review and recommend products or services because they

want to be recognized within their communities, believing that they provide useful information to peers. The psychological explanation about this kind of user behaviour was explained in the previous section (User contribution).

## **2.6. Forms of social commerce**

The categorization of social commerce varies from researcher to researcher but by studying the definitions from the literature, several noticeable forms of social commerce can be readily found.

### ***Online shops utilizing social media or Web 2.0 technologies***

E-commerce giants such as Amazon and eBay provide functionalities that enable customers to contribute content through rating, reviews and forum functions provided by these online shops. The ratings, reviews and opinions contributed by customers help other customers gain knowledge of products and services (Dennison, 2009). Therefore, these online shops need fewer employees to work on product descriptions or answering a Q&A board (Bughin et al., 2009). Along with these functions, there is also a wish list, recommendations and Like button functions.

These online shops provide multiple means and the means are used by customers to participate in their activities. On the ground of the aforementioned definitions, it can be said that these online shops can be regarded as a form of social commerce to support and enhance their business strategies, particularly selling.

### ***Group buying***

Some researchers categorize group buying as another form of social commerce (Curty & Zhang, 2011; Turban, Bolloju & Liang, 2010; Wang & Zhang, 2012) while the functionality of group-buying can be provided within online shops too. Group-buying originated from the fact that user collaboration can reduce prices of certain products by purchasing a large volume of products together (Anand & Aron, 2003; Wang & Zhang, 2012), and there are also standalone group buying websites such as Groupon and Living Social. In fact, the group buying function itself is nothing different from online shops and has nothing to do with social activities (buyers just bid and wait until it a number reaches

the desirable headcount), however, due to the mechanism of group buying by which buyers have to gather in order to get a price reduction, it requires each individual buyer's participation. Besides, in some cases, buyers use social media to spread the word regarding the products they want, in order to gather more people for the purpose of price reduction. While they spread the word, product information is exposed to potential buyers, and some may even include advantages or descriptions of the products which could bring advertising effect in to persuade more people gathering.

### ***Blogs or communities for branding or sales***

One of the most well-known blog type social commerce is the Treonauts blog. Unlike other forms of social commerce, the blog is run by one blogger who provides product information such as tips, advice, news and partners with retailers to sell the products he talks about and to manage his online shop (Ruble, 2005). The information on the blog is more detailed, and anyone can get hints or advice that cannot be obtained from product descriptions attached in the package box (Ruble, 2005). In this case, a blog as a Web 2.0 application is used to deliver a detailed, dissected product description. The online shop attached to the blog provides rating and review functions for buyers, while social plugins such as a Like button for social media sites are deployed as well.

### ***Social networks operated for product or brand fans***

When social commerce providers (e.g., bazaarvice, CrowdFactory, cureBIT, MOONTOAST, Ondango, OWJO, etc.) refer to social commerce, mostly they suggest a strategy of Facebook integration because Facebook pages are designed to foster a community-like environment for a group of people who have similar interests, particularly for businesses that wish to use the Pages as a means for advertising. The difference between a traditional web page for advertising and a Facebook page is that the messages posted on a Facebook Page are simultaneously exposed right away to everyone who is a fan of the page through its newsfeed feature (Müller & Thiesing, 2011). Fans on Facebook are anyone who has clicked the Like button on the page. For instance, clicking the Like button on the Guess Facebook page enables people to become fans of the brand. Afterwards, whenever Guess posts new photos, news, and messages to its Facebook page, these will be shown to its fans.

Rowan and Cheshire (2011) emphasize the significance of utilizing social networks such as Facebook and they provide examples of its uses. Aside from high purchase rates, there is an influential factor of

friends' recommendations due to the fact that countless recommendations, particularly within a social network, support users in finding items - these can be any form of item, such as shopping information, discount deals or special promotions, even photos and music that are relevant to the particular user. Now, Amazon and Facebook accounts are integrated to facilitate the use of user information (e.g., friends' likes) (Rowan & Cheshire, 2011).

Wang and Zhang (2012) also point out the trend of integration between a social network and an e-commerce website and give the examples of eBay's integration with Facebook and the purchasing method on Twitter.

On top of it all, third party web applications can be embedded into Facebook pages. Hence companies can develop and embed various web applications that support their business activities on their Facebook pages (Wang & Zhang, 2012). In fact, Facebook pages that have online shop functionality have been referred to as social commerce or f-commerce (Facebook social commerce), since 1-800 Flowers set up a shop that sells flowers on Facebook (Marsden, 2011a). For example, Green day, 30 Seconds to Mars, The Breast Cancer Site and Kid Rock have their shops on Facebook pages, and other companies, brands and individuals such as celebrities are also pursuing sales through their Facebook pages. Although some organizations pursue social commerce on Facebook without having an e-commerce functionality, buttons and links on Facebook pages lead users to e-commerce websites where the items can be purchased.

One advantage of using social media is that there are already millions of users networked with friends, which means that corporations and individuals who want to implement social commerce have a wider potential audience. In addition, functions on social media fully support social commerce strategies because social media provides what social commerce needs (i.e., social commerce is actually to utilize Web 2.0, which is often interpreted as social media).

### ***Social bookmarking or social shopping***

One of the distinct trends of social commerce is social shopping services such as Wists, ThisNext and Kaboodle. A social shopping service is where shoppers share information, recommend and buy products they discover (Olbrich & Holsing, 2011). Compared to traditional e-commerce, social shopping is more interactive and communicative because members in a social shopping community communicate and support each other by sharing their shopping experiences (FIDIS, 2009).

However, Leitner and Grechening (2008) subdivide social shopping into collaborative shopping networks and bookmarking services. Collaborative shopping networks have the characteristics of a community where people collaborate with each other, and ThisNext, Threadless and MyDeco are examples in this category, whereas bookmarking services are where users bookmark items found online and list their favourite items. Backpack, Kaboodle and Wists are examples of bookmarking services (Leitner & Grechening, 2008).

Stephen and Toubia (2010) see social shopping from a different point of view, as they perceive that social shopping is driven by customers who take on various roles such as creating content, selling products and handling online stores. Contributing media are Epinions, ThisNext and Yelp.

The characteristics of social shopping sites such as Wists, ThisNext, or Kaboodle are that they do not provide purchasing functions within their shopping sites, although there is a button indicating that items can be purchased, because they do not deploy e-commerce functionality on their websites. Instead, community members can bookmark certain items from any website where they discovered the items when browsing the Internet. Links to the bookmarked items are saved on the social shopping site that the members belong to. Then, the members can categorize, recommend or share the list of items they found. Basically, social shopping communities provide a bookmarking function for the members but do not have an e-commerce function; however, members may purchase items through links that lead to the online shops where the items are being sold.

For example, although Kaboodle does not have an e-commerce function within its site, it provides a “Buy it Now” button that seamlessly leads to a couple of online shops where members can purchase the item. The technologies supporting these social shopping services are bookmarking, categorization, community blogs, Like buttons, commenting and sharing via social media sites, etc.

Finally, there are a handful of other attempts to categorize social commerce, even though they are not from the academic literature. For example, Indvik (2013) introduces types of social commerce such as peer-to-peer sales platforms, social network driven sales, group buying, peer recommendations, user curated shopping, participatory commerce and social shopping. Indeed, the author puts eBay and Etsy into a category of peer-to-peer sales platform, and Amazon, Yelp, JustBoughtIt into peer recommendation. Yelp is definitely driven by each individual’s reviews and ratings, rather than selling items. However, although there are also reviews and ratings on Amazon, these are parts of functionalities it has and it primarily pursues selling, unlike Yelp. Marsden (2011c) categorizes types

of social commerce implementations as flash sale sites, group buy sites, social shopping sites, social shopping apps, purchase sharing sites and personal shopper sites.

## **2.7. Web 2.0 and its technologies**

Many researchers assert that Web 2.0 is a *notion* where users utilize the web to participate and collaborate using existing web applications and the technologies (Wigand, Benjamin & Birkland, 2008; Yakovlev, 2007); thus there is no particular software or application for Web 2.0.

In fact, Yakovlev (2007) describes Web 2.0 services such as blogs, image sharing, wikis, RSS, social networks, Mash-ups, Podcasts/Vodcasts and Folksonomies, and compares these Web 2.0 and legacy services that take similar roles. Except for RSS and Mash-ups, there is no new technology. Blogs are nothing more than bulletin board systems and threaded news groups, image sharing like Flickr has the same function as previous image sharing websites, social networks are expanded forms of personal websites, and so forth. In other words, the functionalities of Web 2.0 and legacy services are same, but *the way in which they are used has changed*, as they are now used to share user opinions and resources.

In the same vein, there is no new software for social commerce since social commerce uses Web 2.0 technologies. Hence this research investigates the use of Web 2.0 technologies for social commerce, but does not attempt to define Web 2.0 since it has already been discussed by countless researchers. Instead, this research has selected and adopted a widely accepted conceptual of Web 2.0 provided by O'Reilly (2007, P. 36-37) as follows:

*The core competencies of Web 2.0 companies:*

- *services, not packaged software, with cost-effective scalability,*
- *control over unique, hard-to-recreate data sources that get richer as more people use them,*
- *trusting users as co-developers,*
- *harnessing collective intelligence,*
- *leveraging the long tail through customer self-service,*
- *software above the level of a single device,*

*- lightweight user interfaces, development models, AND business models.*

Although the definition of Web 2.0 does not seem to be standardized (Constantinides et al., 2008; Parise & Guinan, 2008; Constantinides and Fountain, 2008; Lee et al., 2008), the most commonly referred to definition of Web 2.0 is simply web that is led by users and their participation that influences a network of people (O'Reilly, 2007). Wigand et al. (2008, p. 2) also state that there is no new technology of Web 2.0, but it is a “social phenomenon”, thus, Web 2.0 is a “participatory medium that is being created by millions of users”. To put them together, Web 2.0 is an extensive concept that includes user participative activities and the technologies that enable those activities, and enhances the effectiveness of the activities through web applications.

Social media or social software is a means to reflect the features of Web 2.0 (Constantinides & Fountain, 2008). First of all, according to Warr (2008), social software refers to various tools that facilitate user participative activities including instant messaging, text chat, newsfeeds, wikis, blogs, social network services such as Facebook and LinkedIn, social bookmarking sites such as Digg and Reddit, and virtual worlds such as SecondLife. Instant messaging and text chat are small applications, more like utilities when compared to social network services. Apps are also a type of applications such as Facebook Apps and Google Apps which utilize user information by accessing APIs provided by Facebook and Google (Müller & Thiesing, 2011), and these Apps can be installed on Facebook, Google, or websites.

On the other hand, social media is defined by Mayfield (2008) as a group of online media that has Web 2.0 features such as “participation, openness, conversation, community and connectedness.” Types of social media are blogs, wikis, forums, social networks, and micro-blogs including video sharing such as YouTube, as users can use videos for participative activities. In accordance with the categorizations above, social networks are a subset of social media or social software. Although social media defined by Mayfield are similar to social software, social media could be perceived as a channel that facilitates the characteristics of Web 2.0, while social software is a purely technological instrument that functions to reflect those characteristics.

There are a couple of terms that should be clarified for this research. We provide those clarifications below.

### ***Social networks and social media***

Social media and social networks are, sometimes, confusingly used. Indeed, the terms social media and social software are often interchangeably used due to the fact that these originated from Web 2.0. Social networks, on the other hand, are a type of social media or social software, which is an expansive term, that includes any media such as blog, forum, photo or video sharing and communities with Web 2.0 characteristics as discussed above, thus social media can be equated to Web 2.0, while social networks fall within the category of social media. Examples of social networks are MySpace, Facebook, LinkedIn and Google+ where there are personal spaces for users who want to share information such as messages, photos and videos with other members who have agreed to do so (Yakovlev, 2007).

### ***Folksonomy***

Folksonomies are a sort of classification of web content that is aggregated and classified by tags, and is also called social bookmarking or social classification (Glasse, 2001). The term Folksonomy originated from “folk classification,” which refers to services utilizing labels or tags by users, and created like “taxonomy” by replacing the “tax” with “folk.” Its technique is that each individual user tags any type of content such as photos, text, videos, etc., for personal archival indexing, then the tagged content can be found (if shared) as a result of a search using keywords (Vander Wal, 2007).

Examples of Folksonomies are Del.icio.us and Flickr. These are based on user-contributed content with their tags. These services have a web-crawling feature (like a web search engine) that can crawl and display a list of content by finding keywords from tags (Yakovlev, 2007).

Most Web 2.0 technologies such as video and photo sharing, blogs, social networks, wikis and micro-blogs are readily available, meaning that anyone can start utilizing them by simply registering with the services unless one intends to have his own by developing his own social network, blog, or photo sharing. In contrast, to use Web 2.0 technologies such as APIs, Mash-ups, widgets and RSS, there are more development steps required. In fact, these technologies alone do nothing, but purposeful software can be created using these technologies.

For a better understanding of the uses of these technologies, we briefly explore them below.

### ***Really Simple Syndication (RSS)***

RSS is a syndication technology that delivers information in the form of a newsfeed subscription with certain subject matter. It is an XML based format by which up to date information can be subscribed to by creating and registering RSS documents with an RSS publisher, and the information can be not only from one source but from multiple sources (Merrill, 2006). The advantage of an RSS subscription is that readers do not need to visit websites to find pertinent content because the content can be selectively combined from multiple sources with a desirable composition (e.g., title and one sentence of the content, or title, author, and two sentences of content with date, or vice versa) and displayed on one page. Since it is an XML based document, which is self-descriptive, elements are parenthesized in an easy-to-understand format. RSS specification is delineated in the RSS Advisory Board (<http://www.rssboard.org>); an RSS document (the XML format) consists of channel elements and item elements, which are the child elements from a channel and there are required elements such as a title, link, and description within the channel and item elements. Title is a name of the RSS being created, link is the URL of the website where the RSS is located, and description is to describe the RSS.

### ***Web APIs and Web services***

A Web Application Programming Interface (Web API) is a set of functions that allow developers to make use of their functionality by calling them through the web API (Mueller, 2004). Web service/API providers such as Google, Amazon, Twitter and Facebook offer web services so that a developer does not need to know or directly access their database to use resources, but web applications built by the developer can interact with the system through the APIs to perform and use the resources. Often the word web API and web service are synonymously used because a web service is a function and a web API consists of web services (Gosnell, 2005). To borrow the definition of a web service from the official W3C Working Group Note (W3C, 2004), a web service is *“a software system designed to support interoperable machine to machine interaction over a network. It has an interface described in a machine-processable format.”* Web services run on open XML standards and web protocols such as HTTP, so as to be structural and scalable (Curbera,

Dufler, Khalaf & Nagy, 2002). Web services are specified with messages, protocols and locations in a web service description (WSD) for communication (Gosnell, 2005).

The steps of a web service communication are as follows:

- 1) Identifying web services that a client wants to use
- 2) Identifying rules specified for the client to use the web services
- 3) Calling functions based on the specifications of a certain web service
- 4) Providing client id or secret numbers if needed
- 5) The web service perform as the client requested
- 6) Data sent as a result of web service performing to the client
- 7) End of the communication

The web service communication methods include REST, SOAP and WSDL (Rodriguez, 2008), but the use of SOAP and WSDL has declined.

*REST (REpresentational State Transfer)*: A simple way to use resources through HTTP. A web service is executed in the form of a URL using parameters. The parameters are provided from the web service providers, so that developers can call the data they want to display. Google Maps API Web services, for example, provide parameters that users can call geographic data using the parameters as follows:

- Location parameters: Center and Zoom
- Map parameters: Size, Scale, Format, Maptype, Language and Region
- Feature parameters: Markers, Path, Visible and Style
- Reporting parameters: Sensor

With these parameters, a developer can choose data as the one wants to display by selecting proper parameters and by defining the values of the parameters.

<http://maps.googleapis.com/maps/api/staticmap?center=Berkeley,CA&zoom=14&size=400x400&sensor=false>

The URL, which is an example given by Google Developers (<https://developers.google.com/maps/documentation/imageapis>), indicates where the data, or a resource, is located and the provided parameters are center, zoom, size and sensor.

This is a very simple and easy way to get data and resources from web service providers but limited because the values are visible, so confidential data cannot be transferred that way (Gosnell, 2005).

*SOAP (Simple Object Access Protocol)*: SOAP is a protocol to exchange messages with platform independence and interoperability since it is XML based. An XML message consists of two child elements: header and body. Header includes a method to send the message such as POST or GET, and body simply contains the content of the message (Curbera et al., 2002). SOAP communication can be in the form of simple and complex types (e.g., datasets, structure, and classes (Gosnell, 2005).

*WSDL (Web Service Description Language)*: WSDL is also an XML based language that documents a type of message, and web services, how and what to call and types of return values for message exchanges (Gosnell, 2005). WSDL describes the interface of a web service and a point of contact. WSDL messages are delivered through HTTP, SMTP or others.

### ***Mash-ups***

A Mash-up is a technology that aggregates publicly available data content from the web, and mixes and combines it together to create something new. According to Merrill (2006), there are several types of mash-ups available such as mapping, video/photo, search/shopping and news mash-ups:

Mapping Mash-up is to utilize map APIs such as Google Maps. For example, using the publicly available map API, an application that displays tourist attractions in a certain area on a map can be created.

Video/Photo mash-ups are to utilize photo hosting sites such as Flickr, which provides APIs for developers to create applications that use photos in Flickr.

Well known uses of search/shopping mash-ups are comparative shopping tools (e.g., Kayak); price data is gathered from various online shopping sites and the tool displays the collected prices of the same items, so that shoppers can see the different prices and know where to buy.

News Mash-up is to use syndication technologies such as RSS and Atom, which display newsfeeds. News from multiple sources, mostly major newspaper websites, are aggregated and combined, then displayed through a form of RSS or Atom. The structure of a news mash-up consists of ingestion, augmentation and presentation (Jhingran, 2006). Ingestion is the aggregation of information from online resources such as web pages, web services and news feeds. Augmentation is processing the collected data - how to mix and combine it. Presentation is to display the processed data using XML, Atom, and RSS feed or HTML (Jhingran, 2006). There are three different participants in a mash-up application: API/content providers, Mash-up sites, and the client's web browser (Merrill, 2006).

API/content providers such as Google, Flickr, PayPal and Twitter provide content via REST, web services, or RSS/Atom. Some of them are not mash-up friendly as they are contents themselves without providing an API which eases the aggregation of data. Still, the content can be obtained using a technology such as screen scraping. Screen scraping is a technology to parse and analyse content and extract the data as a programmable form. Mash-up sites provide spaces for mash-up applications. Of course, mash-up applications can be implemented as server side web applications, or client side like JavaScript. Lastly, the client browser is to present the processed content.

The advantages of using a mash-up is that it can be simply implemented without a lot of resources, since the technology uses available data from the web, and this does not require to have highly skilled developers; and there are web tools that allow anyone to gather data and mix and combine it to present it in a new form. There are also some disadvantages. One such disadvantage is the fact that a mash-up uses publicly available resources, so if there are changes, the changes are directly reflected on the presentation.

## **Chapter 3: Research methodology**

This chapter describes the approaches and steps taken in conducting this research. The first section describes the research classification and outlines the types of approaches and methods necessary for data collection and analysis. The second section details the research framework and outlines the process of our research.

### **3.1. Research classification**

There are two distinct approaches to research: quantitative and qualitative. Clark and Creswell (2010) describe qualitative research as studying problems to explain them objectively using quantifiable data by asking detailed questions and analysing statistics. On the other hand, qualitative research is defined as studying a problem subjectively and reflexively and exploring it by asking general questions, collecting text data and analysing the data. In more detail, in quantitative research, the purpose of a study specifically pursues measurable and observable data, and a literature review takes a critical role. In qualitative research, the purpose of a study is general and broad, and pursues an understanding of experiences. To undertake either quantitative or qualitative research, a research design should be established to collect, analyse and report data (Clark & Creswell, 2010).

Universal methods for quantitative research are surveys and experiments, and data collection can be conducted through observation, interviews and archival data. Analysis could be a description of statistical tests to address the hypothesis and research problem. The methods for qualitative research include interviews, document review, observation, focus groups, case studies and scenarios. The data collected is textual and can be validated through reliability, internal validity and generalizability (Rudestam & Newton, 2001).

Based on the description from the research methods above, our research pursues a qualitative approach due to the fact that our research objectives are set to understand issues surrounding current e-commerce by asking general questions such as “when does e-commerce become social commerce?”. The data needed for this research is more textual, rather than numeric. However, in a sense there could be some quantitative aspects, as it requires the implementation of prototypes for experiments to test the idea. Although a depiction of example experiments from the research appears to relate to behavioural (e.g., experiments to test a group of people’s behaviour), the experimentation

is that a researcher has to implement practices or procedures to test it and manipulate variables to see the effects of the test archetypal for measurement (Clark & Creswell, 2010; Emory & Cooper, 1991).

The design strategy for this research is exploratory. Exploratory studies are done when the central problems are not clear or the research area is new or vague; however, during the exploration process, the concepts become clearer (Emory & Cooper, 1991). Since this research area is quite new and the central problems are comprehensive, the exploration, therefore, could concededly refine these problems.

Clark and Creswell (2010) list four different types of data collected for research; interview, observations, documents, audiovisual materials. In their classification, observations are a narrowed concept that appears to be limited to behavioural observation. However, Emory and Cooper (1991) define observation as not only watching behaviours, but also observing behavioral and non-behavioral activities and conditions. The types of non-behavioural observations are record analysis, physical condition analysis and physical process analysis. Record analysis is to analyse written, printed, sound recorded, photographed or videotaped records, physical condition analysis is an archetypal way to see the availability of merchandise, and process analysis is to see time and motions for processes and flows (Emory & Cooper, 1991).

The observation defined by Emory and Cooper is more comprehensive than the definition by Clark and Creswell, as it includes documents and audiovisual materials as well. However, the classification of these methods is slightly different between each researcher. For example, some researchers categorize the methods as interview, documentation review, observation, focus group and case studies, whereas other researchers place the focus group within observation. This is because the classification depends on the context of the research. For example, documentation review can be within observation in the light of a broad definition of observation (e.g., record analysis includes written and printed forms) and a focus group also can be within observation if the focus group is observed.

Overall, this research pursues a qualitative approach with observations and experiments. In particular, observation, which is comprehensive, is conducted by documentation review and e-commerce website observation for data collection. Experimentation is conducted by building and implementing prototypes of social apps that enable social commerce activities using Web 2.0 technologies.

This research adopts a prototyping method to test the concepts of social commerce and feasibility of the implementation by applying Web 2.0 technologies to social commerce activities. According to Te'eni, Carey and Zhang (2007, p. 308) prototyping is “to test various aspects of the design, illustrate ideas of features.” A prototype is to denote a certain idea or item that is used to assess the feasibility of the design; thus, a prototype is implemented “to frame, refine and discover possibilities in a design space” ( Lim, Stolterman & Tenenberg, 2008).

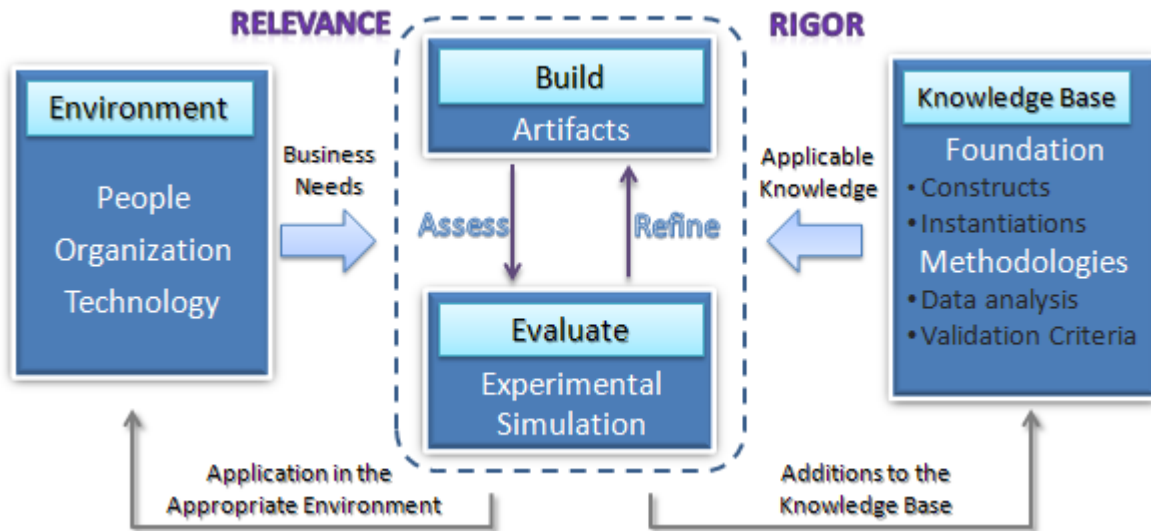
Therefore, in light of this definition, prototyping can be interpreted as subordinate to experimentation.

Prototyping can generally be subdivided into two types: low fidelity and high fidelity. Low fidelity prototyping has the aim of being fast and simple, so the prototype does not need to be very close to finished products, An example of low fidelity prototyping is paper based prototyping; creating an object using paper (Lim et al., 2008). High fidelity prototyping aims for a prototype that is very similar to a finished product, using real materials instead of paper. Mostly, this type of prototype is used for developing software such as websites (Te'eni et al., 2007). With this classification, this research follows a high fidelity prototyping approach since we use Web 2.0 technologies to build actual social apps that implement social commerce.

### **3.2. Research framework**

The ultimate goal of this research is to propose methods of social commerce implementation to achieve specific business goals. In order to do so, revisiting and understanding Web 2.0 technologies that facilitate social commerce activities to support business are required. For that we use the Design Science Research approach. Design Science Research is fundamentally to pursue research in Information Technology, which is “*technology used to acquire and process information in support of human purpose*”(March & Smith, 1995). Design Science Research, in fact, consists of two core activities: “Build” and “Evaluate.” So to speak, *build* is to construct purposeful artifacts, and *evaluate* is to assess the performance of the constructed artifacts (March & Smith, 1995). Artifacts are defined as constructs, models, methods and instantiations (March & Smith, 1995; Hevner, March, Park & Ram). *Constructs*, also called concepts, are descriptions of a problem and specifications of the solution. *Model* specifies a relationship with the constructs. *Method* is a sort of guideline to fulfil tasks. *Instantiation* is to materialize the artifacts, according to March and Smith (1995). Peffers, Tuunanen, Rothenberger and Chatterjee (2007) conclude that an artifact is any object that is devised

to solve research problems. In summary, the Design Science Research Methodology (DSRM) is designed to build and evaluate IT artifacts to identify business needs and to solve organizational problems (Hevenr et al., 2004).



**Figure 3-1. Research Framework (adopted from Hevner et al., 2004)**

Figure 3-1 shows our research framework which is adopted (and simplified) from the one by Hevner et al. (2004) since the framework also contains factors from natural science. As March and Smith (1995) state, research on natural science provides an understanding of reality, whereas design science fulfills human purposes by building objects in order to answer questions such as “*Does it work?*”

In light of these statements, our research fits into the DSRM approach since it attempts to understand the phenomenon of social commerce. In Figure 3-1, *needs* come from the *environment* (e.g., business needs, personal needs and technological needs). In this research, needs are commercial or business needs such as advertising, promotion or market research. Artifacts that can fulfil these needs are created using applicable knowledge such as data analysis and criteria applying constructs or instantiations to the artifacts. The artifacts are assessed and refined through experiments or simulations. Simultaneously, as Figure 3-1 illustrates, building web applications by deploying technological functions as artifacts to fulfil business goals for the purpose of social commerce implementation ought to be followed to solve our research problem.

Note that assessing and refining an artifact is intended for perfecting the artifact in order to see if it solves the problems and if it works properly as planned. However, artifacts in this research are required just as a means to demonstrate how to utilize certain selected Web 2.0 technology. During the process of developing the Web applications, which will be social apps, perhaps, this research could identify undiscovered methods to utilize the selected Web 2.0 technology by assessing and refining the social apps until they are able to properly perform certain social commerce activities as selected.

Peppers et al. (2007) propose a DSRM process consisting of six activities. First, *Problem Identification and Motivation* is to aid in designing artifacts leading to solutions. Second, *Define the Objectives for a Solution* is to deduce the objectives, which are either quantitative or qualitative, to solve problems defined from the previous activity. Third, *Design and Development* is for artifact creation, covering decision of functionality, architecture selection, and creation. Fourth, *Demonstration* is literally to demonstrate the practice of the created artifacts in solving problems. Fifth, *Evaluation* is to assess the created artifacts by comparing them to established objectives. Sixth, *Communication* is to present and discuss the research, including problems, artifacts, utility, effectiveness, etc., with other researchers. Note that the last activity, communication, is not applicable now, but will be soon in the form of a conference publication (and presentation) as well as a journal article.

**Table 3-1. Design Science Research Methodology Process**

<b>DSRM Process</b>	<b>Activities in detail</b>
Identify problem and motivation	Documentation review and real case observation <ul style="list-style-type: none"> <li>• Reviewing literature in current e-commerce and social commerce</li> <li>• Observing e-commerce websites that utilize Web 2.0 technologies</li> </ul>
Define objectives of a solution	Qualitative and exploratory approach <ul style="list-style-type: none"> <li>• Understanding of factors that affect social commerce implementation by reviewing current “e-commerce” issues</li> <li>• Identifying available Web 2.0 technologies for social commerce implementation</li> <li>• Proposing methods of social commerce implementation to achieve business goals</li> </ul>

Analysis	Analysis from the document review and real case examples <ul style="list-style-type: none"> <li>• Analysing social commerce activities and achievable business goals identified from literature</li> <li>• Refining and concretizing the analysed activities and the business goals</li> <li>• Analysing and refining Web 2.0 technologies being used for social commerce</li> </ul>
Design & Development	Prototyping by building social apps to perform social commerce activities <ul style="list-style-type: none"> <li>• Designing and building social apps that can perform social commerce activities using Web 2.0 technologies</li> <li>• Testing social apps through the building process</li> </ul>
Evaluation	Analysing the results of applying Web 2.0 technologies to social commerce activities <ul style="list-style-type: none"> <li>• Analysing the feasibility of the concept and design of social commerce from business aspects</li> <li>• Analysing the capability of the Web 2.0 technologies including any available functionalities</li> </ul>

Table 3-1 illustrates the whole process of this research. Identifying the problem and motivation and defining objectives of a solution have already been discussed in Chapter 1. In Analysis, social commerce activities and business goals are refined by analysing social commerce, and Web 2.0 technologies or any other available technological functions are identified from an analysis of the literature and the observation of websites. In Design, several social commerce activities categorized by business goals are selected, and Web 2.0 technologies applicable to the activities are also selected to prototype social apps that implement social commerce. In Development, web applications are built using the selected Web 2.0 technologies then become social apps, and in this process, we indicate how to utilize them. In Evaluation, we analyze the methods and uses of Web 2.0 technologies identified through the development of the social apps.

## **Chapter 4: The concept of social commerce and its components**

In this chapter, the concept of social commerce is established by refining various definitions from the literature in Chapter 2. Social commerce activities, the business goals that can be achieved through their implementation, and Web 2.0 technologies are also analysed and refined. In addition, real case examples such as websites that implement technological functions that support business are also analysed to supplement the findings from the literature.

### **4.1. Definitions of social commerce refined**

As partially mentioned in Section 1.2, the conceptual ambiguities are predominantly caused by various definitions made by researchers' different perspectives and different unit and level analysis of social commerce. For example, from a business aspect, in some research papers, 1) social commerce is to sell products and services through social media while in the others, social commerce includes branding and marketing. Some definitions imply that 2) social commerce is equal to social shopping whereas others differentiate them. Some researchers perceive that 3) social commerce is to connect business to customers while others perceive that social commerce is to connect individuals - sellers to buyers, or online and offline. Some researchers also perceive that 4) social commerce is a new phenomenon whereas others do not. Therefore, to establish the concept of social commerce, definitions from the literature should be refined to resolve the ambiguities. To progress this task, the arguments described above are analyzed as follows.

#### ***Social commerce for selling or marketing***

In Stephen and Toubia's research (2010), social commerce is treated as marketplaces where individual sellers can sell products by assorting product items on a personalized online shop, so they receive commission of sold products. In addition, according to the Tedeschi's definition (2006), social commerce is a combination of online shopping and social networking. Leitner and Grechenig (2007) who perceive social shopping as social commerce, also define social shopping is a unique approach of e-commerce which has a similar environment as social networks for consumers to collaborate and shop together. In light of the perception from those researchers, social commerce is clearly perceived as using social media for selling or shopping.

In contrast, Marsden (2010) states that social commerce is to use social media to support user interactions to increase the experience of purchasing. In this case, social media is devised to pursue communication useful for purchasing, rather than sales although ultimately increase in sales could be the final goal.

As an IBM white paper (Dennison, 2009) describes, on the other hand, customers want more specific information about products and services in order to make the right purchase decision, so they rely on social and network power to gain "shopping experiences" and at the same time, as customers have access to more information, the transparency of information becomes more important. On the other hand, having customers share their opinions and experiences could generate credibility. This indicates the importance of forming a relationship between the corporation and its customers. In other words, this is a way to build trust and relationships between organizations and customers in order to form loyalty.

### ***Social commerce and social shopping***

The argument about the different standpoints toward social commerce and social shopping are already dealt with in Section 2.5 as this research draws the conclusion that social shopping is a type of social commerce.

### ***Social commerce connects business to consumer or consumer to consumer***

With respect to the perception of whether social commerce is to connect business to consumer, individuals, or online and offline, social commerce can encompass all aspects of those connections. As previously mentioned, researchers such as Stephen and Toubia (2010) who differentiate social commerce from social shopping define social shopping as connects consumers invigorated by online word of mouth whereas social commerce connects sellers. At the same time, it can connect individuals to individuals. For example, a social shopping site such as Kaboodle is operated by each user's postings, and the users are not business personnel. Besides, social media for commercial purpose does not mean social media is used by business organizations only. Individuals can use social media for commercial purpose.

Furthermore, social commerce encompasses online and offline businesses too, and it does not necessarily mean that all actions are taken within social media or online shops (e.g., Starbucks

provided a coupon for a new coffee, which could be shared through social media, so anyone was able to print and bring it to an offline store to get the free coffee). Notwithstanding, a user's intention and willingness could be an important factor.

This research does not limit social commerce to the concept of an online shop plus social media (i.e., selling must be accompanied by social activities), because commerce and commercial activities include not only selling but any other activities that support selling. In other words, selling does not need to be an immediate action. For example, letting customers share product information with their friends has an effect of increasing product awareness.

### ***Social commerce is new or not***

With respect to whether social commerce is a new phenomenon or not, the term of social commerce is relatively new because it first appeared in 2005 but the idea is not (Marsden, 2010). As exemplified previously, a product catalogue in a social shopping site such as Kaboodle, ThisNext, Wist is filled up by individuals. In addition, users of social media promote certain products by posting and sharing information. Excluding the technologies such as social media, it is simple commerce or business supported by help of users or customers. As stated in Section 2.1, long ago, when there was no fast transportation, markets were not just places for selling and buying but they were places for people to share information, and when there was no internet, still people gained information about products and services from testimonies by their family, friends or colleagues.

## **4.2. The concept of social commerce**

Based on the arguments made in the previous section, the concept of social commerce is established by analysing the arguments and various definitions as follows.

- E-commerce utilizing social media or Web 2.0 technologies
- E-commerce is not limited to selling and buying, and it could include managing and operation, however, mainly marketing

- Social media or Web 2.0 technologies facilitate participative, contributive and collaborative activities by individual users through social media
- The activities intensify the overall effects of specific business goals



**Figure 4-1. The components of Social Commerce**

Figure 4-1, the components of social commerce, illustrates the concept refined from definitions analysis. First, there are two entities involved in social commerce interaction: social commerce implementors and enablers. A social commerce implementor is an operating body that implements social media, or Web 2.0 technologies, for the purpose of commercial activities such as advertising, promotion and selling. These social commerce implementors are not limited to organizations or large enterprises, but also include sole proprietors, artists (e.g., musicians, photographers, movie stars, etc.) craftsman, athletes and architects. These individual implementors operate social media to promote and sell their products (e.g., the singer Jaime Jamgochian’s Facebook page providing videos, photos, an online store and a music player that allows users to listen to her songs directly on the Facebook page).

Enablers are social media users who are willing to participate in activities and contribute ideas, opinions and knowledge for networked people; thus, it is hard to specify them in a certain group of people, because enablers are not just Internet users or social network users, customers or potential customers, or sellers or buyers, but they are a combination of at least more than one of those (e.g., social network users and buyers).

Between implementors and enablers, there are social commerce activities. Social commerce activities are any activities that involve contribution, collaboration, engagement, interaction, participation and communication - these are the characteristics of Web 2.0.

Most of all, in their participative activities, there should be the willingness or intention to take on roles to support certain business tasks. Enablers can also be called fans in a Facebook definition, since Facebook users become fans of certain brands once they click a like button within the brand pages. Although it is hard to regard users who clicked a like button as real fans of a brand, the action of clicking the like button implies the user's willingness to see postings by the brand. This is because by clicking the button, all shared postings from the brand will appear on that person's Facebook newsfeed.

Unlike traditional web 1.0 ways of communication, in which organizations directly promoted or advertised their products and services through available media such as corporate websites (where a user had to visit the corporate website to find product information), in a social commerce environment, enablers discover product information anywhere and share it with their friends if they are interested in it. This means that product information is actually delivered by each enabler rather than the corporation itself and can be exposed through the newsfeed, where all people who are connected can see it

Social commerce implementors harness social commerce activities using social media or Web 2.0 technologies to support their business. Therefore, social commerce activities have the following Web 2.0 characteristics: harnessing collective intelligence, wisdom of crowds, word of mouth and rich user experience (O'Reilly, 2007). These characteristics are enabled by user contribution, participation, engagement, collaboration, interaction and communication (see Figure 4-1).

Based on the concept established, social commerce activities, goals and Web 2.0 technologies identified from literature and real cases are discussed in detail in the following two sections.

### **4.3. Social commerce activities and business goals**

This research adopts the point of view of Liang and Turban (2011), Bughin et al. (2007), Constantinides and Fountain (2008), and Anderson et al. (2011) in identifying and implementing

specific social commerce activities using Web 2.0 technologies to achieve specific business goals. Table 4-1 summarizes those activities.

First, Liang and Turban (2011) classify social commerce activities in four categories, namely “social media marketing”, “enterprise management”, “technology, support, integration” and “management and organization.” This categorization broadly exemplifies activities related to commercial intentions and involvement through the use of social media.

Bughin et al. (2007) list three purposes for using Web 2.0 technologies to achieve business goals: internal purposes, customer-related purposes and working with external partners/suppliers. These purposes are largely meant to increase speed, effectiveness, numbers, and revenue; and to reduce costs and time.

Constantinides and Fountain (2008) list reaching and informing new online opinion leaders, listening to customers’ voices, personalized one-to-one marketing and launching corporate blogs and podcasts as a channel of interaction with customers, partnering with talented amateurs and providing customers with personalized products.

Lastly, Anderson et al. (2011) list activities using social media, particularly for marketing; branding, content creation, traffic generation, engagement, innovation/ideation, lead generation, purchase decision, loyalty/advocacy, and after sales service.

In summary, social commerce activities can be divided into three main categories: marketing, operation, and management. This research, as well as other social commerce research magnify, *inter alia*, marketing purposes. For instance, although the research by Liang and Turban (2011) is not limited to marketing aspects, social media marketing still takes up one out of four total activities. In Bughin et al. (2007), increasing the effectiveness of marketing takes up fifty-two percent of customer-related purposes. The research by Constantinides and Fountain (2008) is mostly about customer relations (rather than about operation or management). In fact, the classifications from Anderson et al. (2001) and Bughin et al. (2007) are dubbed “marketing funnel” (i.e., awareness, consideration, conversion and loyalty), which was and still is being used in marketing. Thus, the aforementioned social commerce activities could be classified by this marketing funnel, as can be seen in Table 4-1.

**Table 4-1. Social Commerce Activities**

<b>Bughin et al(2007)</b>	<b>Anderson et al., (2011)</b>	<b>Constantinides and Fountain(2008)</b>	<b>Liang and Turban(2011)</b>
Awareness	Branding Content creation	Informing new opinion leaders	Social Ads / promotion Viral marketing: recommendations / referrals / affiliate marketing Video marketing
Consideration	Traffic generation Engagement Innovation / Ideation Lead generation	Listening to customer's voice Personalized one-to-one marketing Partnering with talented amateurs	Marketing research: rating / reviews Forum / discussion group / Social interaction
Conversion	Purchase decision	Providing personalized products	Direct selling
Loyalty	Loyalty / Advocacy After sales service	Interaction with customers	Social CRM, customer service

However, there is a new version of the marketing funnel dubbed the new customer lifecycle consisting of the following four phases. *Discover* is the phase where a customer discovers brands, products or the needs for products through positive word of mouth or other accessible media. *Explore* refers to a customer's journey of browsing, testing or trying a certain item to experience it until the purchasing decision is made. *Buy* includes not only purchasing activity but inventory look up, perceived actual value of the item, and the buying experience. Finally, *Engage* refers to the customer's activities after the purchase (Noble, 2012).

As Munchbach (2013) points out, the previous marketing funnel does not seem to reflect the customer's standpoint. In other words, it is written from an organization's point of view. In the new customer life cycle customers discover, explore, buy and engage, whereas organizations endeavour to have customers discover in order to be aware of the brand and products, have them explore and be informed enough to consider the products, and have them buy, to be converted into actual buyers, and have them engage, as loyal customers.

Therefore, with the new customer life cycle, which stands for a customer’s perspectives and the marketing funnel, which represents an organization’s standpoints, achievable business goals from social commerce implementation can be organized as shown in Table 4-2.

**Table 4-2. Customer and business goals in social commerce**

Customers (enablers)’ goals	Business goals
Discover products	Awareness: To have enablers discover
Explore to search for product information	Consideration: To have enablers explore
Buy the products	Conversion into actual customers: To have enablers buy
Engage to contribute to the customer’s experience from discovering to buying	Loyalty: To have enablers engage

Finally, one point that should be kept in mind is that, from the customer’s perspective, activities would directly reflect the participative characteristics of Web 2.0, such as contribution, engagement, participation, collaboration, interaction and communication, and these participative activities involve the whole spectrum of activities from the business perspective including discover, explore, buy and engage.

#### **4.4. Applicable Web 2.0 technologies**

##### **4.4.1. Findings from the literature**

Table 4-3 summarizes our literature review on Web 2.0 technologies for implementing social commerce. Although the naming / categorizations are slightly different (i.e., researchers named /

categorized them as Web 2.0 technologies, Web 2.0 tools, social software, social applications, social tools, etc.), to us they all refer to Web 2.0 technologies.

**Table 4-3. Web 2.0 technologies for social commerce**

Web 2.0 technologies supporting business	Video sharing, blogs, social networking, RSS, wikis, podcasts, rating, tagging, P2P, micro-blogging, Mash-ups, prediction markets	(Bughin et al., 2007)
Components and functions used for social commerce	Profiles, photos, blogs, tags, groups, forums, widgets, APIs, videos, events	(Leitner & Grechenig, 2009)
Application types; Web 2.0 as commercial platform	Blogs, social networks, communities, forums/bulletin board, content aggregators	(Constantinides & Fountain, 2008) (Constantinides et al., 2008)
Social media for social commerce	Blogs, wikis, micro-blogs (Twitter, Plurk) Social networking sites (Facebook, LinkedIn) Presentation sites (Youtube, Flickr) Social shopping sites (Kactoos) Group buying sites (Groupon)	(Liang & Turban, 2011)
Social software for business	Wikis, blogs and feeds, social networks and guides, social bookmarking, Virtual worlds	(War, 2008)
Web 2.0 technologies for business	Wikis, blogs, RSS filters, Folksonomies (social bookmarking), Mash-ups, podcasts, crowd sourcing, social networks, virtual worlds	(Andriole, 2010)
Social Applications	User profiles, groups, forums, photos, videos, comments, ratings, reviews, recommendations	(Dennison et al., 2009)

#### 4.4.2. Findings from website observations

As claimed by Wang and Zhang (2012, p. 2), “there are only a handful of academic studies that touched upon some aspects of social commerce”. This is on account of the fact that social commerce is a new coinage, although the fundamental concept is not (Marsden, 2010). However, we believe that

real case examples from organizations that have deployed Web 2.0 technologies for their e-commerce offerings are sufficient for our research to enable us to identify other available Web 2.0 functionalities that could be added to the list of technologies in Table 4-2.

To fulfil this task, we adopted and simplified the method used by Leitner and Grechenig (2009) in their effort to identify web service components and functions. They selected, categorized, evaluated, clustered and then analysed three different types of websites: e-commerce, social commerce and social networking websites. We followed the following steps:

1. *Search*: e-commerce and other websites that were titled or tagged as social commerce were searched
2. *Visit*: the websites seized from the first step were visited for verification purpose
3. *Verify*: each website from the previous steps was reviewed to verify whether it has Web 2.0 features
4. *Identify*: Web 2.0 functionalities to enable social commerce activities were identified
5. *List*: the verified websites as well as the identified Web 2.0 functionalities were listed
6. *Categorize*: the identified Web 2.0 functionalities were categorized in accordance with each characteristic and function

As discussed earlier, since most e-commerce websites presently utilize Web 2.0 technologies, they were included in our analysis. In addition, websites titled or tagged as “social commerce” were searched using web search engines (Google and Yahoo), and a list of social commerce websites from tech magazines (Wired, Tech Crunch and Mashable) was also obtained. Each website was visited and reviewed, first to verify if its characteristics fit into the concept of social commerce refined in Section 4.1, then to identify the Web 2.0 functionalities being used for social commerce activities (see Appendix I. website selection criteria and Appendix II functionality selection criteria). The verification process was required to exclude irrelevant sites. Due to the nature of search engines that grab data based on their unique indexing from relevant keywords, sometimes, the list of links is not necessarily one hundred percent accurate. Some links hardly fit into the description of social commerce. Moreover, some links in the list obtained from tech magazines were discontinued or merged with others. Hence, those irrelevant and discontinued websites were eliminated. Finally, a

total of forty websites were listed and recorded, until we found overly repeating features on the websites.

We identified two distinct categories among the listed sites: (1) social commerce websites run by firms to enhance user engagement and contribution, and (2) social commerce solution providers who provide Web 2.0 functionalities for clients who want to implement social commerce. Once again, due to the way search engines work, solution providers were also suggested by search engines. In addition to being categorised in two groups, the identified and verified websites were recorded based on the forms of social commerce as listed in the previous section. Concurrently, Web 2.0 functionalities that enable social commerce activities were seized and categorized as seen in Table 4-4.

**Table 4-4. Web 2.0 functionalities categorized by forms of social commerce**

<b>Forms/Types of social commerce</b>	<b>Web 2.0 Functionalities</b>
Online shops utilizing Web 2.0 technologies	Personal profile, Rating, Q&A, forums, reviews, comments, tags Video instruction or demo, chat Connecting with social networks by sharing or Like button Redemption , deals, coupons, flash sales, other offers Newsletter or e-mail subscription Listings: favourite list, watch list, wish list
Social shopping or bookmarking	Listing or bookmarking Forum, blog, community Video sharing, commenting, recommendation, tagging, reviewing, rating, sharing, referrals Connecting with a social network by sharing or Like button Buttons: Like, Love, Have, Want, Own, etc. Newsletter subscription
Social network utilized as social commerce implementation	Personal profile Tagging, invitation, event scheduling, sharing, Q&A Various third party event apps attached on a social network, particularly on Facebook Buttons : Like, share, recommend, comment, follow, log-in,

	snippet and registration Photo and video posting Deal, coupon, sweepstakes, other offers. Social store: selling specialty merchandise or digital products such as music
Social commerce solution providers	Social network integration (particularly Facebook) Social rewards, incentives, points, credits, gift cards, cash back Listing / Video sharing Referrals, rating, commenting, reviewing, voting/ polls, invitation, snippets, badges, Q&A, apps, campaign, Redemption, flash deals, coupon, sweepstakes, discount, donation Buttons: Want, Own, Wish, Wear, Need, Love, LOL, Hype, Fav, Eat, Drink, Dig, etc. Blog, news, forum, community Social store creation on Facebook, group buying Analytics APIs, widgets

Note that the Web 2.0 functionalities categorized within “social network” are exclusively from Facebook. First of all, there are plenty of social commerce examples on Facebook, whereas on Google+, social commerce implementors rely mostly on posting photos and videos because there are no supplementary applications that enable or enhance the social activities that can be attached within Google+, although the postings can contain links to web applications outside of Google+. Moreover, a social commerce service provider like Chirpify offers payment mechanisms which can be attached on Twitter, so that it can pursue social commerce, yet due to the characteristic of Twitter where postings disappear faster from the top, it was hard to find good Twitter examples.

The identified Web 2.0 functionalities considerably overlapped with those found in the literature, namely video and photo sharing, rating, tagging, social bookmarking, blogs, social networks, and so forth. One must be aware is that some of them function in similar ways but are named differently. For example, reviewing and commenting are technologically the same function, yet they are named differently. This is not because they are different functions but because they were meant for different

uses. Similarly, forums and discussions appear to be the same, although there might be slight differences.

Excluding the Web 2.0 technologies identified in the literature, there are several features that are worth revisiting.

*Buttons:* one of the most popular items is expression buttons such as the Like button on Facebook (for convenience, they are named buttons in this research). In addition to the Like button, there are various kinds of buttons including Want, Love, Have, Own, Dislike, etc. These are a way for users to express their feelings about news, comments, products and services.

*Bookmarking or listing:* listing is not a new function as it has been used in the form of wish lists by most e-commerce websites for a long time. When a user wants to save a specific item, he can have a list of the items and later decide whether or not to buy them. On the other hand, social bookmarking is somehow an extended form of wish lists because a user in this case can create a list of items identified from any number of websites and share the list with others. However, the fundamental functionality - that it saves a list of certain items - is the same, and the difference is whether the list is within the user's domain or not.

*Promotional offers (deals, coupons, redemption, flash sales):* these online offers are not necessarily Web 2.0 technologies, but are often used by social commerce implementors for the same reason as photo or video sharing (uploading a photo or video is not a characteristic of Web 2.0, but by sharing, it becomes Web 2.0). Information about online deals and temporary coupons are delivered to users through social network newsfeeds, and whoever is interested in the information can share it with their friends and colleagues. The expected effectiveness of these online offers could be first to increase product recognition and brand awareness by sharing the information, and second to quickly reduce the inventory of certain products because this way is faster and cheaper than when the advertisement airs on TV and physically posted on local stores. Above all, this requires users' collaboration and participation to be effective.

*Q&A:* this is not a new function as it has been long used on many websites (e.g., Q&A on online shops or corporate homepages). Q&A nowadays, however, is used between users;

users posting questions and other users who know the answer replying to them. It is therefore safe to say that Q&A is now characterized as user collaboration.

The most salient point from this identification process is that these Web 2.0 functionalities are correlated, and ultimately, the sharing function takes the uppermost role when implementing social commerce. For example, one of the most commonly used means is photo uploading. Photos are not just uploaded but shared in order to be meaningful social commerce activities. An individual can create his own wish list, but when the list is shared, it becomes a social activity. As exemplified in Section 2.4, Flickr has the same function as other image sharing websites but because Web 2.0 is a notion - there is no Web 2.0 technology - technologies named as Web 2.0 have evolved from web 1.0, or their functionalities have expanded. In other words, functionally, photo or video uploading and bookmarking are not dissimilar to previous legacy services but with the sharing function and used as means for participation, contribution, or collaboration, they become Web 2.0 technologies.

These Web 2.0 functionalities are not assigned to specific activities. They are flexibly applied to activities in accordance with intended uses. For instance, to inform online opinion leaders about new products and services, micro-blogging is not the only option; social networking features like Facebook and RSS can also be utilized for this purpose. In addition, rating, reviewing or voting can be used to fulfil business goals in the *Explore* phase by allowing potential customers to explore information before making a purchasing decision. At the same time, these Web 2.0 functionalities are deployed to fulfil the goals of the *Engage* phase by letting customers engage in contributions, hence they are not assigned to fulfil specific business goals either. Rather, they can be utilized wherever appropriate.

#### **4.5. Implementation of Web 2.0 technologies for social commerce**

Different types of social commerce have been identified in the literature, namely online shops utilizing communicational means such as ratings and reviews, blogs with e-commerce functionalities (or linking to online shops), social network fan pages, and social shopping. To use Web 2.0 to implement social commerce there are three different ways: (1) utilizing existing Web 2.0 technologies without modification or customization; (2) utilizing and customizing existing Web 2.0 technologies for enhanced performance and effectiveness; and (3) developing a totally new functionality that fulfills specific business goals.

#### **4.5.1. Utilizing existing Web 2.0 without customization**

The biggest advantage of utilizing Web 2.0 technologies is that they are readily available, so organizations do not feel the need to develop entirely new ones. As Rowan and Cheshire (2011) stress when discussing the advantages of tapping into user profiles, when using available services, organizations have access to wider audiences and potential members since there are already millions of users using these services. Indeed, according to (Constantinides and Fountain, 2008, p.237), “50 per cent of professionals participate already in social networks.” For this reason, regardless of their size or industry, plenty of organizations open and link to their social media websites such as Facebook and Twitter, even though they have their own corporate and/or e-commerce websites.

For example, companies such as Motorola, Audi and Nine West utilize social media sites like Google+ and Twitter to promote their products and brands by posting news and photos. This does not require any development work, but just having these channels provides communication and interaction with users and potential customers. Also, individual sellers can utilize existing e-commerce platforms (e.g., eBay or Etsy) with social networks to create an interaction channel with buyers, or they can utilize social shopping networks (e.g., Kaboodle, ThisNext) where there is community connectedness. This does not cost them anything since all they have to do is register with the available services.

Another simple way to implement social commerce is to adopt the solutions provided by social commerce providers such as Shopigniter, Vendershop, WishPond, MoonToast, CrowdFactory, Bazaarvoice, etc. Basically, Social commerce solution providers develop completely new software that fits perfectly within their clients’ business processes, or they provide pre-developed, easy-to-deploy, configurable social commerce software. Their provision coverage varies widely. Some offer online store functionality for social networks such as Facebook and Twitter, while others provide packages that cover the whole spectrum of social commerce (e.g., promotional means such as share button and sweepstakes; engagement means such as voting; commenting and rating; and analytical means such as traffic view, social network status, amount of comments, etc.).

For example, WishPond, a social commerce solution provider, offers an e-commerce package that can be installed on Facebook as a Facebook App. Clients register the service and initial setup for the shop by providing basic information about the company (name of the business, pricing, shipping,

contact information, etc.). WishPond also offers various functionalities such as discounts, coupons, limited time deals as well as buttons such as Want, Own, Wish, Need and Love.

Moreover, solution providers differentiate service levels to satisfy a variety of clients' needs. For example, if the social commerce implementors are new to the field or are individuals, they may not want a fully customizable, enterprise-level solution. Instead, they may want to start with a small attempt to see if it works, or they may need just a couple of functions. The easy-to-use platform is a pre-developed solution that offers multiple functions to perform tasks without a great deal of development effort.

The pros of utilizing these platforms are that they are easy to start, there is no development process or need to hire developers, no hardware provisions, no maintenance, they are inexpensive compared to developing your own, they are less risky (e.g., when it is not supporting the business, one can simply stop using the service). The cons include, among other things, the fact that some functionalities may not be applicable to a client's unique situation, which might call for a costly customization - the more sophisticated the functionality, the more complicated and expensive the customization.

#### **4.5.2. Utilizing Web 2.0 technologies as a platform to create Web applications**

When people are online, they spend seventeen percent of the total time on Facebook (Nielsen Company, 2012). This indicates a greater advantage of integrating with social media versus having standalone applications that initially have no access to a pool of user data. In addition, people on social networks are linked to their friends and colleagues, meaning that once they subscribe to receive news, photos or any information, there is a higher chance that the information is exposed to their friends and colleagues.

The second way of implementing social commerce by companies is to utilize Web 2.0 technologies as a platform to create Web applications. Müller and Thiesing (2011) discuss the use of Facebook APIs by companies, in particular Facebook profile page which is a fundamental attribute that indicates the identity of each user, groups where users with a common interest communicate with each other, fan pages that are intended to be used by social commerce implementors to create their own brand pages, and finally, apps which are a type of interface embedded in Facebook as integration.

They also describe other resources for creating Facebook apps such as Open Graph API, SDKs and social plugins.

Integration with social media services using available resources is important. As O'Reilly (2007) highlights, the characteristics of Web 2.0 are "lightweight programming models" and "good at reuse", which specifically refers to web services that provide a highly reliable programming environment. First of all, available resources consist of web APIs or web services provided by social media services such as Facebook, Google and Twitter. For instance, Facebook Open Graph API is a critical part of application development, allowing developers to access users' data (Müller & Thiesing, 2011). Users' data includes profile, friends list, location, education, occupation, etc. Of course, standalone web applications can be created to perform activities such as tagging and reviewing without having to connect to social media services. However, utilizing publically available resources has the advantage of opening up the door to access a wider range of users with connections to other uses on a social media site.

To better understand the use of APIs, it is worth studying the integration methods, particularly for Facebook APIs and Google APIs, which are commonly mentioned in the research literature. We present those integration methods in the following paragraphs.

### ***Facebook Social Plugins and APIs (from Facebook Developers)***

The heart of social media is the connections between people and the networked power, and that is the main reason to rely on social media for social commerce implementation (Müller & Thiesing, 2011). Social Graph, also called Open Graph, represents the connections and the networked power formed on Facebook. A graph is a data structure that consists of connections of nodes, and the data is accessed by querying nodes and connections. To tap into the social graph, Open Graph API, FQL and Legacy REST are provided as the means, and there are two ways to implement social commerce using these APIs.

The simplest way is to use plugins such as Like button, Login button, Comments and others. Plugins are provided by Facebook so users can copy their code and paste it into their webpages to deploy the functions without creating code. To use these plugins, a slight setup is required. For example, the comment function can be attached to a user's webpage using one of Facebook's plugins. A user only needs to provide the URL of the webpage, adjust the comment area to the desired size, adjust the

number of posts that will be listed on the page, and select the color. After the adjustments, the code can be obtained by clicking the “Get Code” button. Then, the code can be simply pasted into a desirable webpage. It is simple but strong, as it connects with millions of people because the simple comment button is linked to the user’s Facebook profile data.

In addition to plugins, web apps created on a website and integrated into Facebook using APIs or SDKs can be attached to Facebook. The Open Graph API gives apps access to the resources. Web apps can be created using actions and objects. To use Open Graph, there are a couple of terms that developers should be familiar with.

*Graph:* In Facebook, users are connected to their friends. When a user posts a story through an app, the posting contains not only texts or photos but also the user’s relationship behind the scene. For example, the user may share a posting with all his friends, selective friends or the public and the related connections of the posting are saved in Facebook as a form of Graph.

*Actions:* Actions are simply verbs to describe a user’s action such as Listen, Rate, Watch, Quote, Create etc.

*Objects:* Objects are simply nouns to indicate a place where an action is taken. An object can be an article, website or blog. Objects are entirely dependent to an action. For example, if an action is Like, a user can like any objects such as a book, music, article and movie, etc. However, if an action is Read, then a user can read a book and article but not music.

An object is defined using meta tags (e.g., <meta property=”og:type” content=”article”>). There are common actions created by Facebook and custom actions that a developer can create using the Open Graph tool.

One of the common actions is Like – *og.likes*, and using the Graph API, it can be used as follows:

```
$response = $facebook->api( 'me/og.likes', 'POST', array(...
```

If an app has a function to post a story in a timeline, then the posting in the timeline will display the user’s action about the object along with the posting. With the examples above, the posting will display “(a name of the user) likes an article on (origin of the posting)”.

Here is an example of the use. Open Graph can be used for a movie company by creating an app that introduces new movie information. Whenever the information is shared by a user through the app, the information will be posted to the user's timeline along with a self-created message such as "Shila likes Star Trek". In this case, *Shila* is the user's name, *likes* is the action and *Star Trek* is the object. The action is defined in Open Graph while the object is defined in the code of the app. All the related information can be fetched, so the company can list who liked the movie and the potential people who are connected to the user.

Custom actions can be created by setting the Open Graph tool. For example, actions such as Join, which does not currently exist in Facebook, can be created as long as it is a verb. For this action, objects such as Community can be created. Because Join and Community did not exist, specific configuration to define how they work is required. Once the action and the object are set, five different types of code are ready to be copied: Curl, iOS SDK, Android SDK, JavaScript SDK and PHP SDK, so developers can choose and copy any type they want and apply it to their application.

FQL is another way to access the social graph by simply querying the data and there are tables available to be called. The use of FQL is the same as the use of SQL, so any field from the tables can be called using simple query language. For instance, if user information such as the name, username, location and profile image is needed, then it can be done so as follows;

"select name, username, locale, pic\_small from user where uid=(the user's uid)"

Although the example above does not require permission to access the data as long as it is the person's information, some of the information requires to get permission to access it: user likes, education history, notes, email, birthday, etc.

The third way is to use REST API. In fact, REST API is being deprecated on Facebook but is still available. Facebook provides several methods such as Administrative, Login, Data Retrieval and Publishing methods and their parameters. Use of REST on Facebook is the same as described in the previous section. To add a comment, for example, the *comments.add* method is available and its parameters are text, xid, object\_id, uid, title, url, publish\_to\_stream to be used to add the comment (text) to a certain posting (object\_id).

Once a web app is created, it has to be added to Apps on Facebook Developers by setting up a base environment for the app to perform properly. For the setting, all information regarding the app has to be provided such as the name, location, size, description, icons, contact info as well as optional

information that might be used for advertising purposes. After adding the app, App Id and App Secret which are unique for the specific app are also created.

### ***Google+ Plugins and REST API (From Google Developers)***

Google also provides plugins that can be attached on websites although these are not as diverse as those on Facebook. The provided functions are the +1 button, which is the same as the Like button on Facebook, Share which is same as Send on Facebook, Badge that links to a person's Google+ profile to add to the circle or to follow, and Snippet, which can be displayed as a user puts a title, short description and image. These plugins are provided with code that can be readily copied and pasted on any webpage.

In addition to these plugins, public data stored on Google can be called using REST API. There are three types of resources: People, Activities and Comments. People is where Google+ user profiles are obtained, so basically it contains personal information such as name, birthday, gender, image, id, email, etc. Activities include posting data such as photos, videos or stories. Comments are literally comment data from Google+. All three different types of resources can be fetched and listed. For example, a user's profile can be called using "People: Get" method and a list of comments from a certain posting can be fetched using "Comment: list". One of the APIs that could be used for social commerce is the History API, which provides features that enable web apps to save and share users' activities or any events that can be manifested through their postings. For example, a user can post about their activities such as a trip to New York, playing a board game with friends or going to a movie. In Google's definition, these are called "moments" and the moments are stored in Google+ History. A web app using Google+ History API can write moments by calling HTTP POST, different types of moments such as a moment where a user purchased, commented, listened and viewed, can be defined. Of course, it records users' information and activities, so users' permission and access tokens are required to perform this function. Users can also see each of their moments. Once they permit the web app, a history tap is created on the users' Google+, then, they have options to share all or selected moments.

Unfortunately, unlike Facebook, Google+ does not support posting. In the case of Facebook, it provides Publishing Methods such as comments, links, notes, photos, stream, etc., so that by using Facebook API a web app is able to take a role to post comments, notes or photos on Facebook.

However, by using Google+ API, data such as user profile, comments, links or photos can be fetched, but comment, links or photos cannot be added to Google+ through a web app.

#### **4.5.3. Developing totally new software that fit into the business**

Amazon and eBay created their own rating, commenting and forum functionalities for their e-commerce websites. The advantage of developing one's own web apps or services is that implementors can create web apps that best suit their business needs and goals without limitations. Note that our research focuses more on the second approach than on the first and third ones because the first approach is achieved by registering desirable services while the third one is nothing more than developing new software. The second approach consists of using existing Web 2.0 technologies and enhancing their effectiveness. In other words, our research primarily deals with available Web 2.0 technologies including other functionalities and how to use them effectively for social commerce.

## **Chapter 5: Demonstration of the concept of social commerce**

This chapter demonstrates the concept of social commerce as refined in Chapter 4 by developing prototypes of social apps that perform social commerce activities. We selected specific social commerce activities for each business goal stated in Chapter 4, as well as Web 2.0 technologies to perform those activities.

### **5.1. The prototyping process**

According to Steenkamp and Van (2004), a prototyping process is comprised of the following stages: (1) planning the prototype; (2) defining and refining the prototype requirements; (3) developing the prototype and documentation; and (4) reviewing the prototype. Although this prototyping process was suggested for in a Business Process Redesign (BPR) project, Shaheen (2011) adopted it to develop a prototype of an e-commerce portal in order to demonstrate how the concept of e-portal can be implemented. Along similar lines, we adopted the prototyping process suggested by Steenkamp and Van (2004) for our research as follows: (1) planning of prototypes; (2) technological requirements; and (3) application development.

### **5.2. Design and development**

#### **5.2.1. Planning of prototypes**

Hitherto, we have taken a look at social commerce activities that facilitate the achievement of certain business goals, and Web 2.0 technologies to enable those activities.

Here we use prototyping to develop social apps that realize a set of specific social commerce activities to achieve a set of specific business goals. Each social app includes several Web 2.0 functionalities.

**Table 5-1. Types of social apps to perform social commerce activities**

<b>Types of social apps</b>	<b>Social commerce activities</b>	<b>Business goals</b>
Discount coupon sending	Viral marketing	Awareness
Rating items	Market research	Consideration
Limited time sales	Direct sales	Conversion
Photo contest event	Loyal customer contribution	Loyalty

The selected social commerce activities (see the discussion and the justification for this selection in Chapter 2), the web applications that enable them and the corresponding business goals to achieve are all listed in Table 5-1. They are *discount coupon sending* for viral marketing, *rating items* for market research, *limited time sales* for direct sales and finally, and *photo contest event* for loyal customer contribution.

**Table 5-2. Selected social commerce activities and scenarios**

<b>Business goals</b>	<b>Social commerce Activities</b>	<b>Scenarios</b>
Awareness	Sending discount coupon for viral marketing	<ul style="list-style-type: none"> <li>• Users send a coupon to their friends to get a discount</li> <li>• User can get discount coupon only if more than one person buys more than one item</li> <li>• 50% off for two or 60% off for three people</li> </ul>
Consideration	Rating items for market research	<ul style="list-style-type: none"> <li>• Users can rate and comment on each item</li> <li>• Users can share each item's information</li> </ul>
Conversion	Limited time sales for direct sales	<ul style="list-style-type: none"> <li>• User can buy certain limited items within a limited time</li> <li>• The information of this limited time sales can be shared by users</li> </ul>
Loyalty	Photo contest event for user engagement	<ul style="list-style-type: none"> <li>• Users can post their photos which promote a certain product sold by the event holder</li> <li>• A user can ask or invite friends to vote on the one's photo by sending messages</li> <li>• Users can comment on each photo</li> </ul>

Table 5-2 summarizes scenarios for each selected social commerce activity and the functionalities of each social app prototype. The details are as given below.

### ***Sending discount coupon***

- Description: Types of social events held by social commerce implementors are numerous and decisions to select a certain type of event could depend on what social commerce implementors want to pursue, yet the purpose is usually the same; events require participative activities which will lead to the promotion of a certain item and its brand name by social media users themselves. Constantinides and Fountain (2008) found that purchasing decisions are strongly influenced by peer reviews, referrals, social networks and forums. Thus, coupon sending by networked friends can be more persuasive than that by the brands directly.
- Scenario and process: The scenario of the coupon sending for a discount deal is that a user can get a discount coupon, which can be used in a store, by sending a message of this discount deal to friends on a social network and suggesting to them to purchase together, so that they can get a 50 per cent discount on any product in the store. The condition of the discount deal is that the user has to send a message to his friends. Of course, the user can just print out the discount coupon for his own use without spreading the word to his friends. To prevent this from happening, the user has to invite a friend to get a discount of 50 per cent, and two or more friends for a discount of 60 per cent. The process of the scenario is that a user sees the information of the discount deal and selects one or more friends to send the discount deal to. After sending it, the link to the discount coupon is immediately visible for the user to print out. At the same time, the friends who have received the message can also see the link to the discount coupon along with the friend's message, and can click it to print the coupon.

### ***Rating items***

- Description: As discussed earlier, consumers no longer rely on traditional marketing media such as print or TV ads, but rather they tend to believe peers' opinions more. At the same

time, rating is one of the most critical means for sellers to respond to consumers (Dennison et al., 2009) because rating and commenting reflect what consumers really want and how they want it. Therefore, the data collected from ratings and comments is a critical resource for product development and/or improvement (Dellarocas, 2003; Lee et al., 2008).

- Scenario and process: The rating application scenario is that users are regular visitors to a corporate social network page, so there is a higher chance that new information provided by the social commerce implementor can be readily exposed to users. When a user accesses the corporate social network page, he can rate, share and like one of the items within the page, and can also comment on the item.

### ***Limited time sale***

- Description: One classic marketing strategy to sell products is to have customers feel the products are somewhat special, by giving them limited access, limited offers, limited availability or time sensitive deals because when resources are scarce, people tend to put more value on them (Marsden, 2010). In addition, the “Buy” stage in Forrester’s new customer lifecycle includes perceived actual value of items and the experience from the customer’s standpoint (Nobel, 2012). Therefore, this application could offer a chance for customers to have an experience of using the items they purchased.
- Scenario and process: This promotion is to offer only limited items for a limited time, and there is no complicated functionality required. When a user sees this limited offer through a newsfeed, he can reach to this app linking from the newsfeed and purchase items as long as the items are available by clicking the “Buy” button.

### ***Photo contest event***

- Description: User generated promotional photos of certain products are marketing resources since the participants pose as marketing personnel. Besides, the content created by users is more credible. As discussed earlier, this kind of credibility strongly affects resources, rendering them more believable, persuasive and trustworthy to customers (Amblee & Bui,

2011). By encouraging users to participate in the event, they might influence their friends by telling them about their experience regarding certain products or services. Remember that in these types of contests, participants would want to invite their friends and colleagues in order to gain more votes.

- Scenario and process: There is a functionality to encourage users to post their photos, and to allow people to vote on them, so that the photo with the highest vote will be awarded. The activity requires users to draw more people such as their friends, families and work colleagues who are willing to vote on their photos. Users have a chance to see the Photo contest event information through a newsfeed or a message from their friends. Then users can visit the Page through a link from one of them; newsfeed or message and vote a the photo they like. They also can put a comment and share any photo posted in the app.

### **5.2.2. Technological requirements**

As discussed in Chapter 4, there are three different approaches to deploy Web 2.0 technologies to implement social commerce: (1) utilizing existing Web 2.0 technologies without alteration; (2) utilizing and customizing existing Web 2.0 technologies and publicly available resources; and (3) developing totally new software. We adopt the second approach and use Facebook APIs and the plugins.

Using social plugins is a quick and easy way to implement social commerce, and despite the simplicity, plugins are strong Web 2.0 functionalities of integration which connect to a large pool of potential audiences (Müller & Thiesing, 2011). Social plugins are provided by social network services such as Facebook, Google+ and Twitter.

Note that seventy four percent of social commerce solution providers identified in this research offer integration methods with Facebook (see Appendix IV, particularly the last table – social commerce solution providers) rather than the other leading social networks, and their common claims are that: (1) Facebook is where people spend most of their online time; (2) content can be shared quickly; (3) and friends draw more friends on Facebook (see social commerce solution providers' websites such as Bazaarvoice, VenderShop, WishPond, Crowd Factory and MoonToast, etc.).

In contrast, so far, there is neither a way to attach an online shop application within Google+, nor a way to write content on Google+ via outside web applications, since writing on Google+ via outside applications is prohibited, unlike Facebook where developers can create a web application to write content which can be posted on Facebook. Thus, this feature renders Facebook more favourable for integration between a corporate website and a Facebook page.

To develop Facebook applications, we need a web server with SSL to store web applications and a database to store data. Since Facebook requires developers to provide an HTTPS web address of the application to protect user information, SSL is required on the client side.

PHP SDK has to be installed within the client’s web server before starting the development. SDKs are available at an external developer’s community: github. Each web application should state the location of the SDK in order to perform correctly. For JavaScript, there is no need of installation but we need one HTML document containing one line of code specifying the location of the Facebook js file.

**Table 5-3. Social apps and their required functionalities**

<b>Application type</b>	<b>Types of functionalities</b>	<b>Functionalities</b>
Discount coupon sending	Primary functions	Sending a message Displaying the information Accepting an offer Issuing a coupon
	Supplementary functions	Sharing, liking
Rating items	Primary functions	Listing, viewing, rating, Commenting
	Supplementary functions	Sharing, liking
Limited time sales	Primary functions	viewing of products, Payment
	Supplementary functions	Sharing, liking
Photo contest	Primary functions	Listing, uploading, viewing, Voting
	Supplementary functions	Sharing, commenting

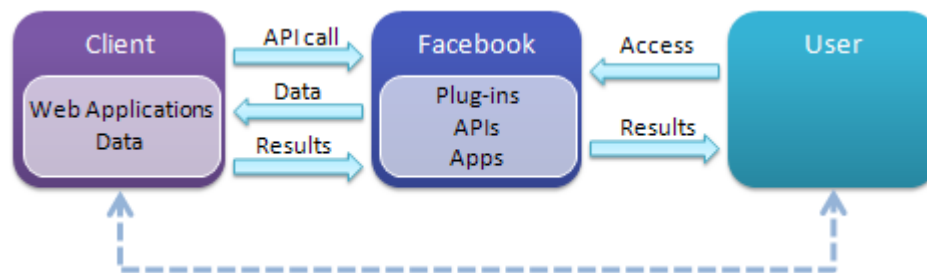
Within this environment, the functional requirements for developing each application are summarized in Table 5-3. Functionalities of each application are divided into primary and supplementary functions. Primary functions are core requirements for an application to perform its role. Supplementary functions are to support a certain application but not compulsory, meaning that an application can fulfil its tasks without the supplementary functions. The detailed descriptions are as given below.

- *Discount coupon sending*: To perform this functionality, the discount deal information page is required, and functions for sending a message, issuing a coupon and a page that will be viewed by the recipient are required. Supplementary functions for this scenario are Liking and Sharing.
- *Rating items*: The primary functionality for this application is rating and commenting since the purpose of this scenario is to collect data from people. Thus, required functions to perform this scenario are listing, rating with scale of one to five and commenting of each item. Supplementary functions to support this application are Liking and Sharing.
- *Limited time sales*: The required functionality for this application is Viewing of items and Payment. Supplementary functions to fulfil this scenario are Liking and Sharing. However, because it is not a regular online shop that sells items permanently, it does not necessarily need to have regular e-commerce functionalities such as product catalogue, searching, shopping cart or tracking purchase history.
- *Photo contest*: What is required here are functionalities for listing, uploading, viewing and voting on the photos. Supplementary functions are Sharing and Commenting of the photos. Listing, Uploading and Viewing are created in the form of web applications, while Voting, Sharing, Liking and Commenting are deployed using Facebook plugins. Particularly, the Facebook Like plugin is used to perform the voting function. Note that the Like plugin only allows one liking per person, and the liking data is stored on Facebook.

### 5.2.3. Application Development

The development stage consists of the following steps: (1) installing PHP SDK; (2) creating a Facebook Page; (3) creating independent web applications on the client side; (4) registering the web applications on Facebook developer (registering is what Facebook calls “creating apps” and it is explained in the communication architecture below); (5) modification of the applications if needed (e.g., some functions require a unique access token to perform, and in order to obtain it, the App ID and App Secret, which are created after the registration, are required); and finally (6) add the apps on Facebook Page Tap. Once the web application is completely settled as a Facebook app, in some cases, users’ permission is required to access their profile when they first access the app.

#### 5.2.3.1. Development environment



**Figure 5-1. Social app communication map**

Figure 5-1 shows the whole communication flow between a client and the server (i.e., Facebook). When an app is displayed with data from Facebook, the app needs to call the corresponding Facebook APIs (e.g., when it accesses a user profile). Then, Facebook returns the data to the app, and using the data, it can show the complete results to the user.

The development environment we used for our prototypes is PHP5.3, Mysql 5.x on a Linux server with Quad-Core CPU (\*2) = 8Core 64bit. PHP and JavaScript were used as programming languages.

### 5.2.3.2. Plugins

The codes for the plugins consist of API calls and UI codes of the plugins. The first part in Figure 5-2 indicates an API call for the Like button and the second part defines the display of the plugin: size, color and font., etc. The codes for the Like, Send (which is same as Share), and Comment plugins were obtained by providing links of each social app at the client side..

URL to Like  
hayliespace.n

Send Button  
 Send But

Layout Style  
standard

Width (?)  
450

Show Face  
 Show fac

Font (?)  
tahoma

Color Scheme  
light

Verb to disp  
like

Get Code

#### Your Like Button plugin code:

HTML5 XFBML IFRAME URL

1. Include the JavaScript SDK on your page once, ideally right after the opening <

```
<div id="fb-root"></div>
<script>(function(d, s, id) {
  var js, fjs = d.getElementsByTagName(s)[0];
  if (d.getElementById(id)) return;
  js = d.createElement(s); js.id = id;
  js.src = "//connect.facebook.net/en_US/all.js#xfbml=fjs.parentNode.insertBefore(js, fjs);
})(document, 'script', 'facebook-jssdk'));</script>
```

2. Place the code for your plugin wherever you want the plugin to appear on your

```
<div class="fb-like" data-href="http://www.hayliespace/photocon_list.php" data-send="false" data-width="450" data-font="tahoma"></div>
```

**Figure 5-2. Like plugin setup**

(Image captured from Facebook Developers -

<https://developers.facebook.com/docs/reference/plugins/like>)

The code for each plugin is provided in HTML5 by default, therefore, most applications use HTML5 format. However, to implement the Like plugin to perform a voting activity for the photo contest, the XFBML format was used (see Figure 5-2) because this particular activity requires to seize the moment when a user clicks the Like button in order to save the clicking data into the client server. In this case, only XFBML format is accepted to perform these actions.

Unlike the Like plugin, the Send and Comment plugins required more configuration. Dialogs are a simple interaction mechanism with users, so that a user can write a message and send it somewhere. To perform a coupon sending activity using this functionality, the source code of Send dialog provided on Facebook developers was used and modified by specifying the app ID, name of the content, link to the website, font, color, a word that appears on the button. These are options that a developer can select but it can perform by default without setting the options..

This Send Dialogue provides a dialogue-popup where a user can select friends and leave a message. Then the message will be delivered to the selected friends along with the link of the event information. This is the basic function of Send Dialogue.

In fact, the application can perform without using the Send Dialogue if the sending functionality is created by a developer instead. The difference between using the Send Dialogue and creating your own sending functionality is that the Send Dialogue provides a perfect friend list and groups that are related to the user. On the other hand, in the latter case, the user may not see all friends in the list if there are friends who set up their privacy not to be searched.

### **5.2.3.3. Web applications (or social apps)**

#### **1) Installing PHP SDK**

PHP SDK was installed on the client web server to develop the web applications using PHP. In fact, both PHP SDK and JavaScript SDK were used, however, the use of JavaScript SDK does not require installation. PHP SDK is available at GitHub (<https://github.com/facebook/facebook-php-sdk>). After downloading and extracting the PHP SDK package from GitHub, the files were installed on the client side as shown in Figure 5-3. As can be seen in Figure 5-3, the files include examples and tests but

more importantly, files in the *src* directory must be on the client side in order for web applications to perform properly.

```
[xereint@uws64-043 FB]$ ls -al facebook-php-sdk/
36
drwxr-xr-x 5 xereint xereint 4096 2 19 06:46 .
drwxr-xr-x 7 xereint xereint 4096 4 7 11:09 ..
-rw-r--r-- 1 xereint xereint 11 2 19 02:43 .gitignore
-rw-r--r-- 1 xereint xereint 108 2 19 02:43 .travis.yml
-rw-r--r-- 1 xereint xereint 1058 2 19 02:43 changelog.md
-rw-r--r-- 1 xereint xereint 536 2 19 02:43 composer.json
drwxr-xr-x 2 xereint xereint 4096 2 19 02:43 examples
drwxr-xr-x 2 xereint xereint 4096 2 19 06:46 src
drwxr-xr-x 2 xereint xereint 4096 2 19 02:43 tests
[xereint@uws64-043 FB]$
```

**Figure 5-3. PHP SDK installed on the client server**

## 2) Creating a Fan Page

This is straightforward task. A Facebook Fan Page named Mini Store was created. Creating a Fan Page requires filling out a form by providing basic information about the Page. The Fan Page's initial interface is similar to that of regular individual users, so that anyone can readily set it up and modify it. Through this Fan Page, Facebook apps are attached, and can be used by any user who visits the Page

## 3) Creating independent web applications on the client side

Table 5-3 summarizes the required techniques and functions of the web applications we developed to implement social commerce activities

**Table 5-4. Required functionalities and utilization methods**

Application type	Function type	Functions	Utilization	Action taken in
Discount coupon sending	Primary functions	Sending a message	Send Dialogue	Server side
		Displaying the information Accepting an offer, Issuing a coupon	Web programmed pages	client side
	Supplementary functions	Sharing, liking	Send and Like plugins	server side
Rating items	Primary functions	Listing, viewing, rating	Web programmed pages	client side
		Commenting,	Comment plugin	server side
	Supplementary functions	Sharing, liking	Send and Like plugins	server side
Limited time sales	Primary functions	viewing of products	Simple web page	client side
		Payment	PayPal payment	third party
	Supplementary functions	Sharing, liking	Send and like plugins	server side
Photo contest	Primary functions	Listing, uploading, viewing	Web programmed pages	client side
		Voting	Like plugin	server side
	Supplementary functions	Sharing, commenting	Send and comment plugins	server side

- Discount coupon sending application:* Displaying, issuing, and recipient viewing functions were developed using PHP and JavaScript on the client side. As described previously, the Send Dialogue was deployed to perform message sending which is a primary function. In fact, at the planning and requirement stages, the sharing and liking functions were planned to be deployed, however, the Send Dialogue has the same function as the Send plugin. Besides, once a Facebook app is attached into a Facebook Page, the

Like button is automatically created for each app, thus, there is no need to insert the code for both plugins into the app.

The data regarding the sender is fetched from Facebook and the data of the coupon sender and the coupon numbers are stored on the client side.

- *Rating item application:* This is a standalone application and the information of each item is stored on the client side (see Appendix V DB tables created for the social apps), so that the rating action is taken within the client side, therefore, the rating data is stored on the client database (see Appendix VI). The Share, like and Comment plugins are from Facebook and the data created for each plugin is stored on Facebook and displayed through the plugins, thus, there is no need to develop a function to call this data.
- *Limited time sales application:* This application requires two functions; to show the items and to sell the items. The displaying function was created using HTML. For the payment functionality, there were two options; using Facebook payment or PayPal. Facebook provides a payment method for the apps within Facebook. It requires several steps to set up and to perform the payment by providing information such as organization's information including tax ID number, owner's information, bank account information – name, branch, SWIFT/BIC code and account number, finally admin information. Another way to implement the payment functionality is to use PayPal by registering for a PayPal account. PayPal is one of the most widely used methods and its plugin-like functionality allows developers to easily install a payment function on any webpage. We deployed PayPal *Buy Now* plugin in the app because if an implementor already has a PayPal account, there is no need to create a new account and provide confidential information such as bank account number.
- *Photo contest application:* The Listing, Uploading and Viewing functions were created using PHP and JavaScript. The Like plugin was used to perform the Voting function due to its functional similarity by which whenever a user clicks the like button, it stores click counts and the person who clicked. To store the click counts, the app has to catch the moment of clicking, and using the `FB.Event.subscribe` function, the click counts can be added (`'edge.create'`) or deducted (`'edge.remove'`). The code of the Like plugin was placed in the viewing page, so that users can like each item. For this implementation, a DB table of photo uploading was created (see Appendix V: 4. Table of

the photo contest) in order to store the data such as title, links of photo or uploading a photo itself and a short message about the photo. Since liking and commenting data is stored within Facebook, to display the status of liking, the liking count data is fetched from Facebook, so each time a user clicks the like button, the click count is also stored in the client database.

#### 4) Registering the web applications on the server side - Facebook

Once a web application has been created - whether completed or not, it can be registered (Facebook calls this “creating apps”) by providing the namespace, domain, URLs of the web application, icon images, name of the app and so on. After registration, the web application becomes a Facebook app with one unique app ID and app secret.

#### 5) Modification of the web applications

A Facebook app that communicates with the Facebook API needs to include app ID and app secret. Figure 5-4 is part of the code from the discount coupon sending app. As previously stated, to use PHP SDK, *facebook.php* has to be included in the code, as can be seen in line 2 in Figure 5-4. *appId* and *secret* of coupon sending app are located in line 4 and line 5 of the same figure.

The app is supposed to send a message to the user’s friends, so it needs to get a list of those friends, and in order to do so, the app must check if the user is logged in, and to check who it is and who his friends are.

```
1. <?php
2. require_once('../facebook-php-sdk/src/facebook.php');
3. $config = array(
4. 'appId' => '351329414922420',
5. 'secret' => 'e1a2acc419ef2f41b1f979dce6b29896',
6. );
7. $facebook = new Facebook($config);
8. $user_id = $facebook->getUser();
9. $access_token = $facebook->getAccessToken();
10. if($user_id){
```

**Figure 5-4. Part of source code from the discount coupon sending app**

## 6) Adding the Facebook apps on the Facebook Page Tab

Although apps were created and registered on Facebook, they are not yet visible on the Facebook Page. To be visible, they must be added as a Facebook Page tab.

Figure 5-5 is part of the code provided by Facebook Developer, and modified for the photo contest app. The source code specifies the app ID at line 4 and the location of the web application at line 17 in Figure 5-5.

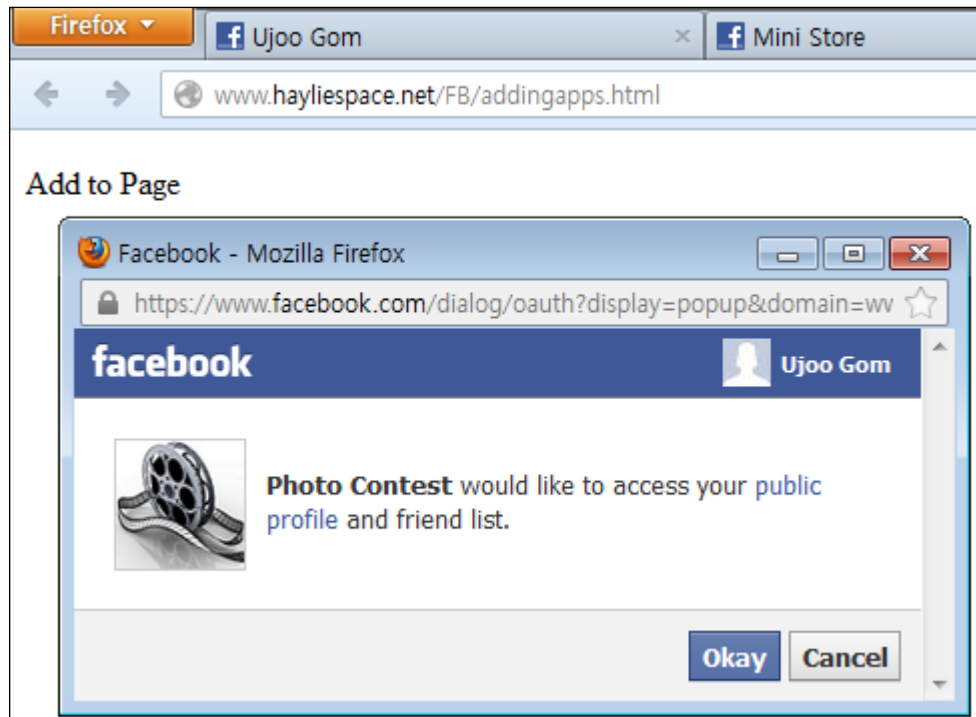
```
1. window.fbAsyncInit = function() {
2. // init the FB JS SDK
3. FB.init({
4.   appId      : '326702837451847', // App ID from the app dashboard
5.   status     : true,              // Check Facebook Login status
6.   xfbml      : true,              // Look for social plug-ins on the
   page
7.   cookie     : true
8. });
9. // Additional initialization code such as adding Event Listeners goes
   here

10.  FB.getLoginStatus(function(response) {
11.    if (response.status === 'connected') {
12.      // adding aap
13.      function addToPage() {
14.        // calling the API ...
15.        var obj = {
16.          method: 'pagetab',
17.          redirect_uri:
            'https://www.facebook.com/lab6142/app_326702837451847',
18.        };
```

**Figure 5-5. Source code for adding an app to a Facebook Page**

When the code shown in Figure 5-5 is executed, a web browser will display as in Figure 5-6. This adding function has to be created for each app to appear in the Facebook Page. For the final step, once the “Okay” button in Figure 5-6 has been clicked, the app can be displayed on the main page as in Figure 5-7. In the same way, all four apps: coupon sending, rating items, limited time sales and photo contest apps appear on the main page (see Figure 5-7).

Anyone who accesses the Mini Store Page can use these apps. In some cases such as using Photo contest and Discount coupon sending apps, user permission is required to access user data.



**Figure 5-6. Adding an app into a Facebook Page**

Basically, this Mini Store is open to the public, so anyone including non-Facebook users has access to the Page and can view each content and the apps, however, non-Facebook users (or users not logged in) must register to Facebook as a member, or log in to use the apps. Because the biggest advantage of using services such as Facebook is to access a wider range of users which can be potential customers, whoever is interested can, at least, see the information.

Herewith, four Facebook apps that perform selected social commerce activities were developed following the prototyping process described at the beginning of Chapter 5 (planning of prototypes, defining technological requirements, and developing the prototypes). The final step, reviewing the prototypes, is discussed in the next chapter.



Figure 5-7. The Facebook Mini Store Page

### 5.3. Running the apps

#### *Awareness (To have customers discover products): using discount coupon sending app*

The coupon sending app allows a user to send a message to his friend (or friends) by clicking the “Send a message to your friends” button as shown in Figure 5-8. If the user is currently logged in (in most cases due to the fact that users would mostly discover this while they are logged on to Facebook), it pops up a message dialogue for the user, as in Figure 5-9. If it is the first time for the user to access the app, it asks the user to allow the app to obtain one’s data, particularly a list of friends.

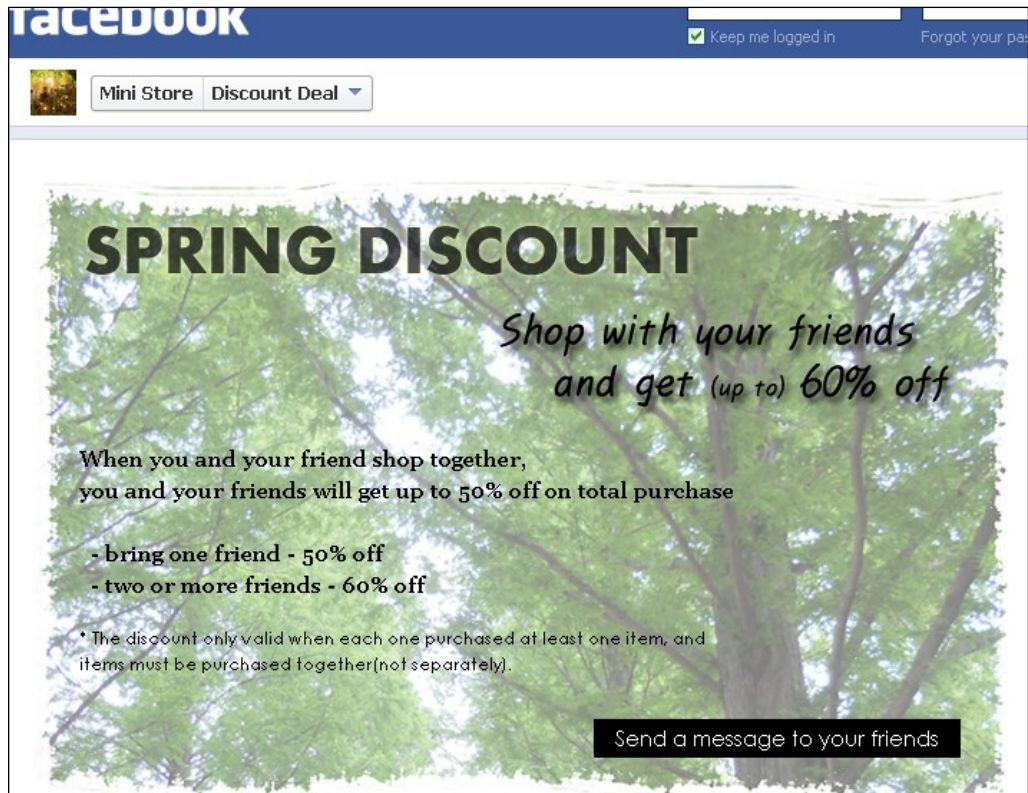


Figure 5-8. Discount coupon sending app

This allows the message dialogue to suggest friends to the user, so that he can easily select them; in case a user sends it to a friend who is not connected as a friend in Facebook or who is not a user of Facebook, he has to manually type in email addresses of the friend.

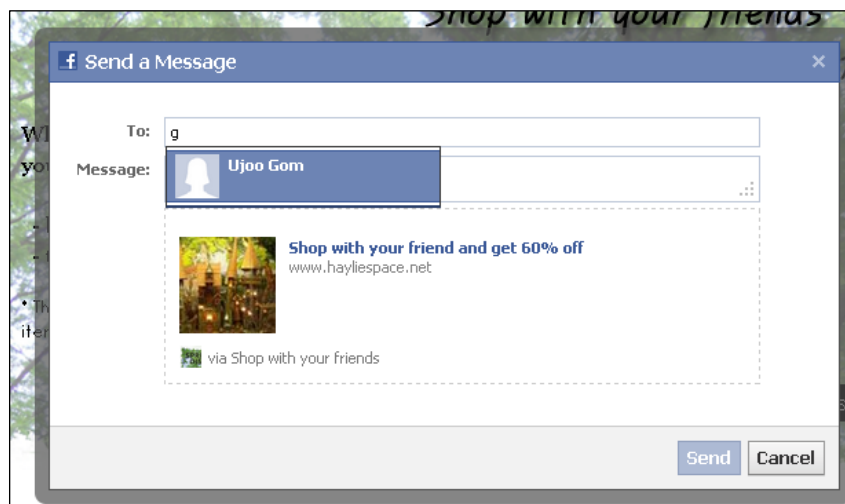


Figure 5-9. Message dialogue in discount coupon sending app

Checking the log-in status performs two tasks: checking if the user is logged in and checking if the user already gave the permission for the app to access a list of his friends previously. Appendix VI: source code of the discount coupon sending app, lines 37-54 and 76-84 show this checking process.

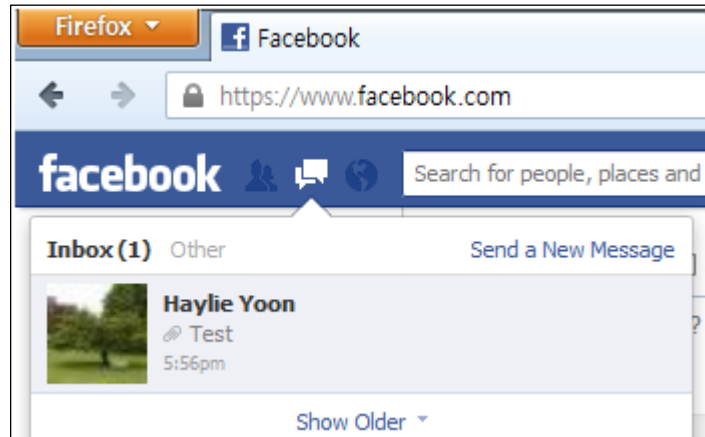


Figure 5-10. A message in a recipient side

Once the message has been successfully sent, the discount coupon link becomes visible and the user can print the coupon by clicking it.



Figure 5-11. The recipient's view when the message has been clicked

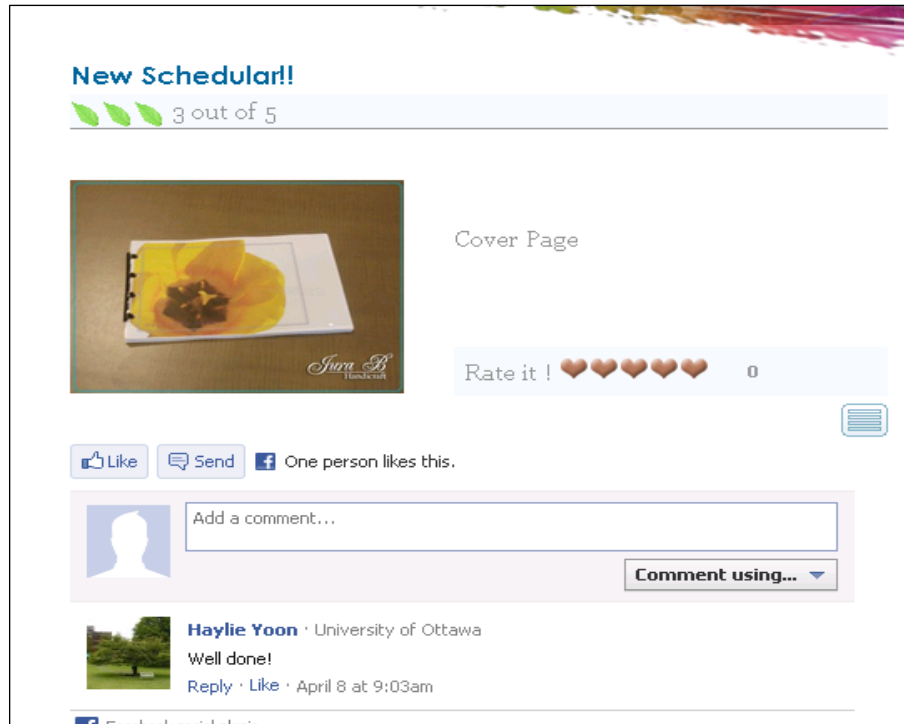
At the same time, the recipient can see the message arrival as in Figure 5-10. The user is able to see the discount information as in Figure 5-11 by clicking the message shown in Figure 5-10. The information as shown in Figure 5-11 includes two links: to print out the coupon and to send a message to the other friends (“Let the other friends know”).

***Consideration (To have customers explore the products): using rating app***

The rating app has been created as shown in Figure 5-12. A user can click items on the app and each item has its detailed view, which contains information of the item, rating, commenting, liking and sharing functions as shown in Figure 5-13. Rating data is stored in the client side. Since this app does not access user data, it does not ask users to give permission. Therefore, basically, this app does not store the data from commenting and liking, but stores the rating within the client side.



**Figure 5-12. Rating app**



**Figure 5-13. Rating view with rating, liking, sharing and commenting functions**

With this implementation, the basic functionalities designed for this app satisfy the original purpose; which one is the most popular and which one is not, so that which one should be further developed as the final product to be in the market, without storing the data from comments and likes in the client side. However, the data of comments and likes exists in the server side where it can be fetched anytime. For the purpose of future marketing, the data from the use of the plugins can be stored and analysed in the client side.

***Conversion (To have customers buy): using limited time sales app***

This app is also created as initially planned (see Figure 5-14). As long as the app is accessible, anyone including non-Facebook users can purchase the items since the app shows product information which is an html page and the payment method using PayPal.

The use of the PayPal payment method is similar to that of Facebook plugins. By configuring a selected button with some information regarding products that will be sold (e.g., name, price,

shipping cost, tax of the product), the code of the payment button can be obtained, copied and pasted into any of desirable pages (see Figure 5-15).



Figure 5-14. Time limit sales app

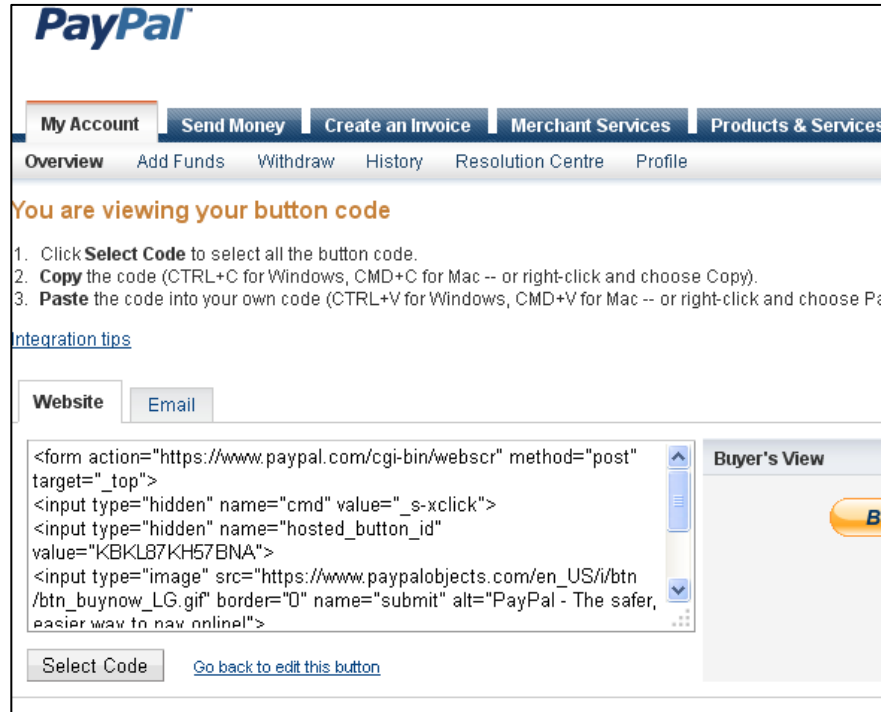


Figure 5-15. PayPal Buy Now button setting

(Image captured from PayPal website - <https://www.paypal.com>)

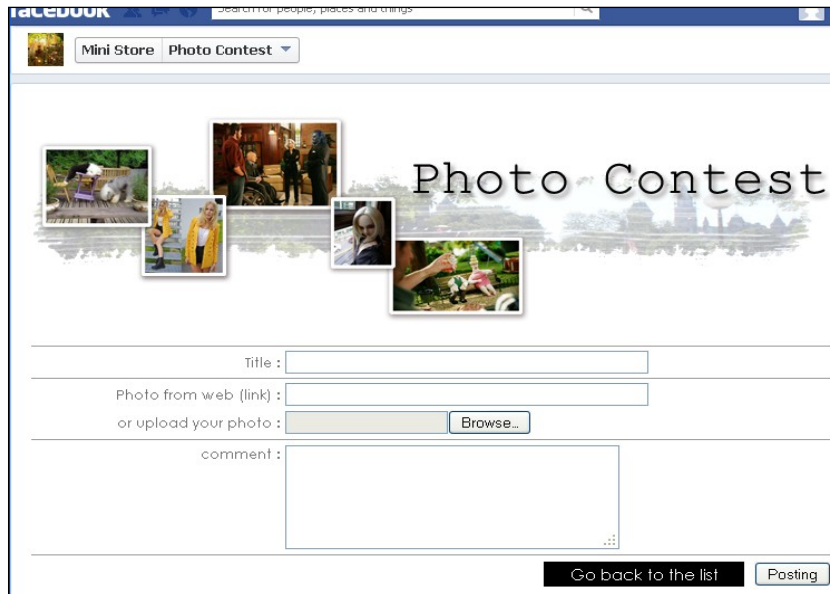
For this app implementation, three Buy Now buttons were created using the auto-created-code provided by PayPal (see Appendix VIII: source code of the limited time sales app, line 55-60, 74-79 and 93-98).

***Loyalty (To have customers engage): using photo contest app***

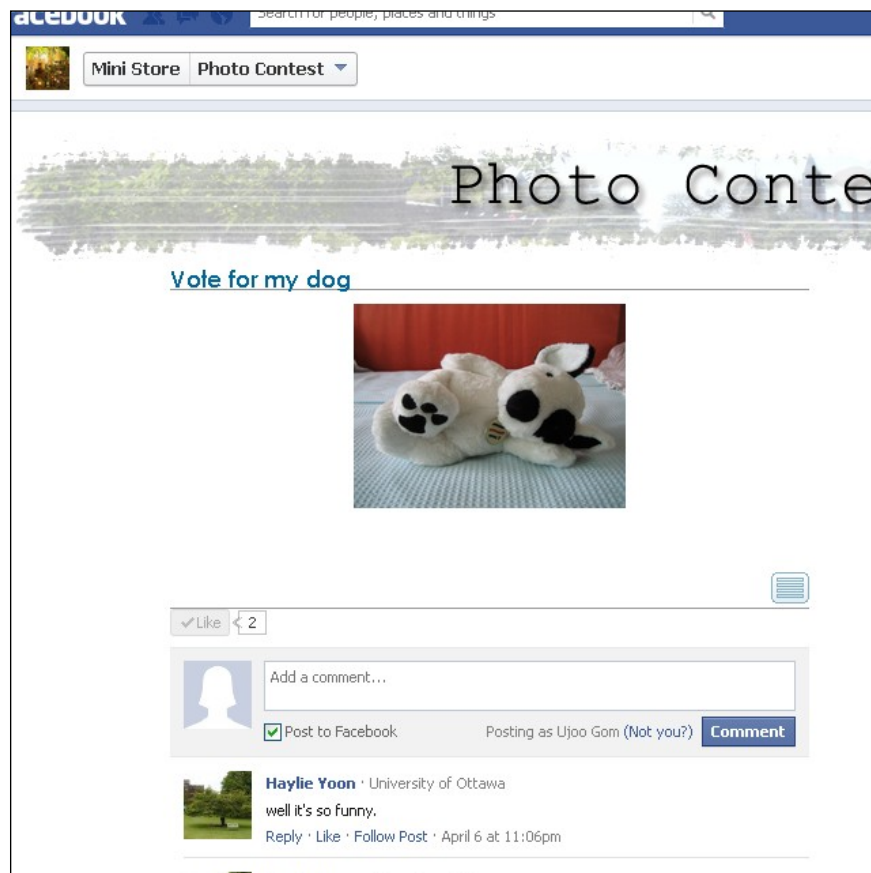
The photo contest app is shown in Figure 5-16. The functionalities that are used for this app are that users can upload photos with a simple message as in Figure 5-17, and anyone can view and vote on the photos in each detailed view as in Figure 5-18 by clicking a photo.



**Figure 5-16. Photo contest app**



**Figure 5-17. Photo uploading function**



**Figure 5-18. Photo contest detailed view with liking and commenting functions**

## **Chapter 6: Capability of Web 2.0 technologies in achieving social commerce activities and business goals**

The capability of Web 2.0 technologies, including the Facebook platform, the Facebook APIs, and the other available resources in achieving social commerce is analysed in this chapter on the basis of attributes of the IEEE Standard “IEEE Std 1061-1992”.

We adopted and rearranged standards originally proposed by IEEE to be suitable with the scope of our research. IEEE Std 1061-1992 is designed to measure software quality. Unlike ISO/IEC 9126-1 standard, it does not provide specific attributes or factors that can be measured. Instead, it provides sample factors and sub-factors (see Appendix VI. Sample factors and the description from IEEE Std 1061-1992), and states that these factors are not fixed but can be flexibly selected, added or excluded.

In fact, this IEEE standard relies on computing numeric data using measurable attributes, or factors, therefore, the results of the measurement are numeric, while the results from our prototyping process are conceptual and narrative. Thus, we use the sample factors and their descriptions from the IEEE document Std 1061-1992 Annex B as a check-list for our analysis by answering questions developed from the descriptions of each factor, and the factors are selectively adopted to suit our research.

### **6.1. Resource efficiency**

Are they capable of performing specific functions under stated conditions using appropriate amounts of resources?

As previously described, a web app consists of two different sections; client side where an actual web application is stored and service provider’s side where the web application is embedded. This means that server side recourses are utilized and even if some functions are not available on the server side, the unavailable functions can be supported by developing them within the client side.

On the contrary, although plugins are efficiently deployed on websites, there are some limitations which cause inefficiency. For example, the photo contest app is created using the Like plug in, so that the counts of likes are stored on the server side. To display counts of each item on the initial page of the app, all count data has to be called from the server side, which makes the display very slow.

Otherwise, whenever a user clicks it, the click count has to be saved on the client side too. In other words, the same data - the click counts - is stored on both the client and server side.

## **6.2. Security**

Are they secure enough to detect and prevent information leak, loss and illegal use?

As discussed, utilizing social networks is to tap into user demographic data which can be used for market research, so that information can be effectively delivered by the users themselves, and to access the demographic data through the social network, apps need to obtain permission to access user profiles. Even though a developer knows certain user ids and attempts to test the ids on the developer's tools to get some data from the users' profiles, the result does not show up prior to obtaining permission. Besides, the access token is a onetime temporal means that stays for a couple of hours to allow certain activities on an app when the app uses the client side login flow, and this token is only valid when APIs are called on behalf of the user, otherwise, the app should be programmed using server side login flow or the duration of the token has to be extended.

Inversely, to allow users to publish, modify or delete a posting on a Page, another access token, called a page access token, is required for the user to do so, because basically the authority of the Page is given to the admin, thus, if the user is not registered as a manager, he cannot write or modify postings on the Page. To allow the user to take this action, the login code in the app has to contain codes that give users the manager's authorization by granting them a page access token.

However, security might be changed from the user's perspective, once a user allowed and gave the permission, the app can access the user data such as a list of friends, favourites, likes, education, work, religion, status, etc. Although the permission request including the information regarding what to access is popped up when a user accesses the app, if the user does not pay attention and simply clicks to allow it, the user would not know what kind of information can be exposed to the app provider. It is the users' responsibility to be aware of what is being shared.

### **6.3. Testability**

Is it hard or easy to test software?

Debugging of Facebook apps might not be very different from that of others software applications. Facebook provides various tools such as Graph API Explorer, JavaScript Test console, Debugger, Access Token tool and so on. Problems that developers commonly face are that it is hard to find an error when the codes are quite long, and sometimes, they are not even sure if the data that they called is actually called or does exist. Using these tools, developers can test data availability and workability.

For example, the Debugger tool helps a developer to get a comprehensive view of an app when the developer provides the address of the web application. In addition, for test purposes, JavaScript SDK that contains expanded checking procedures can be used instead of the default SDK which is simplified for better performance as does not include a detailed level of checking.

### **6.4. Reliability**

Do the web apps depend on the software environment (platform)? Is the platform stable?

As described above, technically, a web application itself can perform without going through a Facebook page, which means a web application does not necessarily embedded in a Facebook page using iframe but to access the pool of information, the app needs to call an API which requires an access token. Otherwise, with the standalone web application itself, it needs to start from scratch (e.g., finding people, encouraging them to register to the service, asking for their information, asking them to login and visit, and so forth). Once a web application is registered as an app on the server side, it becomes dependent; it is required to contain app ID and app Secret to communicate with the Facebook platform. When a user is within Facebook, apps can be used seamlessly, once the user gives the apps permission to access the user profile. On the other hand, web applications that run outside of Facebook can still utilize Facebook APIs and resources, but if the web applications need to access user profiles, then, logging in is required for the users to verify their state. This dependency feature is actually to harness the competence of social network users because users of Facebook can seamlessly use its functionalities. Besides, once a user is recognized as a Facebook member by logging, the user's activities are saved and social commerce implementors can utilize information of

users' activities and their networks. Without this dependent feature, apps would not gain the access to this kind of resources.

Nevertheless, this platform reflects one of the characteristics of Web 2.0; perpetual beta. Some functionalities, methods and objects have been changed, disappeared, created or being deprecated. For instance, REST is being deprecated, so new apps should be built in other ways such as using Graph API. There was *offline\_access* permission for apps (no need to login), but it was also deprecated, therefore, any apps using this permission had to be rewritten, but an access token that has a long expiration time is allowed, instead. Moreover, there were some issues with SDKs. In particular, there was an unidentified bug in the JavaScript SDK, the debugger version. Although the problem has been solved now, some developers who used it had to suffer from the sudden malfunction on their creations which properly worked before.

## **6.5. Usability**

Is it easy to learn how to create apps or is it complicated?

As for any other software development, the complexity of app development is dependent on the complexity of the required functionality. Web apps that perform simple tasks such as the photo contest and rating items created for this research are not as complicated as game software or e-commerce solutions; therefore, programming expertise could be a less important factor since someone who understands any web programming language can create those web apps. Thus, web apps can be complicated depending on the required functionality to perform certain tasks.

In contrast, the biggest hinder to develop web apps using web APIs is how much time the developer has dealt with certain APIs and how well he knows about them. To create a web app using what the service provider offers, the developer has to work in ways the provider allows him to do. For example, Facebook provides FQL which is quite similar to SQL but not completely the same as SQL. Developers can easily fetch data using FQL if they know SQL, but some of the basic functions such as Join and Union from SQL are not supported. Instead, there is a multi-query function in FQL. If the developers are not familiar with this unique feature, they would struggle to figure out how to use it. In this case, regardless of the level of expertise, developers rely on forums where they can obtain

information when they get stuck. Examples within Facebook only show how it works, and do not tell how to solve unique and unexpected problems.

## **6.6. Flexibility**

Are their functions sufficient and necessary to satisfy customers?

Multiple SDKs including JavaScript, PHP, iOS, Android, and others are available on the Facebook platform, and various functions can even be implemented with JavaScript only, so developers can choose the one they are familiar with.

Besides, there are different ways to call data on Facebook. For example, to fetch a user's name, one can use FQL by querying the data or the Graph API with the GET function, and both return the same result. Thus, developers can decide on a way that they are familiar with, or when they have a problem calling data one way, they can simply try the other way.

Nevertheless, unlike Google's OpenSocial based applications which are interoperable with various social networks, Facebook apps created for the Facebook platform are proprietary attached within Facebook (Häsel, 2011).

## Chapter 7: Conclusion

### 7.1. Validation of the research questions

The research questions have been developed from each research objective: the first research objective is to understand factors that affect social commerce implementation by identifying the issues and needs of current e-commerce. The first research question related to this objective is:

*What are the distinctions between social commerce and e-commerce?*

The first research question is answered through the analysis based on various definitions from the literature. Overall, this research has attempted to draw the refined definition as follows:

- e-commerce utilizing social media or Web 2.0 technologies
- e-commerce is not limited to selling and buying but includes managing and operation, however, mainly marketing
- Facilitating participative, contributive and collaborative activities by individual users through social media
- The activities intensify the overall effects of specific business goals, particularly in e-commerce

The second research question is:

*What are the factors that constitute social commerce?*

The factors that constitute social commerce are acting entities, social commerce implementors and enablers, Web 2.0 technologies and social commercial activities as specified in Chapter 4, Figure 4-1. Social commerce implementors provide Web 2.0 technologies that can be used by enablers who participate in social commerce activities by creating, sharing and commenting.

The second research objective is to identify and investigate available Web 2.0 technologies and the services being used as means for social commerce implementation. The third research question is:

*What is the impact of deploying Web 2.0 technologies on e-commerce?*

This research question has also been answered through documentation review.

There are several critical features worth noting amongst commonly discussed Web 2.0 characteristics and particularly for e-commerce.

First of all, the communication between organization and customers has changed from unidirectional to bidirectional. Second, the trend of e-commerce discussed in Chapter 2 signifies how the behaviour of online shoppers has changed, as they now prefer to gain knowledge before making a purchasing decision, and to talk about their purchasing experience to their friends, colleagues and families, with whom they are willing to share the information. In other words, people were passive in the past, but now they are more active. In addition, social media reshapes ways of communication and relationships, since people spend more and more time on social networks. This has effects on consumer buying behaviour, and what and how they buy. Moreover, proliferative information due to participative behaviour results in information transparency. Consequently, organizations have deployed various Web 2.0 technologies to tap into these participative behaviours and the wisdom of crowds.

The merit of utilizing Web 2.0 technologies for e-commerce is an increase in effectiveness of marketing and communication from various aspects, as it reduces costs and time and opens opportunities to access knowledge provided by people.

The third research objective is the methods of implementation in ways to achieve specific business goals, and the fourth research question is:

*What kinds of business goals, especially e-commerce, can be achieved using Web 2.0 technologies?*

The fourth question is well manifested in Table 4-1, social commerce activities, in Chapter 4. Basically, Web 2.0 technologies support business; however, through a literature review, this research found that Web 2.0 technologies are more popularly used for marketing purposes. Social commerce activities that serve to accomplish business goals, which are as follows:

- ✓ Awareness: To have customers discover
- ✓ Consideration: To have customers explore
- ✓ Conversion into actual customers: To have customers buy
- ✓ Loyalty: To have customers engage

The fifth research question is:

*What kinds of functionalities are required to perform activities that lead to achieve the business goals?*

This research has looked through available Web 2.0 technologies and the functionalities in a literature review, and has analysed and refined these in Chapter 4. Basically, various Web 2.0 functionalities can be utilized upon the basis of what to achieve. Table 7-1 summarizes the essential functionalities identified and refined through the entire process of this research.

**Table 7-1. Web 2.0 and the functionalities for achievable business goals**

Awareness	Customers can discover through : <ul style="list-style-type: none"> <li>• Blogs, micro-blogs, social networks, communities, groups, forums, RSS, newsfeeds, newsletter, online shop</li> <li>• Friend’s message or sharing, invites, referrals, recommendation</li> </ul>
Consideration	Customers can explore : <ul style="list-style-type: none"> <li>• Comments, review, rates, votes, bookmarks, likes, recommendation by searching</li> </ul>
Conversion	Customers can buy through : <ul style="list-style-type: none"> <li>• Blogs, micro-blogs, social networks, communities, groups, forums, online shops</li> </ul> Customers can buy with : <ul style="list-style-type: none"> <li>• Coupon, various deals or offers, redemptions, sweepstakes, flash sales</li> </ul>
Loyalty	Customers can engage in : <ul style="list-style-type: none"> <li>• Profiling themselves</li> </ul>

	<ul style="list-style-type: none"> <li>• Creating and posting content as forms of text, photos and videos</li> <li>• sharing, commenting, reviewing, rating, voting, bookmarking, liking, referring, recommending, tagging, inviting, selling, buying, answering, following</li> </ul>
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## 7.2. Limitations and future work

First of all, although social media could be utilized in the B2B sector, this research has mainly dealt with B2C aspects, since social media for business as social commerce implementation is to utilize users' participative behaviours or activities to boost effectiveness, particularly in marketing.

Furthermore, according to the concept established in Chapter 4, e-commerce includes not only selling and buying but also a whole spectrum of management of suppliers and customers. However, in Chapter 5, the demonstration of the concept primarily focused more on promotion and selling.

Second, the prototypes (social apps) were created using a couple of selected Web 2.0 functionalities - Facebook platform as a social network, its APIs and its plugins due to its popularity, which means there is a wider range of audiences on Facebook, compared to the others. Majority of social commerce solution providers also emphasize on the integration with Facebook, rather than other social networks. However, there are more options of technologies available to perform social commerce activities. According to a Nielsen report (2012), Pinterest and Google+ are seen as having the greatest growth rates among social networks. The amount of visitors on Pinterest has increased by 1,047 per cent, while there was an 80 per cent increase in Google+ albeit Facebook is still the top-visited social network. Thus, it is worth studying a comparison between those different platforms for social commerce implementation.

Third, four different apps were created to demonstrate the concept and the components of social commerce. As a result, these apps work as planned, however; this research did not deal with how effectively they perform the tasks. As mentioned in Chapter 3, the intended purpose of the social app development is to understand and demonstrate how to utilize, what the obstacles are, and how to overcome by creating the apps. Therefore, evaluation of these apps to see how effectively they perform certain tasks can be the next step of this research.

In addition, the development of social apps was simplified since this research does not focus on software development and rather focuses more on discovering what is available, how to utilize and how to create. Therefore, social applications can be created with more sophistication and efficiency.

Accordingly, the web applications were developed without the help of expert software developers. The demonstration of how to utilize Web 2.0 technologies should be clearly understood by social commerce implementors, organization personnel or individuals who implement social commerce and who are highly unlikely to be experts in developing software. This way, the benefits of utilizing Web 2.0 technologies such as lightweight and simplicity can be reflected.

Lastly, in Chapter 6, the security aspect of utilizing a Facebook API has been dealt with by considering developers' standpoints when apps are created, yet this research does not touch upon security concerns from external factors. For example, Facebook has faced multiple law suits against user data exposure such as in the case of Beacon (Vara, 2007). If the cases are resulted from lack of legitimacy, which is not the scope of this research, it should be dealt with. Otherwise, it is the user's responsibility to be aware of what is being shared. As Scott McNealy, CEO of Sun Microsystems, said, "You have zero privacy anyway, Get over it" (as cited in Dreazen, 2002). Organizations endeavour to obtain more user data that can be used for their business. Individuals may mistakenly think that using social media is free, but they are using the services in exchange of their information.

### **7.3. Closing remarks**

The fundamental principle of social commerce is utilizing Web 2.0 technologies. Use of the Web 2.0 technologies for business purposes has received a great attention due to the characteristics such as user participation, contribution and collaboration although the characteristics offer not only benefits but also nuisance: organizations can manage social media, but this does not mean they can control postings created by multiple users of social media.

Despite the risks, organizations and individuals are utilizing Web 2.0 technologies because Web 2.0 technologies offer tactical advantages when they are properly utilized. Particularly, social networks such as Facebook, My Sapce and Twitter are where there are people who are audiences of videos, photos and any messages created for marketing and promotional purposes, and who are potential customers.

Nowadays, customers are spending more time on social networks than on watching TV, so that, markets are driven by customers as customers provide ideas or suggestions, promote or complain about products and services. It is hard to control what the customers say. Therefore, how to respond to the complaints could be a key to mitigating the problems or even improving reliability for the corporation.

Likewise, utilizing Web 2.0 is handling a double-edged sword. Since the current trend of e-commerce and online customers' behaviours portray the strong influence of social media and the networked power, it is hard for organizations to ignore this trend. Perhaps, it is fate that they either have to go with or deal with it.

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## Appendix I: Website observation criteria

The criteria were developed from the definition of social commerce refined at chapter 4.

Articles	Yes	No
e-commerce : not limited to selling and buying but mainly marketing		
Utilizing Web 2.0 technologies : Social networks, forum, blogs, micro-blogs, Wiki, RSS, Folksonomies, photo or video sharing, etc.		
The social media used for participative, contributive and collaborative activities done by individual users.		
are actually to support business		

## Appendix II: Web 2.0 functionality selection criteria

Articles	Yes	No
Web 2.0 technologies such as social networks, photo or video sharing, Blogs, micro-blogs, RSS, wikis, Web APIs, Mash-ups, etc.		
Any functionalities that requires users to use them : post, share, rate, comment, review, recommend, tag, vote, bookmark, etc.		
The users' actions support the other users and/or the implementors : rating, commenting, reviewing, recommending, sharing, tagging, voting, bookmarking, etc.		

## Appendix III: The initial list of social commerce sites obtained from tech magazines

<a href="#">3AL Universal Trade</a>	<a href="#">Compra3</a>	<a href="#">Gloople</a>	<a href="#">Nectar Online Media</a>
<a href="#">8thBridge</a>	<a href="#">ConnectionPoint</a>	<a href="#">GoNabit</a>	<a href="#">Needle</a>
<a href="#">99Presents</a>	<a href="#">Systems</a>	<a href="#">GothamBox</a>	<a href="#">Nimbit</a>
<a href="#">AGORAZ.com</a>	<a href="#">CoupaFly</a>	<a href="#">Grabbit</a>	<a href="#">Odelay Limited</a>
<a href="#">AHHHA</a>	<a href="#">Crave.com</a>	<a href="#">GramercyOne</a>	<a href="#">Oh That's You</a>
<a href="#">ActiveGift</a>	<a href="#">Crowd Factory</a>	<a href="#">GreenLink Networks</a>	<a href="#">Omnea</a>
<a href="#">AddShoppers</a>	<a href="#">Curebit</a>	<a href="#">GroupCoin</a>	<a href="#">Ondango</a>
<a href="#">Adman Media</a>	<a href="#">Curisma</a>	<a href="#">Groupout</a>	<a href="#">Outbid</a>
<a href="#">AgooBiz</a>	<a href="#">D'Marie Group</a>	<a href="#">Grupanya</a>	<a href="#">Owjo</a>
<a href="#">Alphabuyer</a>	<a href="#">Daily Gourmet</a>	<a href="#">Half Off Depot</a>	<a href="#">PIO Social</a>
<a href="#">Alumnay</a>	<a href="#">DealBird</a>	<a href="#">HaulerDeals</a>	<a href="#">PULOMA</a>
<a href="#">Ambassador</a>	<a href="#">Dealmobs</a>	<a href="#">Have to Have</a>	<a href="#">Parrut</a>
<a href="#">Argento Partners</a>	<a href="#">DealsAndYou</a>	<a href="#">Hitch'd</a>	<a href="#">Pawsley</a>
<a href="#">AvalanShare</a>	<a href="#">Delightem</a>	<a href="#">Infused Industries</a>	<a href="#">PayByGroup</a>
<a href="#">Balluun</a>	<a href="#">Delusha</a>	<a href="#">Intentio</a>	<a href="#">Jetrend.com</a>
<a href="#">Bazaarvoice</a>	<a href="#">DicaX</a>	<a href="#">Internet Media Labs</a>	<a href="#">Keep</a>
<a href="#">BeeBillion</a>	<a href="#">Doggy Deals</a>	<a href="#">JOYRIDE</a>	<a href="#">Keep Holdings</a>
<a href="#">Bizchum.com</a>	<a href="#">Dotbox</a>	<a href="#">LikeStore</a>	<a href="#">Keepio</a>
<a href="#">Blomming</a>	<a href="#">DubLi</a>	<a href="#">LilLuxe</a>	<a href="#">Kuliza</a>
<a href="#">Bondsy</a>	<a href="#">ELIKE</a>	<a href="#">Listly</a>	<a href="#">LOT NET</a>
<a href="#">Boutine</a>	<a href="#">Ecato</a>	<a href="#">LivingSocial</a>	<a href="#">LUX FIX</a>
<a href="#">Bravisa</a>	<a href="#">EvoTronix</a>	<a href="#">LocalSense</a>	<a href="#">LUX-FIX</a>
<a href="#">BuyWithMe</a>	<a href="#">Evocatus</a>	<a href="#">Loom Decor</a>	<a href="#">Lashou.com</a>
<a href="#">Buyosphere</a>	<a href="#">FUTURE NOTION</a>	<a href="#">LovingEco</a>	<a href="#">Leetchi</a>
<a href="#">Buyvite</a>	<a href="#">FanFueled</a>	<a href="#">Magazinga</a>	<a href="#">Lemonade</a>
<a href="#">CLINK!</a>	<a href="#">Fantastic</a>	<a href="#">Maozhao</a>	<a href="#">Pin or Peg</a>
<a href="#">Casa à porter</a>	<a href="#">Firmology</a>	<a href="#">Marquee</a>	<a href="#">Pepper Global</a>
<a href="#">Chapter Eight</a>	<a href="#">Fliptu</a>	<a href="#">MediaNet Group</a>	<a href="#">PetDeals</a>
<a href="#">China Social</a>	<a href="#">Flubit Limited</a>	<a href="#">MerchantTribe</a>	<a href="#">Playwho</a>
<a href="#">Commerce Group</a>	<a href="#">FlutterScape</a>	<a href="#">Mertado</a>	<a href="#">PowerReviews</a>
<a href="#">Chirpify</a>	<a href="#">Four51</a>	<a href="#">Mezino Technologies</a>	<a href="#">Preen.Me</a>
<a href="#">Cinsay</a>	<a href="#">Friendize.Me</a>	<a href="#">MindReign</a>	<a href="#">Procast</a>
<a href="#">Cliqup</a>	<a href="#">Giantnerd</a>	<a href="#">Moontoast</a>	<a href="#">Productism</a>
<a href="#">CommerceSocial</a>	<a href="#">GiftConnected</a>	<a href="#">Motorator</a>	<a href="#">Prooflink</a>
<a href="#">Commonplace</a>	<a href="#">GiftHit</a>	<a href="#">Movement Strategy</a>	<a href="#">Purge</a>
<a href="#">Ventures</a>	<a href="#">GiftSimple</a>	<a href="#">My Top 10</a>	<a href="#">Rally Commerce</a>
<a href="#">CompleteSet</a>	<a href="#">Global</a>	<a href="#">Myreks</a>	<a href="#">Rately</a>

<a href="#">Rec.fm</a>	<a href="#">StyleBlueprint</a>	<a href="#">eKomi</a>	
<a href="#">Rentlord</a>	<a href="#">Surfmandu</a>	<a href="#">eKrowd</a>	
<a href="#">Repbuilder</a>	<a href="#">SyncFu</a>	<a href="#">eRENT</a>	
<a href="#">RevBright</a>	<a href="#">TOKEN</a>	<a href="#">easyOwn.it</a>	
<a href="#">Reverb</a>	<a href="#">Tastemaker Labs</a>	<a href="#">edelight</a>	
<a href="#">Rewardli</a>	<a href="#">Testimonial Monkey</a>	<a href="#">frents</a>	
<a href="#">Rise Art</a>	<a href="#">The Gifts Project</a>	<a href="#">friendfund</a>	
<a href="#">SalesinGroup</a>	<a href="#">TheCreator.ME</a>	<a href="#">goSawa</a>	
<a href="#">Save2Help</a>	<a href="#">TheNewProvider</a>	<a href="#">gopogo</a>	
<a href="#">Sharegift</a>	<a href="#">Thoughtful.co</a>	<a href="#">gravitasbay.com</a>	
<a href="#">ShirtJax</a>	<a href="#">Tipspring</a>	<a href="#">gtrot</a>	
<a href="#">Shop My Label</a>	<a href="#">Touristaz</a>	<a href="#">homedeco2u</a>	
<a href="#">ShopIgniter</a>	<a href="#">Tradesparq</a>	<a href="#">hopscout</a>	
<a href="#">ShopSquad/Ownza</a>	<a href="#">TrustedAd</a>	<a href="#">inSparq.com</a>	
<a href="#">ShopTab</a>	<a href="#">TurnTo Networks</a>	<a href="#">j-Grab</a>	
<a href="#">Shopandtip</a>	<a href="#">Tweetalicious</a>	<a href="#">kixtand</a>	
<a href="#">Shopcade</a>	<a href="#">Tyched</a>	<a href="#">merchee</a>	
<a href="#">Shoplinkz</a>	<a href="#">Ubokia</a>	<a href="#">mindreign.com</a>	
<a href="#">ShoppTag</a>	<a href="#">Universe</a>	<a href="#">mogulfish</a>	
<a href="#">Shopsy</a>	<a href="#">Useadeal</a>	<a href="#">mypopupshop</a>	
<a href="#">Shustir</a>	<a href="#">ValuTrex</a>	<a href="#">optimise-it</a>	
<a href="#">Skymarker</a>	<a href="#">VendingBox</a>	<a href="#">outgrow.me</a>	
<a href="#">SlashMob</a>	<a href="#">VendorShop</a>	<a href="#">produki</a>	
<a href="#">Slingr</a>	<a href="#">Venpop</a>	<a href="#">revvler</a>	
<a href="#">SoMoLo Summit</a>	<a href="#">Wantbox</a>	<a href="#">selbey</a>	
<a href="#">Sociable Labs</a>	<a href="#">Weever Media Limited</a>	<a href="#">shoply</a>	
<a href="#">Social Adrenaline</a>	<a href="#">Whyteboard</a>	<a href="#">sohalo</a>	
<a href="#">Social Genius</a>	<a href="#">Willet</a>	<a href="#">speedbuy</a>	
<a href="#">SocialCart</a>	<a href="#">Wishpond</a>	<a href="#">stylefruits</a>	
<a href="#">SocialCom</a>	<a href="#">YoBucko</a>	<a href="#">ticket truck</a>	
<a href="#">SocialMart</a>	<a href="#">ZeBeDoo</a>	<a href="#">tracx</a>	
<a href="#">Socialmoon</a>	<a href="#">ZoopShop</a>	<a href="#">travelavenue.com</a>	
<a href="#">Soletron</a>	<a href="#">a Gripper</a>	<a href="#">womapp</a>	
<a href="#">Sooligan</a>	<a href="#">aSociete</a>		
<a href="#">Sotlet</a>	<a href="#">alex+von</a>		
<a href="#">Spinback</a>	<a href="#">approves.it</a>		
<a href="#">Spreadly</a>	<a href="#">atHomestars</a>		
<a href="#">Spreadshirt</a>	<a href="#">bopaboo</a>		
<a href="#">StackSocial</a>	<a href="#">byMii</a>		
<a href="#">Startup Heroes</a>	<a href="#">comr.se</a>		
<a href="#">Stayhound</a>	<a href="#">digitalle</a>		
<a href="#">Storeplacer</a>	<a href="#">doggyloot</a>		

## Appendix IV: Web 2.0 functionalities identified from website observation

### Online shops utilizing functionalities having Web 2.0 characteristics

In addition to e-commerce functionality (e.g., content list , product category, search, payment, etc);

Etsy	Seller profile, favourite, follow Share via Twitter, Pinterest and Facebook.
Amazon	Review, rate, wish list, Q&A Share via Facebook, Twitter, Pinterest, and email Forums, product photo upload
eBay	Q&A, seller rating, watch list, wish list
Wal-Mart	Review, rate, Q&A, email subscription Reviewer profile (age, gender, frequency of uses, use by dates, recommend) Review evaluation (helpful or not), review share Lists : remind me list / wish list Share via Facebook, Twitter, Pinterest, Email FB Like, G+
Sears	Wish list, rate, review, Q&A Review evaluation Share via Facebook, Twitter, Delicious, ShopYourWay, email
American Apparel	Rate, comment, wish list Buttons : Want, Love, Have Share via Twitter, Pinterest, G+, Facebook, Tumblr, email Video instruction, photo upload , Email subscription
Dell	Rate, review, call and chat Share via email, Facebook, Digg, Del.icio.us Coupons Communities
Best Buy	Rate, review, wish list FB Like, G+, Tweet, Pin it Community
Staples	Shopping list (wish List)

	Review, rate Share via Tweeter, Facebook, LinkedIn, email, G+
Sam's Club	Rate, review
Target	Rate, review, list (wish list) FB Like, G+ Share via email, Twitter, Facebook
TigerDirect	Review, rate, wish list Share via email
Newegg	Rate, review, wish list, price alert Share via Facebook, Pinterest, G+, Twitter, email Email subscription
Apple Store	Rate, peview, Q&A
Office Depot	Rate, review, shopping list Live chat Share via Facebook, Twitter, email, Linked In, G+, Pinterest
Zappos	Rate, review, favourite Share via Facebook, Twitter, Pinterest, email Newsletter subscription
DaWanda	Add to list, add to amazon wish list , heart it, comment FB Like and share Share via email, Pinterest, G+
Boutine	Designer's profile Share via Pinterest, Facebook, Twitter, or on your blog

### **Social shopping or bookmarking**

Kaboodle	Lists (My Style, Wish List, Things I love) created by users Personal profile Like, comment, tag Share via Pinterest, G+, Twitter, Facebook
Thisnext	Product lists (Categorized) created by users

	<p>Personal profile  Add products, Tag  Buttons : Love, Recommendation  Shopping guide (created by users)  share via Facebook, Twitter  FB Like, G+, Tweet</p>
Wists	<p>List (Wist list : categorized) found by users  Personal profile  Create a blog(or page) for lists  Create a community  Add to friends  Publish, Share, Tag</p>
StyleHive	<p>Wish list created by users  Create own blog(or page) for lists  Personal profile  Save a item (same as add items/products)  Share via email  FB Like, G+ , Tweet  Communities, Invite friends, recommend  Communicate (compliment me button), Tag</p>
Crowdstorm	<p>Q&amp;A (using Facebook API)  FB Like, Tweet, G+</p>
Curisma	<p>Buttons : Like, Want and Have</p>
Polyvore	<p>Custom styling tool – users can create own fashion style by drag and drop  Like (both : own like and Facebook like), comment, follow,  Blog,  Share via Twitter, Facebook, Tumblr  Style contest</p>
Storenvoy	<p>Store open for sellers (can be embedded on Facebook)  Various offers, discount deal  Envy (similar function as Like), comment  Share via Facebook, Twitter, Pinterest, Wanelo  Developers API</p>
Pricegrabber	<p>Rate, review, favourite,  Share via Facebook, Twitter, Pinterest, Google+ or email</p>

## Social network utilized as social commerce implementation

In addition to basic functions provided by Facebook such as sharing, liking, event, photo, video

Old Navy	Word Game (custom app) Discount deal (custom app) Fit Labs (custom app) - users create own style, as a result, it shows a matching item
Kid Rock	Ticketing with event schedule Storefront
Justin Bieber	Download music (for purchasing, share, discuss) Ticketing with event schedule Listen & vote (custom app) Newsletter sign up Game Fan merchandise (Perfumes) promotion
NBA	Photo store (custom app) - leading to online shop out of Facebook Fan Appz (custom app) - voting Storefront
Old Spice	In addition to basic functions on Facebook Store app (customer app) - Product list linking to its online shop when “Buy” button clicked Wallpaper download Mobile wakeup call gift
Green Day	Storefront for merchandises Music download (for purchasing) Ticketing with event schedule Video contest (custom app) Urturn (custom app) – users can upload their portraits to make album design covers Fan club join (custom app) Games
Benefit Cosmetics	Prize apps (custom app) - users fill up a blank and it randomly select and give them a gift. Email subscription Beauty Getaway (custom app) – users would get a chance to travel San Francisco.

	Catalogue (custom app)
HP	Make it Matter (custom app) – with various functions such as buying, sharing and polling Product Q&A (custom app)
American Eagle Outfitters	Polyvore joint event (custom app) – users create own styles by drag and drop tool AEO Credit (custom app) – AE credit card online application Email or mobile subscription
Coca-Cola	WWHSN (custom app) – promotional videos for the corporate image Gift giving (custom app) Global community (custom app) – recruiting adviser tool

### Social commerce solution providers

Addshoppers	Social apps Offers, deals Share Facebook and Twitter using apps, Widget, etc
getambassador.com	Referral, campaign Widgets, snippets
Bazaarvoice	Rate, review, Q & A Campaigns, social applications for Facebook
Discrevolt	Music download Redemption Promotion Facebook Store
Blomming	e-commerce functionality Integration with Facebook Store app embedded on Facebook and other websites Share via twitter, G+, Pinterest, and others
Commonplace	Personal online show-spaces Collect and list items Share with others / discuss / chat

Crowd Factory	Facebook Like builder Share, vote / poll, comments, rate, referral, comment and message Sweepstakes, flash deals, group offer, email campaign Sign-up
Curebit	Referrals, coupons, reward e-commerce integration
Gloople	Sign-up, group buying, blog and news Share, rate, review, referral Facebook store
MoonToast	Sweepstakes Social store (similar to Facebook store), message Mp3 downloading
Ondango	Customer profiles Discount, coupons, fan-only discount
Owjo	Facebook store Soundscan (for music) Discount and deals
Shopigniter	e-commerce functionality Integration with other social media Share via Facebook, Pin, Tweet, G+ Flash sales, fan only products, rewards, badges
Storeplacer	Facebook store Integration with Facebook
VenderShop	Facebook store Share via Twitter and FB Want, sneaquit (list of favourite items)
WishPond	Integration with Facebook Sweepstakes, deals, discount coupon or code / free item or gift card / limited time discount) Share via FB, twitter, G+ and email Buttons : Want, Own, Wish, Wear, Need, Love, LOL, Hype, Fav, Eat, Drink, Dig
Sohalo	Offers, deals, Redemption Games

	Social apps (e.g., listening to music, purchasing tickets, writing reviews)
Agoobiz	e-commerce functionality Blogs Profile, comment, rate, review, invite Deals, discounts, sales
Shopify	e-commerce functionality Blogs Discount Apps
8thBridge	Buttons : Love, Want, Own, Wearing Integration with Facebook
Cinsay	e-commerce functionality donation, Video player Share Integration with social networks Facebook store
Delusha	e-commerce functionality Tags, Users designing tool
Kuliza	Social apps Share, referral, recommendation Post-purchasing, deals, discount offers, Point reward List, Rank Integration with social networks

## Appendix V: DB tables created for the social apps

### 1. Table of discount coupon issue record

```
mysql> desc dc_state;
```

Field	Type	Null	Key	Default	Extra
pid	mediumint(9) unsigned	NO	PRI	NULL	auto_increment
inviter	varchar(16)	YES		NULL	
wdate	int(10) unsigned	YES		NULL	
dccode	varchar(26)	YES		NULL	

```
rows in set (0.00 sec)
```

### 2. Table of item list for the rating

```
mysql> desc mybbs;
```

Field	Type	Null	Key	Default	Extra
pid	mediumint(9) unsigned	NO	PRI	NULL	auto_increment
title	varchar(50)	NO			
content	text	NO		NULL	
wdate	int(10) unsigned	NO		0	
thumb	varchar(50)	YES		NULL	
copen	char(1)	YES		NULL	
post_type	char(3)	YES		NULL	
rts	char(1)	YES		NULL	
img_link	varchar(120)	YES		NULL	

```
rows in set (0.01 sec)
```

### 3. Table of the rating counts

```
mysql> desc tb_rts
-> ;
```

Field	Type	Null	Key	Default	Extra
pid	mediumint(9) unsigned	NO		0	
addr	varchar(20)	YES		NULL	
rts	char(1)	YES		NULL	

```
rows in set (0.00 sec)
```

#### 4. Table of the photo contest

```
mysql> desc bbs_posting;
```

Field	Type	Null	Key	Default	Extra
pid	mediumint(9) unsigned	NO	PRI	NULL	auto_increment
title	varchar(50)	YES		NULL	
comment	text	YES		NULL	
thumb	varchar(50)	YES		NULL	
udate	int(10) unsigned	NO		0	
post_type	varchar(10)	YES		NULL	
comment	varchar(5)	YES		NULL	
plink	varchar(150)	YES		NULL	

```
rows in set (0.00 sec)
```

## Appendix VI: Source code of the discount coupon sending app

### The main page of the app

```
1. <html xmlns="http://www.w3.org/1999/xhtml"
2. xmlns:fb="https://www.facebook.com/2008/fbml">
3. <head>
4. <title>Event Share</title>
5. <link rel="stylesheet" href="../fb.css" type="text/css">
6. <style>
7. .geoB_FT {

8. color:#000000;
9. font-family:Georgia,Cambria;
10. font-size:11pt;
11. font-weight:bold;
12. line-height:1.5;
13. }

14. .smB_FT {

15. color:#000000;
16. font-family:Century Gothic,Verdana;
17. font-size:9pt;
18. line-height:1.5;
19. }
20.</style>
21.</head>
22.<body>
23.<?php
24.// Remember to copy files from the SDK's src/ directory to a
25.// directory in your application on the server, such as php-sdk/
26.require_once('../facebook-php-sdk/src/facebook.php');

27.$config = array(
28.'appId' => '351329414922420',
29.'secret' => 'ela2acc419ef2f41b1f979dce6b29896',
30.);

31.$facebook = new Facebook($config);
32.$user_id = $facebook->getUser();
33.$access_token = $facebook->getAccessToken();
34.// echo 'userID : ' . $user_id; // . 'accT : ' . $access_token . '<BR>';

35.$dcode = strtotime('-13 hours') . substr($user_id, -6);
36.// echo '<BR> now time = ' . strtotime('-13 hours') . '<BR> part id= ' .
    substr($user_id, -12) . '<BR>DC C= ' . $dcode;

37.if($user_id){

38.try{

39.//     echo $user_id;

40.} catch(FacebookApiException $e) {
41.// If the user is logged out, you can have a
42.// user ID even though the access token is invalid.
43.// In this case, we'll get an exception, so we'll
44.// just ask the user to login again here.
```

```

45. $login_url = $facebook->getLoginUrl();
46. //      echo 'Please <a href="' . $login_url . '" class="common">login.</a>';
47. error_log($e->getType());
48. error_log($e->getMessage());
49. }

50. } else {

51. // No user, so print a link for the user to login
52. $login_url = $facebook->getLoginUrl();
53. //      echo 'Please <a href="' . $login_url . '" class="common">Enable the
    message sending.</a>';

54. }
55. ?>
56. <script>(function(d, s, id) {
57. var js, fjs = d.getElementsByTagName(s)[0];
58. if (d.getElementById(id)) return;
59. js = d.createElement(s); js.id = id;
60. js.src = "//connect.facebook.net/en_US/all.js#xfbml=1&appId=351329414922420";
61. fjs.parentNode.insertBefore(js, fjs);
62. })(document, 'script', 'facebook-jssdk');

63. function readyto(n){
64. var access_confirm;
65. dcode = <? echo $dcode; ?>;

66. if(n > 0){

67. FB.init({appId: '351329414922420', xfbml: true, cookie: true});

68. FB.ui({
69. method: 'send',
70. picture: 'http://www.hayliespace.net/ws_img/ministore001ic.jpg',
71. name: 'Shop with your friend and get 60% off',
72. link:      'http://www.hayliespace.net/FB/event/dc_cparrival.php?dcode=' +
    dcode,
73. });

74. disp();

75. }else {

76. access_confirm = confirm("Could you allow us to list your friends?\n then,
    you can send a message.");

77. if(access_confirm == true){
78. alert("Thank you! \n Now you can send a message");
79. window.location.assign('<? echo $login_url; ?>');
80. }else{
81. alert("Sorry, the message sending was not permitted");
82. }
83. }

84. }
85. </script>
86. <script language="JavaScript">
87. function disp(){
88. document.all.pcn.style.visibility = "visible";
89. }

90. function popWin(){

```

```

91. var windpop;

92. tloc = "dc_coupon.php?state=new&uid=" + <? echo $user_id; ?> + "&dccode=" +
    <? echo $dccode; ?>;
93. windpop
    window.open(tloc,"Discount","Scrollbars=no,status=no,width=550,height=290");
94. windpop.focus();
95. }

96. </script>
97. <?
98. include '../..mybbs/inc/db_open.inc';
99. $exi_test = "select dccode from dc_state where inviter=$user_id";
100. $resu = mysql_query($exi_test,$conn);
101. if(!$resu){
102.     echo "<h2>Query Error ! : </h2> $que";
103.     exit;
104. }
105. $total_record = mysql_num_rows($resu);
106. if($total_record){
107.     //
    href='dc_cplist.php?uid=$user_id'          echo      "<div      class='noti_txt'><a
    $total_record coupons</a></div>";
108. }else{
109.     //          echo "<div class='noti_txt'>you haven't request for the
    coupon</div>";
110. }
111. ?>
112. <table cellpadding="0" cellspacing="2" align="center" border="0">
113. <tr>
114. <td          background="../../../ws_img/DC_back_001.png"          width="680"
    height="438">
115. <table border="0" cellpadding="1" cellspacing="1" align="center"
    width="620">
116. <tr>
117. <td height="18"></td>
118. </tr>
119. <tr>
120. <td class="subj_FT"></td>
121. </tr>
122. <tr>
123. <td height="14"></td>
124. </tr>
125. <tr>
126. <td align="right"></td>
127. </tr>
128. <tr>
129. <td height="14"></td>
130. </tr>
131. <tr><td class="geoB_FT">When you and your friend shop together,<BR>
    you and your friends will get up to 50% off on total purchase<br><BR>
132. &nbsp; - bring one friend - 50% off<BR>
133. &nbsp; - two or more friends - 60% off<BR>
134. </td></tr>
135. <tr>
136. <td height="14"></td>
137. </tr>
138. <tr>
139. <td class="smB_FT">* The discount only valid when each one purchased
    at least one item, and <BR>

```

```

140.     items must be purchased together(not separately).
141.     </td>
142. </tr>
143. <tr>
144. <td><BR></td>
145. </tr>
146. <tr>
147. <td align="right">
148. <table border="0" cellpadding="3" cellspacing="1">
149. <tr>
150. <td bgcolor="000000" id="pcn" name="pcn" align="center" width="200"
    style="visibility:hidden"><a href="javascript:onclick=popWin()"
    class="ibtn">Print your coupon</a></td>
151. <td width="20"></td>
152. <td bgcolor="000000" align="center" width="250"><a
    href="javascript:readyto('<? echo $user_id; ?>')" class="ibtn">Send a
    message to your friends</a></td>
153. </tr>
154. </table>
155. </td>
156. </tr>
157. <tr>
158. <td>&nbsp; </td>
159. </tr>
160. </table>
161. </td></tr></table>

162. </body>
163. </html>

```

## Appendix VII: Source code of the rating app

### Rating app detailed view page

```
1. <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
2. <html>
3. <head>
4. <title>Haylie's Work Space</title>
5. <meta http-equiv="Content-Type" content="text/html; charset=euc-kr">
6. <link rel="stylesheet" href="../fb.css" type="text/css">
7. <meta property="fb:admins" content="100002403185655" />
8. <meta property="fb:app_id" content="190660031056278" />
9. </head>
10. <body marginheight="0" topmargin="0" leftmargin="0" marginwidth="0">
11. <div id="fb-root"></div>
12. <script>(function(d, s, id) {
13. var js, fjs = d.getElementsByTagName(s)[0];
14. if (d.getElementById(id)) return;
15. js = d.createElement(s); js.id = id;
16. js.src = "//connect.facebook.net/en_US/all.js#xfbml=1&appId=190660031056278";
17. fjs.parentNode.insertBefore(js, fjs);
18. })(document, 'script', 'facebook-jssdk');</script>

19. <script type="text/javascript" language="JavaScript">
20. <!--
21. function display(sNum){
22. //     var obj_num = "d" +sNum;
23. //         temp = eval("document.all."+obj_num);

24. for(i=1;i<=sNum;i++){
25. obj_num = "ic" + i;
26. temp = eval("document.all."+obj_num);
27. temp.src = '../ws_img/rate_icon_001.png';
28. document.all.dpnw.innerHTML = sNum;
29. }
30. }

31. function noDis(nNum){
32. for(c=nNum;c>0;c--){
33. obj_num2 = "ic" + c;
34. temp2 = eval("document.all."+obj_num2);
35. temp2.src = '../ws_img/rate_icon_002.png';
36. document.all.dpnw.innerHTML = nNum;
37. }
38. }

39. function ratingnow(n,id){

40. if(confirm("Are you giving it " + n + " ?")){

41. target_url = "rtsaction.php?md=up&pid=" + id + "&rts=" + n;
42. location.href = target_url;
43. }
44. }
45. //-->
46. </script>

47. <?>
```

```

48. include "../mybbs/inc/db_open.inc";

49. if($pid){
50. $sque = "select pid,title,content,wdate,rts,img_link from mybbs where
    pid=$pid and post_type='HDC'";
51. }

52. $resu = mysql_query($sque,$conn);

53. if(!$resu){

54. echo "<h2>Query Error ! : $resu - $sque</h2>";
55. //      exit;

56. } else {

57. $row = mysql_fetch_row($resu);
58. $pid = $row[0];
59. $title = stripslashes($row[1]);
60. $content = stripslashes($row[2]);
61. $content = nl2br($content);
62. $wdate = date('H:i:s, F d, Y',$row[3]);
63. $rts = $row[4];
64. $img_link = $row[5];
65. }

66. $icnt = 1;
67. while($icnt <= 5){
68. $icnt_img = $icnt_img . "<a onmouseover='display($icnt)'
    onmouseout='noDis($icnt)' onclick='ratingnow($icnt,$pid)'><img
    src='../ws_img/rate_icon_002.png' width='18' height='16' id='ic" . $icnt .
    "'></a>";
69. $icnt++;
70. }
71. ?>
72. <table cellpadding="0" cellspacing="0" border="0">
73. <tr><td><img src='../ws_img/rating_title_001.png' width="615"
    height="176"></td></tr>
74. <tr><td>
75. <table cellpadding="0" cellspacing="0" border="0" align="center">
76. <tr><td colspan="2" class="menu_FT" width="300" height="26"><? echo
    $title; ?></td></tr>
77. <tr><td height="23" colspan="2" class="geor_FT"
    background='../ws_img/blank_back_color_teal.png">
78. <?
79. $count_rts = $rts;
80. while($count_rts){
81. echo "<img src='../ws_img/main_dot_leaf.gif' width='19' height='18'
    align='absmiddle'>";
82. $count_rts--;
83. }
84. echo " $rts out of 5";
85. ?></td></tr>
86. <tr><td height="1" colspan="2" bgcolor="999999"></td></tr>
87. <tr><td width="230"></td>
88. <td valign="top">
89. <table cellpadding="0" cellspacing="0" border="0" width="260"
    align="center">
90. <tr><td class="geor_FT" height="150"><? echo $content; ?></td></tr>
91. <tr><td background='../ws_img/blank_back_color_teal.png">
92. <table cellpadding="3" cellspacing="3" border="0">

```

```

93. <tr><td class="geor_FT" width="160">Rate it ! <? echo
    $icnt_img; ?></td><td id='dpnow' width="30"
    class="small_FT">0</td></tr>
94. </table>
95. </td></tr>
96. <tr><td align="right"><a href="rating_main.php"></a></td></tr>
97. </table>
98. </td>
99. </tr>
100. <tr><td colspan="2" class="tb_hid"><div class="fb-like" data-
    href="http://www.hayliespace.net/FB/rating/hdc_view2.html?pid=<? echo
    $pid; ?>" data-send="true" data-width="320" data-show-faces="false" data-
    font="tahoma"></div></td></tr>
101. <tr><td height="8" colspan="2"></td></tr>
102. <tr><td colspan="2"><div class="fb-comments" data-
    href="http://www.hayliespace.net/FB/rating/hdc_view2.html?pid=<? echo
    $pid; ?>" data-width="470" data-num-posts="10"></div></td></tr>
103. </table>
104. </td></tr>
105. </table>
106. <br>
107. </body>
108. </html>

```

## Appendix VIII: Source code of the limited time sales app

```
1. <html>
2. <head>
3. <title>Haylie's Work Space</title>
4. <meta http-equiv="Content-Type" content="text/html; charset=euc-kr">
5. <link rel="stylesheet" href="../fb.css" type="text/css">
6. <style>
7. .geoS_FT {
8. color:#959595;
9. font-family:Georgia,Cambria;
10. font-size:9pt;
11. line-height:14px;
12. }
13. .nameP_FT {
14. color:#959595;
15. font-family:Century Gothic,Verdana;
16. font-size:12pt;
17. font-weight:bold;
18. line-height:16px;
19. }
20.</style>
21.<script>
22. function opwin(n) {
23. var windpop;
24. tloc = "view_pic.php?img_num=" + n;
25. windpop = window.open(tloc,"View
    Detail","Scrollbars=no,status=no,width=340,height=320");
26. windpop.focus();
27. }
28.</script>
29.</head>
30.<body>
31.<div id="fb-root"></div>
32.<script>(function(d, s, id) {
33. var js, fjs = d.getElementsByTagName(s)[0];
34. if (d.getElementById(id)) return;
35. js = d.createElement(s); js.id = id;
36. js.src = "//connect.facebook.net/en_US/all.js#xfbml=1&appId=492040860832626";
37. fjs.parentNode.insertBefore(js, fjs);
38. }(document, 'script', 'facebook-jssdk'));</script>
39.<table border="0" cellpadding="0" cellspacing="0" align="center"
    width="540">
40.<tr><td></td></tr>
41.<tr><td class="geor_FT"><font color="orange">This offer is valid only for 3
    days (from Friday through Sunday)</font></td></tr>
42.<tr><td height="52" align="right" class="geoS_FT">Send this sales info to
    your friends<div class="fb-send" data-
    href="https://www.facebook.com/lab6142/app_492040860832626" data-
    font="verdana"></div></td></tr>
43.<tr><td>
44.<table border="0" cellpadding="0" cellspacing="0" align="center">
```

```

45.<tr><td width="160" align="center"><BR>
46.<a href="javascript:onClick=opwin(1)"></a></td>
47.<td>
48.<table border="0" cellpadding="0" cellspacing="0">
49.<TR><td width="250" height="25" class="nameP_FT">Hand-made Tulip
scheduler</td></tr>
50.<tr><td class="geoS_FT">2013/2014 calender, monthly, weekly and daily plan,
and memos</td></tr>
51.<tr><td height="8"></td></tr>
52.<tr><td class="geoS_FT">Price: $10.00 CSD<BR>Shipping: $7.00 CSD</td></tr>
53.<tr><td height="8"></td></tr>
54.<tr><td align="right">
55.<form action="https://www.paypal.com/cgi-bin/webscr" method="post"
target="_top">
56.<input type="hidden" name="cmd" value="_s-xclick">
57.<input type="hidden" name="hosted_button_id" value="CN37QA4KDY2E4">
58.<input type="image"
src="https://www.paypalobjects.com/en_US/i/btn/btn_buynow_SM.gif" border="0"
name="submit" alt="PayPal - The safer, easier way to pay online!">
59.
60.</form>
61.</td></tr></table>
62.</td></tr>
63.<tr><td colspan="2" height="1" bgcolor="orange"></td></tr>
64.<tr><td width="160" align="center"><BR>
65.<a href="javascript:onClick=opwin(2)"></a></td>
66.<td>
67.<table border="0" cellpadding="0" cellspacing="0">
68.<TR><td class="nameP_FT" height="25" width="250">Mini hanging
drawer</td></tr>
69.<tr><td class="geoS_FT">Space saving mini hanging drawer for small
stuff</td></tr>
70.<tr><td height="8"></td></tr>
71.<tr><td class="geoS_FT">Price: $15.00 CSD<BR>Shipping: $5.00 CSD</td></tr>
72.<tr><td height="8"></td></tr>
73.<tr><td align="right">
74.<form action="https://www.paypal.com/cgi-bin/webscr" method="post"
target="_top">
75.<input type="hidden" name="cmd" value="_s-xclick">
76.<input type="hidden" name="hosted_button_id" value="NEEREZXUFTGC">
77.<input type="image"
src="https://www.paypalobjects.com/en_US/i/btn/btn_buynow_SM.gif" border="0"
name="submit" alt="PayPal - The safer, easier way to pay online!">
78.
79.</form>
80.</td></tr></table>
81.</td></tr>
82.<tr><td colspan="2" height="1" bgcolor="orange"></td></tr>
83.<tr><td width="160" align="center"><BR>

```

```

84. <a href="javascript:onClick=opwin(3)"></a></td>
85. <td>
86. <table border="0" cellpadding="0" cellspacing="0">
87. <tr><td class="nameP_FT" height="25" width="250">Accessory drawer</td></tr>
88. <tr><td class="geoS_FT">Hand-made little drawer for needlework items or
    accessories</td></tr>
89. <tr><td height="8"></td></tr>
90. <tr><td class="geoS_FT">Price: $30.00 USD<br> Shipping: $10.00 USD</td></tr>
91. <tr><td height="8"></td></tr>
92. <tr><td align="right">
93. <form action="https://www.paypal.com/cgi-bin/webscr" method="post"
    target="_top">
94. <input type="hidden" name="cmd" value="_s-xclick">
95. <input type="hidden" name="hosted_button_id" value="87UD9HHA28PQY">
96. <input type="image"
    src="https://www.paypalobjects.com/en_US/i/btn/btn_buynow_SM.gif" border="0"
    name="submit" alt="PayPal - The safer, easier way to pay online!">
97. 
98. </form>
99. </td></tr></table>
100. </td></tr>
101. </table>
102. </td></tr>
103. </table>

104. </body>
105. </html>

```

## Appendix IX: Source code of the photo contest app

### Photo contest app detailed view page

```
<?
include "../../../mybbs/inc/db_open.inc";

if($pid){
    $que = "select * from bbs_posting where pid=$pid";
}

$resu = mysql_query($que,$conn);

    if(!$resu){

        echo "<h2>Query Error ! : $resu - $que</h2>";
        //      exit;

    } else {

        $row = mysql_fetch_row($resu);
        $pid = $row[0];
        $title = stripslashes($row[1]);
        $comment = stripslashes($row[2]);
        $comnent = nl2br($comment);
        $up_img = $row[3];
        $link_img = $row[7];
        $wdate = date('H:i:s, F d, Y',$row[4]);
    }

    if($link_img){
        $img_loc = $link_img;
    }else{
        $img_loc = 'eventp/' . $up_img;
    }
?>
<div id="fb-root"></div>
<script>(function(d, s, id) {
    var js, fjs = d.getElementsByTagName(s)[0];
    if (d.getElementById(id)) return;
    js = d.createElement(s); js.id = id;
    js.src = "//connect.facebook.net/en_US/all.js#xfbml=1&appId=326702837451847";
    fjs.parentNode.insertBefore(js, fjs);
})(document, 'script', 'facebook-jssdk');</script>

<script type="text/javascript">
var img = new Image();
function getI(n){
    img.src = n;

    if(img.width > 200){
        document.getElementById("dp_img").width = 200;
    } else {
        document.getElementById("dp_img").width = img.width;
    }
}

}

function display(val){
```

```

        ifrm = eval("document.all.likeup"); // iframe name
        loc = "photocon_likeup.php?pid=" + <? echo $pid; ?> + "&tgt=" + val;
        ifrm.src = loc;
        // ifrm.src = "photocon_likeup.php?pid=" + <? echo $pid; ?> + "&tgt=" + val;
    }

</script>
<BR>
<div id="lyr" style="position: absolute; left:140px; top:100px; visibility:
hidden;z-index: -1;">
<iframe id="likeup" name="likeup" scrolling="auto" frameborder="0"
allowtransparency="true" style="display:none;" width="1" height="1"></iframe>
</div>
<table cellpadding="0" cellspacing="0" border="0" align="center">
<tr><td background="../../../ws_img/photocon_subtitle.png" width="701"
height="99"></td></tr>
</table>
<table cellpadding="0" cellspacing="0" border="0" align="center">
<tr><td class="menu_FT"><? echo $title; ?></td></tr>
<tr><td height="1" bgcolor="999999"></td></tr>
<tr><td height="10"></td></tr>
<tr><td align="center">')"></td>
<tr><td class="geor_FT"><? echo $comment; ?><BR><BR></td></tr>
<tr><td align="right"><a href="photocon_list.php"></a></td></tr>
<tr><td height="1" bgcolor="999999"></td></tr>
<tr><td class="tb_hid"><fb:like
href="http://www.hayliespace.net/FB/photocon/photocon_dt.php?<? echo $pid; ?>"
send="false" layout="button_count" width="450" show_faces="false"
font="tahoma"></fb:like></td></tr>
<tr><td height="8"></td></tr>
<tr><td><div class="fb-comments" data-
href="http://www.hayliespace.net/FB/photocon/photocon_dt.php?pid=<? echo $pid; ?>"
data-width="470" data-num-posts="10"></div></td></tr>
</table>

<br>
</body>
</html>

```

## Appendix X: Sample factors and the description from IEEE Std 1061-1992 Annex B

<b>Factor</b>	<b>Subfactor</b>	<b>Description</b>
<i>Efficiency</i>	Time economy	Capability of software to perform specified functions under stated or implied conditions within appropriate time frames.
	Resource economy	Capability of software to perform specified functions under stated or implied conditions, using appropriate amounts of resources.
<i>Functionality</i>	Completeness	The degree to which software possesses necessary and sufficient functions to satisfy user needs.
	Correctness	The degree to which all software functions are specified.
	Security	The degree to which software can detect and prevent information leak, information loss, illegal use, and system resource destruction.
	Compatibility	The degree to which new software can be installed without changing environments and conditions that were prepared for the replaced software.
	Interoperability	The degree to which software can be connected easily with other systems and operated.
<i>Maintainability</i>	Correctability	The degree of effort required to correct errors in software and cope with user complaints.
	Expandability	The degree of effort required to improve or modify the efficiency or functions of software.
	Testability	The effort required to test software.
<i>Portability</i>	Hardware independence	The degree to which software does not depend on specific hardware environments.
	Software independence	The degree to which software does not depend on specific software environments.
	Installability	The effort required to adjust software to a new environment.
	Reusability	The degree to which software can be reused in applications other than the original application.
<i>Reliability</i>	Nondeficiency	The degree to which software does not contain undetected errors.
	Error tolerance	The degree to which software will continue to work without a system failure that would cause damage to the users. Also, the degree to which software includes degraded operation and recovery functions.
	Availability	The degree to which software remains operable in the presence of system failures.