Survey of Social Commerce Research

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Abstract. Social commerce is a field that is growing rapidly with the rise of Web 2.0 technologies. This paper presents a review of existing research on this topic to ensure a comprehensive understanding of social commerce. First, we explore the evolution of social commerce from its marketing origins. Next, we examine various definitions of social commerce and the motivations behind it. We also investigate its advantages and disadvantages for both businesses and customers. Then, we explore two major tools for important for social commerce: Sentiment Analysis, and Social Network Analysis. By delving into well-known research papers in Information Retrieval and Complex Networks, we seek to present a survey of current research in multifarious aspects of social commerce to the scientific research community.

1 Introduction

$14 billion dollars, or 5% of all online revenue, are expected to come from social commerce in [3]2015. Social commerce, a rapidly growing branch of commerce, originates from social media marketing and hence marketing.

Marketing is an integral part of commerce that has evolved greatly throughout the years. Before the 1400's, marketing was mainly word-of-mouth. Mid-1400's, print advertising become popular. Advertisements were published in newspapers, magazines, billboards, and posters. However, with the invention of the telephone and the radio in late 1800's, marketing soon shifted to these devices as it's main form of communication. Radio advertisements and telemarketing were the most popular methods of marketing in addition to print advertising. Soon, television became popular and marketing spread to this platform too. By the early 2000's, the computer started prevailing and marketing online became highly profitable. Spam emails and online ads spread. Then came Web 2.0 where user generated content started increasing as blogs and other forms of social media became popular. Soon, marketers started realizing consumers trusted other consumers' inputs more than they trusted advertising campaigns run by marketers. Thus, social media marketing began, eventually giving rise to social commerce.

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[3] http://blog.hubspot.com/marketing/social-ecommerce-revenue-infographic

In this paper, we try to present a survey of social media commerce where we do not assume the reader has any previous background in social commerce. We seek to clarify what social commerce is and what are the motivations behind it before analyzing the technology driving it.

2 Social Commerce

2.1 What is Social Commerce?

Origins Yahoo is credited with coining the term social commerce in 2005. It introduced the term as it released its "Shoposphere" [4] which allowed users to add items that they wanted to buy to pick lists. Other users were then able to comment on and rate the pick lists. Users could also share their lists with family and friends. From then, social commerce has been researched by many and defined in multiple ways.

Definition Researchers haven't agreed upon one standard definition of social commerce but social media and commercial activities are at the core of definition [12]. Social commerce involves activities and transactions via social media environment. It supports the use of social interactions and user content contributions [11]. Simply put, social commerce is where the sellers are individuals, not firms [18]. Firms don't market directly to customers but rather take advantage of customers' willingness to share their experiences online to market their products. Social commerce connects to sellers as well as users [5]. [17] defines social commerce as a type of e-commerce that uses online media that supports social interaction to support online buying and selling of products and services. This aspect of social media is what differentiates social commerce from e-commerce.

Domain of S-commerce Social commerce is considered by most researchers to be a subset of e-commerce which includes a social component [17, 12, 20, 23, 3]. Furthermore, while e-commerce is popular among males, social commerce is more female-oriented [3]. [23] expand the domain of social commerce to include not just transactions but exchange-related activities that occur before, during, and after a focal transaction. Both consumer-side and firm-side activities fall under the domain of social commerce. Firm-related activities include participating in public social networks by advertising, market researching, creating brand and product awareness campaigns, etc. Firms have also been creating their own social networks such as Oracle's Connect and IBM's Beehive [20]. Consumer-side activities include sharing and liking a business' post, participating in social contests, making purchases using s-commerce, etc.

2.2 What Drives Social Commerce?

Social Support The rise of social commerce depends primarily on social support offered in a Computer Mediated Social Environment(CMSE). Social support is

[4] http://www.ysearchblog.com/2005/11/14/social-commerce-via-the-shoposphere-pick-lists/

defined by [12] as an individual's experiences of being cared for and helped by people in the social group. The greater the social support on a social network, the more likely the user is to participate in social media commerce. [12] found that social support plays a greater role in continuance intention of social commerce than the website quality of the social media site. They concluded that frequent sharing of helpful and supportive information can strengthen relationship quality between users. Closely related to social support is subjective norm: an individual's perception of whether or not people important to them think a specific behavior should be performed [17]. Subjective Norm also positively affects a user's social commerce intention.

Social Commerce Strategies There are a variety of social commerce strategies in place. Firstly, companies use social media, email, web sites, print, mobile sites/applications, SMS text message among other vehicles for marketing their services to customers [8]. In a survey of 500 companies, it was found that some of the most effective incentives for increasing social media interaction are discount codes for "Liking" or "Following" a brand page, In-store discounts, and social contests. Social contests are successful because they involve the public, which helps humanize a brand[14]. Companies also reported using daily deals, ratings, reviews, and product recommendations, wish lists, curation, and user-generated photos to further encourage social commerce [8]. Warby Parker, a business that sells glasses, allows home try-ons of their products where customers can order several pairs of glasses, try them on, and post them to the Warby Parker Facebook page asking other users on social media to help them decide which pair to choose [15]. This strategy is very common where users are encouraged to upload pictures of them using a product because images are retweeted much more than just text posts, and users are more likely to purchase a product if they see their friends using it [6]. Viral marketing is another popular strategy employed where even if the topic of the advertisement, most often a video, isn't related to the product or service directly, a logo is added at the end which helps to spread the name of business and garner some attention from the media [23]. Viral marketing is effective when influential users engage in a campaign and pass along information to their followers or friends. Social media marketing is more trusted by users because it propagates from user to user[6].

2.3 Advantages and Disadvantages of Social Commerce

Advantages of Social Commerce There are certain advantages to using social commerce. The primary advantage is users find it pleasurable [5]. A secondary advantage is that users of s-commerce do not need to physically go anywhere. Everything can be bought online and even shopping with friends can be done online. Consumers can consider their friends' inputs and opinions before purchasing a product or service. Another positive factor is the discounts and deals offered when using social commerce [5]. [5]Groupon, a popular e-commerce marketplace, employs this strategy to sell products where if a certain number of people buy

[5] https://www.groupon.com/

a coupon, they receive a "groupon" with a greater value than the amount they spent on it. For example, a customer can buy a restaurant coupon for $15 but spend up to $30 on food at the restaurant. Other benefits of using social commerce include faster vendors' responses to complaints, customers assisting other customers, and engaging directly with vendors among others [12].

Social Advantages However, discounts are not always the first and foremost factor for using group social shopping sites such as Groupon, LivingSocial, Plum District and Half Off Depot. [9] found that group shopping on these sites was mainly focused around social activities such as event planning, building relationships, and identity construction. Furthermore, social media is also used for soliciting advice before buying a product as observed in the Facebook page of Warby Parker [15]. [12] categorize social media marketing into several activities such as social shopping, ratings and reviews, recommendation and referrals, forums and communities, and social advertising campaigns.

Vendors' Benefits There are also benefits to vendors such as saving money on customer service, testing new products/ideas easily, learning about customers, easily comparing to competitors, users marketing, improved service/product design, etc [12]. Using a group shopping site (e.g. Groupon) can be expensive for businesses which face a loss when they offer more expensive services at cheap prices. However, the exposure the businesses gain when many customers sign up for a "groupon" helps them spread their customer base and get more recognition. Similary, social media marketing really proves to be successful with the buzz mechanism when users pass information to other users making a campaign go viral [2].

Disadvantages However, there are a few disadvantages to businesses and customers. Companies may not be able to justify spending on s-commerce and abandon it all together like Wal-Mart because a lot of the benefits are intangible [20]. Invasion of privacy is a major issue where social networks such as Facebook will sell members' information to advertisers. For example, Facebook's attempt at tracking users' web history resulted in a class-action lawsuit [22]. Insufficient security is another issue that harms both businesses and customers. Fraud, a problem in e-commerce, also affects s-commerce where fake accounts are used to dupe people and steal identities. Companies may also face problems over violating intellectual property laws [20]. Lastly, as in e-commerce, keeping reviews and recommendations honest is another problem in s-commerce [10].

3 Tools for Social Commerce

With the rise of social commerce, there is a need for research in tools for understanding social media such as sentiment analysis and social network analysis. In this section of the paper, we explore important technologies that are crucial to using social media effectively.

3.1 Sentiment Analysis

Opinion mining and sentiment analysis are used interchangeably to describe the process of extracting posts from Web 2.0 and automatically analyzing them to determine the sentiment of users towards a certain product, services, and/or companies. Opinion mining is a broad term which refers to extracting data from Web 2.0 and analyzing it for various applications such as identifying trends. Sentiment analysis refers to taking the same data but analyzing it further for emotions on a certain topic.

The first step to any opinion mining system is data extraction. Twitter offers a public API where tweets pertaining to a specific search query can be retrieved. The second step is data pre-processing and normalization. Often times, users' posts on social media contain non standard language such as slang words, grammatical errors, and spelling errors. Most researchers clean up the data by eliminating repetitive words, excessive punctuation, correcting spelling errors, expanding abbreviations, and fixing other grammatical errors [21].

After preprocessing, data is then analyzed using a variety of techniques. In text mining, a document (such as a blog) is often split into smaller segments using either classification or clustering techniques. For microblogging, clustering isn't necessary and a part of speech tagger, the next step, can be immediately implemented after preprocessing. This linguistics approach is useful for creating a matrix for keywords and features. Adverbs and adjectives are most indicative of sentiment. There are many exisitng sentiment lexicons for these words. SentiWordNet[6] is popular resource for identifying the polarity of an adjective. However, negations can reverse the sentiment of text. Thus, negations ('not' good), and intensifiers ('*very*' good) are also tracked and sentiment scores are adjusted accordingly. Since sentiment of words depends on the context they are used in, topics of the data must also be considered [13]. For example, "unpredictable" may be negative when used in the context of automobiles such as "unpredictable steering," yet the same term can be positive when used in context of movie reviews to describe an "unpredictable plot"[21]. Most researchers have used domain-specific sentiment lexicons to simply analyze if the sentiment is positive or negative but some researchers have also classified the sentiment in various bipolar or unipolar emotions.

The final step is presenting the analyzed data. For trend analysis, polarity isnt a required measurement and instead, after clustering/classification, various statistics are used on the topics to figure out the most trending topics on a social media site. A tree map which indicates volume and sentiment (if analyzed) is presented with the data. Another visual tool is a word cloud in which the largest term indicates the highest popularity.

The results of opinion mining and sentiment analysis are used in a variety of applications in social commerce. Companies can "listen in" on social media to determine people's opinions on their products and adjust their product assortment accordingly. For example, Converseon[7] is a company that offers data

[6] http://sentiwordnet.isti.cnr.it/
[7] http://converseon.com/

consisting of comments around the web on their client's brands and services so that the client can understand public sentiment on various aspects of their products and services [16]. For example, in 2003, Kraft monitored public sentiment over trans fat and decided to cut down trans fat from their products [19]. Perhaps an even more lucrative application of social media analysis is using it to predict stock price movements [20] [22]. Finally, trend analysis is often used in the design process and for tailoring marketing strategies. Marketers can design their advertisements based on opinions extracted from social media in order to stay updated and connect to customers better.

3.2 Social Networks Model

Another useful analysis for social commerce is social network analysis. In order to analyze networks, [18] first defined four characteristics of social commerce marketplaces: 1) Sellers are individuals instead of firms. 2) Sellers create product assortments as personalized online shops. 3) Sellers can create links between personalized shops. 4) Sellers' incentives are based on making commissions from sales by their shops. In social commerce, sellers often don't own merchandise but simply manage it. Uber[8] is an example of this model where the company doesn't own any taxis but offers a taxi service to customers. A network structure that is most successful for social commerce in one that is expansive and has many hyperlinks. This ensures few dead ends so that customers can easily find appealing shops and products before leaving the marketplace. Their research further showed that shops with more links going into them and less links going out of them generate more revenue. However, if links going out of a shop are reciprocated by the shops they are going to, then the outgoing links aren't necessarily harmful to the shop. Yet incoming links from shops that are highly interconnected don't generate much traffic into the shop. Overall, the presence of network adds economic value to online marketplaces [18].

A social network is treated as a graph where users are the nodes and the relations between them are the edges. Also called complex networks, in this analysis the document is first preprocessed, clustered, and classified. Preprocessing consists of removing duplicate nodes (a user has multiple profiles), inactive nodes (user has an account but stopped using it), and artificial nodes (spam accounts with malicious intentions) [1].

The next step is to create mapping rules and transform the data into a graph. A node can be a hub or an authority. Hubs are users who follow others whereas authorities are users who are followed. While nodes are almost always users, edges can be classified by many different types of relations. Researchers note that while explicit relations are most often used, implicit relations can be helpful in predictive modeling. Explicit relations are those in which users knowingly interact with another user by adding them as a friend or following them on social media sites, messaging them, posting on their wall or tweeting at them, etc . Implicit relations is still a new area of research but consists of tracking

[8] https://www.uber.com/about

shared interests and activities of those users who dont have an explicitly defined relation [24, 1][2][28]. For example, two users on Facebook may like a lot of the same pages or belong to the same groups but not be friends. Implicit relations are of interest because social friendships often form between similar people with shared interests and can be used in predictive modeling.

After establishing the mapping rules, data is analyzed in a variety of ways. Component analysis usually labels components as weakly connected or strongly connected. Weakly connected components are important because they are important for understanding the network structure on massive graphs. Strongly connected components are useful in identifying if there is a strong core to the network where users are well connected and interact frequently. Various other measurements and statistics aid in characterizing a core. Network size, network density, average degree, average path length, diameter, modularity, and average clustering coefficient are frequently used in analysis. For example, a large network is often thought to lack trust and strong relations among users. Another example is viral marketing which is most effective when the core is penetrated along with the networks influential users. Influential users are often found using algorithms such as PageRank. The more mentions a user has, the more influential he or she is assumed to be.

As mentioned previously, viral marketing and other social marketing strategies greatly utilize social network analysis. It can also be used to avoid churn, loss of customers. Social network analysis aids in determining if there is an unexpected amount of churn so that businesses can rethink their advertising campaigns and execute customer management measures [1]. It can also be used in predictive modeling where businesses can predict which other users will leave based on their relations to the lost customer. If an influential user leaves, businesses can assume several other users will also leave. Networks can also be used to route customer services differently through social media. [1] suggest assigning trust and reputation scores to users where businesses can easily differentiate spam comments from comments that require immediate action based the customers previous actions. Social search is another useful application where search results could be based on what other members of a users network search for.

Network analysis of Flickr, LiveJournal, YouTube, and Orkut found that all the networks have a large, densely connected core. The path lengths from node to node are also fairly short (2-6 hops). This information suggests that if marketers or business want to reach a wide audience quickly, they have to affect users in the core of the network. Also, viral campaigns will be relatively easy to achieve since path lengths are short. Thus, users can easily pass along information through their networks. For this reason, companies have also been creating their own internal social networks to generate ideas and receive feedback from their employees [20]. Analysis of the world's largest e-commerce marketplace in China, Taobao, by [7] showed that there is an increasing positive relationship between trade volume and message volume. Taobao has an integrated messaging system where buyers can message sellers and other members on the site. Furthermore, the number of messages sent increased logarithmically as price increased.

Similarly, a direct relationship exists between the seller's rating and the prices at which products are sold [7].

4 Suggestions for Future Research

While social commerce is becoming more prominent, more research is required in various aspects of it to fully understand the field and ensure the success of a company's social commerce strategy. One area that many businesses haven't considered much is using input from customers to design and improve products. Companies have used social networks for this purpose internally with their employees but not frequently with the common public. Companies could initiate an open design concept where they could initiate polls and surveys on features they would like to include in a product before designing the product. This way both users and businesses benefit where users can specify what they would like to see in a product and businesses can receive help and suggestions in the design processes.

Another area of lesser research is social media marketing. Combined with social network analysis, businesses could learn to identify and advertise to various cluster centers for easy propagation of information among a social network. Since people trust other users more than marketers for input on products and services, strategies could be revised to incorporate comments from social media sites into the advertising [20]. Customer service could also be greatly improved through the use of social media. Since other users can see complaints on a business' Facebook and how the business responds, more research is recommended on how network analysis can used to make the whole process more efficient. Perhaps a social media page can be customized to user based on the activities of other members of the user's network. Product recommendations could be greatly improved with the use of social media analysis. An interesting application of trend analysis is businesses creating deals on sites such as Groupon based on the products or topics that are trending. This could allow businesses to profit by offering deals in trending products or topics.

Furthermore, research on what makes a social network suitable of social commerce is an interesting topic to explore. Facebook accounts for a majority of the purchases on social media but research on why isn't extensive. Twitter was found to be easier to use by businesses to implement social commerce strategies but Facebook drives more purchases. Thus, there exists a discrepancy between businessess' social media platform preferences and the effectiveness of them [4]. A social commerce strategy successful on one social media platform may not be effective on another platform. Hence, research on tailoring strategies to different platforms is recommended to ensure the success of social commerce implementation. Privacy concerns must also be addressed since network analysis often reveals a lot of information about a user.

In the field of sentiment analysis, irony and emoticons are some aspects that have not been fully explored yet. Sarcastic posts are often eliminated in data analysis because of the difficulty in detecting sarcasm. Emoticons and excessive

punctuation are also removed and cleaned up but these features can provide valuable data to sentiment analysis. Especially, when users post comments that don't express sentiment in the text but express it through an emoticon or punctuation. For example, a user could post the phrase "iPhone6 :D" or "You are in Paris?!" and no sentiment would be derived through traditional sentiment analysis but analysis of the emoticon would reveal happiness and analysis of the punctuation could suggest wonder and excitement. Though emoticons are gaining momentum as research topic of interest, punctuation has still not been explored as a sentiment-expressing feature. More research in these topics along with improving sentiment lexicons and fully automating the analyzing process would make social commerce an accessible tool for more companies and businesses. See [20] for more suggestions in social commerce research.

5 Conclusion

In this paper, we presented a review of various aspects of social commerce from the technology perspective and suggested areas of future research. We presented a review of well-known papers in Sentiment Analysis, and Complex Networks, along with Social Media Commerce in order to enable researchers to obtain an adequate picture of social commerce in order to contribute to the field. However, we did not fully explore the advertising perspective and investigate customer psychology. A vast field of research exists on improving marketing strategies, and ensuring the success of social media commerce from a business' perspective.

Social media is a great medium for businesses to market and sell their products since many people spend a significant amount of their time on various social media sites. A third of adult Internet users under 30 are getting their information from what their friends post on social media sites instead of business homepages[9]. With this in mind, we sought to establish a basic understanding of social commerce that explores both the technology and intentions behind it. Social media is used for a variety of reasons and social commerce strategies can be greatly improved with this understanding.

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