Customer Service on Social Media: Do Popularity and Sentiment Matter?

Completed Research Paper

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Abstract

Many companies are now providing customer service through social media, helping and engaging their customers on a real-time basis. To study this increasingly popular practice, we examine how major airlines respond to customer comments on Twitter by exploiting a large data set containing Twitter exchanges between customers and three major airlines in North America. We find that these airlines pay significantly more attention to Twitter users with more followers, suggesting that companies literarily discriminate customers based on their social influence. Moreover, our findings suggest that companies in the digital age are increasingly more sensitive to the need to answer both customer complaints and customer compliments while the actual time-to-response depends on customer's social influence and sentiment as well as the firm's social media strategy.

Keywords: Social media, Social influences, Empirical analysis

Introduction

On Saturday, February 13, 2010, filmmaker Kevin Smith, after being told by Southwest Airlines to leave a plane he boarded, angrily sent out a tweet to his 1.6 million Twitter followers claiming that he had been kicked off a Southwest Airlines flight for being "too fat". Sixteen minutes later, Southwest Airlines, which had over 1 million Twitter followers, responded and started to de-escalate the crisis.

Aside from airlines' controversial policies on "customer of size", Southwest's handling of the situation is certainly prompt and commendable. But what if Kevin Smith were not some celebrity with millions of Twitter followers vigorously complaining on Twitter? Would he get a response in sixteen minutes? Or, would he even get a response?

Clearly, the answers hinge on a company's social media strategy, which is becoming increasingly important for the reputation of a brand. Empowered by the popularization of social media and smart phones, customers nowadays are no longer limited to a passive role in their relationships with a brand. They can easily express and distribute their endorsements or complaints publicly to a large audience in real time, significantly raising the bar of customer service in the age of social media. United Airlines learnt this the hard way when the famous protest song "United Breaks Guitars" went viral on YouTube in 2009.[1] While most people probably would not bother writing a song or making a video to share their experience, more and more people are turning to Twitter by simply tweeting publicly towards corporate Twitter accounts through mention (i.e., @).[2] According to a recent New York Times article, such a public approach may actually work out better for consumers than spending time on the phone.[3] In response, companies are scrambling to monitor and respond to consumer mentions on Twitter, making real-time interaction a standard practice.[4]

To better understand this growing phenomenon of using social media as customer service, this paper empirically examines how brands manage customers' "requests" for engagement on social media. In particular, we focus on the following research question: Does a customer's popularity on social media and sentiment towards a brand affect whether and how fast the brand responds to the customer's "request" for engagement?

To address this research question, we select Twitter as the social media platform and focus on the airline industry because Twitter is one of the most popular social media platforms and the airline industry has leveraged Twitter for real-time customer service more than any other industry.[5]

Our data is collected from Twitter using the public API. From May 1st 2013 to October 12th 2013, we collected tweets sent to (i.e., mentioning) and by American Airlines and United Airlines, two of the largest international airlines in the United States and two of the most active airlines on Twitter. In addition, we collected tweets sent to and by Air Canada, the largest international airline in Canada, from April 1st 2014 to July 31st 2014. Such tweets carry a variety of content including both endorsements and complaints. We

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[1] https://www.youtube.com/watch?v=5YGc4zOqozo

[2] For example, in September 2013, people sent 37,028 tweets directly and publicly to AmericanAir, the official Twitter account of American Airlines. In the same month, people sent 34,280 tweets directly and publicly to united, the official Twitter account of United Airlines.

[3] In the most recent General Motors (G.M.) vehicle recall, Lauren Munhoven, a customer in Ketchikan, Alaska, turned to Twitter after wasting an hour on the phone with G.M. trying to get help with her 2006 Saturn Ion. After she wrote the public tweet "*@GM your agents keep telling me to take my car to a GM dealer for the recall, after I've explained I live on an island in Alaska! Help!!!!*", a member of G.M.'s Twitter team helped and the company agreed to pay the $600 cost of a round-trip ferry to ship Ms. Munhoven's car to the nearest dealer, about 300 miles away in Juneau, and pay for a rental car for the time she is without the Saturn. For detailed report, please see http://www.nytimes.com/2014/03/24/business/after-huge-recall-gm-speaks-to-customers-through-social-media.html?_r=0.

[4] Many companies are hiring consultants and specialized firms like HootSuite Media Inc. and SocialOomph.com to deal effectively with online critics. See a recent Wall Street Journal article for example: http://online.wsj.com/news/articles/SB20001424052702303949704579461412963008056?mod=index_to_people

[5] At least 63 of the major airlines in the world have set up their verified accounts on Twitter.

use text mining to classify tweets sent to airlines into three categories: complaints, compliments, or neutral tweets.

Interestingly, not all tweets sent to airlines are responded. For example, among the 220,677 tweets sent to American Airlines, 103,059 were responded, and among 178,038 tweets sent to United Airlines, 49,047 were responded. As for Air Canada, among the 59,760 tweets sent to the airline, 13,624 were responded. The time it takes to receive a response from an airline also varies by tweets and users and differs by airlines. For example, conditional on being responded, it takes 10 minutes, 50 minutes and 45 minutes on average for a tweet to be responded by American Airlines, United Airlines and Air Canada respectively.

We use binary choice models to examine how customer's popularity on Twitter affects the chance of his or her tweet being responded by airlines. Estimation results show that all the three airlines are more likely to respond to tweets sent by customers with a higher number of followers, suggesting that airlines, strategically or not, do take consumer popularity on social media into account in determining whether to respond or not. One plausible explanation for this finding is that airlines recognize the higher risk of antagonizing opinion leaders on social media but may have limited resource to handle all requests for engagement. We also find that all the three airlines are more inclined towards responding to complaints and compliments.

To understand whether popularity and sentiment affect the time-to-response, we build survival analysis models to analyze the data. Specifically, we formulate and estimate Cox proportional hazard model, Lognormal model, and the Loglogistic model to analyze airlines' time-to-response. Interestingly, we observe American Airlines reporting longer response times for customers with a higher number of followers and for customers with complaints. This suggests that American Airlines emphasizes more on prudent response to customers popular on social media or customers with complaints. Given that the overall response time of American Airlines is fairly low already, this probably is an appropriate strategy. On the other hand, we find it takes shorter time for United Airlines to respond to customers with a higher number of followers and customers with complaints. Hence, United Airline is in line with the traditional view of consumer relationship management which recommends immediate responses to powerful customers and customer complaints. This is probably due to the fact that the overall response time for United Airlines is quite large compared with American Airlines. Moreover, we find Air Canada reporting longer response times for complaining tweets, which may be probably due to the emphasis on more careful response to customers with complaints. Estimation results also indicate that all airlines respond faster to customer compliments.

This paper is among the first in the Information Systems (IS) literature to study the growing trend of using social media for customer service and our findings suggest social media as customer service may be a double-edged sword for both customers and brands. While customers popular on social media may get a "premium" customer service over social media, less connected customers may be "popularity-discriminated" by brands. On the other hand, brands with limited resource for social media may have to carefully walk the line between optimally allocating their attention to highly influential customers on social media while not antagonizing the less influential but large customer base.

The rest of the paper is organized as follows. We first review relevant literature and then develop the hypotheses for our research question. After that, we describe our data, followed by the description of the econometric models. Then we estimate the models and present the results. We conclude the paper by discussing the implications of the findings and pointing out future research directions.

Literature Review

Our study is related to a rich array of literature that examines the evolution of consumer power in the digital age. The concept that competitive advantage stems from the creation of value for the customer and associated value creation activities is well developed in the marketing literature (Payne and Frow, 2005). Sen and Sinha (2011) define Customer Relationship Management (CRM) as the overall process of building and maintaining profitable customer relationships by delivering superior customer value and satisfaction. The rise of social media which has connected and empowered customers, challenges this fundamental notion of CRM process as customers are no longer limited to a passive role in his or her relationship with a company (Malthouse et. al., 2013). Customers can easily express and distribute their opinions to large audiences, and organizations find it increasingly difficult to manage the information that customers receive about their products or services (Schultz et. al., 2012).

Lovett et. al. (2013) hypothesized that consumers spread word of mouth (WOM) as a result of social, emotional and functional drivers. They found that whereas social and functional drivers are the most important for online WOM, the emotional driver is the most important for offline WOM. Hennig-Thurau et. al. (2004) used an online sample of 2,000 consumers to generate information on the structure and relevance of the motives of consumers' online articulations. Their findings suggest that consumers' desire for social interaction, desire for economic incentives, their concern for other consumers and the potential to enhance their own self-worth are the primary factors leading to electronic word-of-mouth (eWOM) behavior.

On the other hand, the emergence of social media has opened up new opportunities for business organizations to listen to and engage with their customers and potentially to encourage them to become advocates for their products (Malthouse et. al., 2013). This can also be potentially detrimental to a business organization as customers can spread negative WOM about the brand or the company. Regardless of how excellent the service a company delivers, every company often makes mistakes in meeting the expectations of customers (Nikbin, 2011). Previous studies indicate that failures themselves do not necessarily lead to customer dissatisfaction, since most customers accept that things may sometimes go wrong (Del Río-Lanza et al., 2009). Instead, the service provider's response to the failure or lack of response is the most likely cause of dissatisfaction (Smith et al., 1999).

Gu and Ye (2013) studied the impact of management responses on customer satisfaction using data retrieved from a major online travel agency in China. They found that online management responses are highly effective among *low satisfaction customers* but have limited influence on other customers. Moreover, they discovered that while online management responses increase future satisfaction of the complaining customers who receive the responses, they decrease future satisfaction of complaining customers who observe but do not receive management responses.

Our study is also related to the literature on the impact of social media on the organizational performance in the digital age. As businesses become more comfortable in utilizing social media for their marketing, product development, sales and interactive communication strategies, a number of empirical studies have been conducted in the recent years to study the impact of social media on organizational performance. Luo et. al. (2013) studied the predictive relationships between social media and firm equity value and the relative effects of social media metrics compared with conventional online behavioral metrics. Their results suggest that social media based metrics such as web blogs and consumer ratings are significant leading indicators of firm equity value while the conventional online behavioral metrics such as Google searches and web traffic are found to have a significant yet substantially weaker predictive relationship with firm equity value than social media metrics.

Brand management in the social media environment is another aspect of organizational excellence that has been extensively studied recently. Traditionally, Brand Managers used one-to-many marketing communications, such as advertising, to pass their brand stories on to consumers (Hoffman and Novak, 1996), but the advent of social media has changed this. Gensler et. al. (2013) introduced a framework of social media's impact on brand management which argues that consumers are becoming pivotal authors of brand stories due to new dynamic networks of consumers and brands formed through social media and the easy sharing of brand experiences in such networks. They emphasize the importance for a firm to pay attention to such consumer-generated brand stories to ensure a brand's success in the marketplace.

Laroche et. al. (2013) investigated how brand communities based on social media influence elements of the customer centric model (i.e., the relationships among focal customer and brand, product, company, and other customers) and brand loyalty. Their findings suggest that brand communities established on social media have positive effects on customer/product, customer/brand, customer/company and customer/other customers' relationships, which in turn have positive effects on brand trust while trust has positive effects on brand loyalty.

Although Twitter based studies gained tremendous attention from the researchers over the recent years, studies conducted in the context of CRM in the digital age are relatively sparse. With millions of Twitter users mostly making their tweets public, Twitter stands out from the other social networking platforms in terms of simplicity and the great influence that the messages sent over the network can have (Del Campo-

Ávila, 2013). Twitter data provided a treasure of information for researchers and in general two streams of research exist: research based on the characteristics of the tweet content itself and the research based on the applicability of Twitter data in many settings such as branding, disease trend and emergency situations.

Sreenivasan et. al. (2012), investigated airline users' microblog postings pertaining to their travel related information exchange in order to assess their wants, preferences and feedback about airline products and services. They analyzed 8,978 tweets that mention three specific airlines as well as 260 airline postings from the respective airlines' official Twitter accounts. Their findings suggest that microblogs are primarily used to share compliments, while airlines use microblogs mainly for marketing. They also identified various categories of user posts such as tweets for sharing general information, asking questions and providing personal updates. They also noticed a high number of attention-seeking postings that highlighted user issues and concerns. According to the analysis, the airlines being studied did not appear to be as responsive to users' postings as expected. The researchers emphasize the importance of evaluating the sentiments and take steps to address customer issues as needed. Leung et. al. (2013) examined the Facebook pages of three budget airlines in order to discover the overall use of social media within low cost airline sectors and to find out how they react, engage, and influence users. According to the findings of this study, users are interested in commenting to wall posts which are fresh, or simply the posts published within two days.

Our research intends to shed some light to the stream of social media research literature on the growing trend of using social media for customer service.

Hypotheses Development

Correspondence with customers has long been recognized as an important aspect of doing business, for number of reasons. Among them are the cost effectiveness of keeping existing customers rather than trying to win new ones (Uller, 1989), increased sales to current customers and new customer attraction (Gulledge, 1990), less potential for negative WOM communication (Richins, 1983) and the ability to listen to customers for new ideas (Hunt and Cooke, 1990). The same business motivation applies to companies in the social media era where each brand can be different in employing strategies towards achieving the goal of *effective* brand responsiveness to consumer correspondence. In the next few sections, we formulate our hypotheses on strong theoretical basis drawing from different branches of previous research literature.

Influence diffusion through social networks has a long history in the social sciences and attracted much attention from many fields including marketing science, computer science, statistics and applied physics (Bonchi et. al., 2011). The traditional view of influence diffusion assumes that a minority of members in a society possesses qualities that make them exceptionally persuasive in spreading ideas to others (Cha et. al., 2010). They are called the *Opinion Leaders* in the Two-Step Flow Theory (Katz and Lazarsfeld, 1955), *Innovators* in the Diffusion of Innovations Theory (Rogers, 1962) and *Hubs, Connectors,* or *Mavens* in other work (Gladwell, 2000). By targeting the most influential individuals in a network, a chain reaction of influence driven by WOM can be activated such that a very large portion of the network can be reached with a very small marketing cost (Bonchi et. al., 2011).

A more modern view of influence diffusion argues that people's decision to purchase a product is strongly influenced by their peers and friends rather than the influential (Domingos and Richardson, 2001). Using a series of computer simulations of interpersonal influence processes, Watts and Dodds (2007) found that large cascades of influence are driven not by influential but by a critical mass of easily influenced individuals. The findings of Cha et. al. (2010) on user influence on Twitter indicate that popular users who have high in-degree (number of followers) are not necessarily influential in terms of spawning retweets or mentions but can hold significant influence over a variety of topics.

On Twitter, users interact by following people who post interesting tweets and the number of followers of a user directly represents the size of the audience that particular user has. Both the traditional and the modern views of influence diffusion are relevant in this case since a tweet posted by a user who is influential at least in terms of followers, is instantaneously received by a large number of followers who would potentially spread the information further across the social network in the cascading periods. Hence, to prevent an influential customer from spreading bad word of mouth, companies may have a stronger incentive to respond to such customers and to respond quickly. Therefore, we expect the following hypotheses to hold:

Hypothesis 1A: A company is more likely to respond to a tweet sent to it by a customer with a higher number of followers.

Hypothesis 1B: A company is more likely to respond faster to a tweet sent to it by a customer with a higher number of followers.

Customers provide feedback to companies by making complaints, paying compliments, offering suggestions and asking questions (Myron, 2011). Without consumer feedback, unrecognized problems cannot be fixed and opportunities to develop and extend customer relationships are lost (Kraft and Martin, 2001). Customer complaint behavior has received greater research attention over the past few decades and has been the focus of many studies in Marketing. Complaint management refers to the strategies used to resolve disputes and to improve ineffective products or services in order to establish a firm's reliability in the eyes of the customers (Tax et. al., 1998). Effective customer complaint management has been considered a *defensive marketing strategy* which diminishes customer dissatisfaction (Fornell and Wernerfelt, 1987). According to Fornell and Westbrook (1984), effective complaint management has a dramatic impact on customer retention, deflects potential negative word-of-mouth, and improves profitability.

Stephens and Gwinner (1998) investigated how many potentially helpful complaints are never received because consumers fail to voice them, preferring instead to quietly discontinue patronage. They concluded that firms must make complaining less costly and even reward consumers if the firm wishes to benefit from the information communicated. Up until recently, customers used to complain directly to the brands by various means such as letters, phone calls, fax and e-mail. All the communication took place in a private and confidential manner with no record available in public. In contrast, social media has offered consumers and companies with a *free* and *informal* yet immensely powerful platform to complain loudly and recommend remedies openly in public, regardless of how bitter the truth can be. Apparently, social media has taken the burden of tiresome formal complaining off the consumers at almost zero cost to them, dramatically increasing the *perceived easiness* in complaining. Consequently, social media is becoming increasingly popular among the most preferred choices of communication for making consumer complaints, while setting the bar high for the brands in customer service.

For some time, the *Expectations-Performance Disconfirmation* model has been the dominant paradigm in consumer satisfaction research (Olshavsky and Miller, 1972; Oliver, 1980; Oliver, 1987). When the actual experience exceeds the expectations, the customer is satisfied and when the experience does not meet the expectations, the customer is dissatisfied. Therefore, the dissatisfaction is considered as an antecedent of complaining (Landon, 1980). Although the disconfirmation paradigm explains the cognitive process that culminates in satisfaction appraisal, it only indirectly addresses the question of how consumers respond to consumption experiences (Westbrooke, 1987).

For decades, Hirschman's (1970) *Theory of Exit, Voice*, and *Loyalty* has been the foundation for many of the customer complaint behavior based studies in Economics and Marketing. His *exit-voice* theory pertains to situations in which a customer becomes dissatisfied with the services or products provided by the organization and chooses to *exit* or *voice*. In the context of business, *exit* implies that the customer will not make future purchases from the organization while *voice* is the customer's direct complaint to the firm, expressing the dissatisfaction. Hirschman views *voice* as political action par excellence that involves the attempt to change practices, policies and outputs of the organization from which one buys, and is manifested in complaints in private or in public.

Hirschman (1970) suggested that the customers consider two distinct but somewhat interrelated factors in deciding whether to complain. Singh (1990) evaluates these as the *Perceived Probability of Successful Complaint* and the *Worthwhileness of Complaint*. The former suggests that a dissatisfied customer would tend to choose voice actions if he/she is convinced that such actions would effectively bring the desired outcomes. The latter is about the balance between the costs and the benefits of complaining where the costs and benefits can include both economic and psychological components. For example, refunds, exchanged products, satisfaction derived from complaining itself, time invested in creating the complaint and the feelings of embarrassment, stress and confrontation may all include in the economic and psychological benefits and costs of complaining. All these traditional notions of consumer complaining behavior is still very true in the age of social media. For instance, if customers *believe* that a company will respond to them on social media at the time of their need, it is indeed a success of the company towards building a loyal customer base. For example on Twitter, if the customers *believe* that help is just a *tweet away*, it is more than likely that they continue to stay loyal to the company no matter how harsh their experience can be, compared to the most common situations of having bad experience with no help from the company.

The findings of Bearden and Oliver (1985) suggest that the degree of public complaining has a positive relationship to satisfaction with the eventual outcome of the problem while the extent of private complaining has a significant negative relationship. Oliver (1987) asserts that only when customers, through direct complaining, are looking for redress, apology and psychological benefit it is possible to transform their dissatisfaction into a second, post-complaining, level of satisfaction or secondary satisfaction. Again, this may be another reason why companies want to respond to customer complaints on social media. Even though the social media teams may not always have all the answers at their fingertips, their empathy in interacting with the complaining customer and their commitment in finding corrective action may truly make a difference in the mind of the customer, which can be vital in creating long-term authentic customer relationships.

As customer complaints may be a result of perceived shortcomings of the organization, lack of prompt response can create negative customer perception of the organization and may result in aggravated dissatisfaction (Bitner et. al., 1990). Despite the intuitive answer that *"the sooner the better"*, research results regarding the speed of which organizations respond to complaints are not clear-cut (Davidow, 2003). Research findings of Clark et. al. (1992) suggest that a speedy response to complaints improves a company's image, but only if redress is included. Conlon and Murray (1996) found that response speed for complaints has a positive effect on satisfaction and intentions to repurchase. The findings of Davidow (2000) suggest that timeliness has a positive effect on satisfaction and word-of-mouth valence, but no effect on repurchase intentions or word-of-mouth likelihood. Cho et. al. (2002) investigated the current sources and causes of online complaints and recommended effective ways of handling customer complaints for successful Electronic-Customer Relationship Management (e-CRM). Their findings suggest that e-businesses should respond to customers' requests/complaints fast because the *response speed* is more important in online customer satisfaction than offline.

The speed with which complainants receive replies from the brands on social media can be very important for the consumers in the digital age. This is more obvious in time-sensitive service industries such as in airlines where most customers usually contact the airline on social media during their travel. For instance, travelers who experience flight delays or cancellations may desperately want to raise their concerns directly to the airline in one way or the other. Social media can provide a hassle-free opportunity for these customers to submit their concerns online in real time as opposed to the hours of on-hold times often experienced in trying to contact the company's call centers. Every second counts and not responding to a customer's complaint sooner would increase the economic and psychological costs for the customer such as missing important business meetings, additional costs of accommodation, unproductive times spent at the airport and costs of lost opportunities. It can also cause unnecessary financial costs for the company such as refunds, coupons, vouchers etc. followed by diminishing customer loyalty and potential negative WOM. As a result, just as in the traditional notions of complaint management, there is a very strong incentive for the brands on social media to respond promptly to their customers' concerns.

When dissatisfied customers decide to complain they are actually offering companies a second chance for remedial action. The power of abundant information in the digital age and the current market situations where competitors are known and easily accessible, may oblige companies to be even more sensitive and respondent to customer complaints. On these grounds we raise the question whether consumer complaints on social media stimulate company's choice to respond as opposed to other types of consumer requests for engagement and whether a complaint can effectively reduce the time-to-response. Accordingly, we expect the following hypotheses to hold:

Hypothesis 2A: A company is more likely to respond to a complaining tweet than to a neutral tweet.

Hypothesis 2B: A company is more likely to respond faster to a complaining tweet than to a neutral tweet.

Previous studies on consumer feedback mostly focused on complaints and there is surprisingly little research done on consumer compliments. Holmes (1986) defines a compliment as a speech act which explicitly or implicitly attributes credit to someone other than the speaker, usually the person addressed, for some good which is positively valued by the speaker and the hearer. Satisfied customers are presumed to have had a better than anticipated experience in the original transaction (Day, 1984). Oliver (1989) proposed that two types of satisfied customers exist, those pleasantly pleased but within a normal range, and those encountering such a positive experience who are delighted. In terms of *Equity Theory,* delighted customers perceive their transaction to be much in their favor that they feel the *procedural justice* need to voice their pleasure. In doing so, they invest their time and effort necessary to construct complimentary communication and may seek to provide something to the organization. Findings of Robinson and Berl (1980) suggest that the motives for complimenting behavior are more socio-psychological than economic. Kraft and Martin (2001) examined consumer feedback and presented a set of motivations including *delight, expected benefits, involvement, social norms* and *personal and situational factors* to explain consumer complimenting behavior. Payne et. al. (2002) found that consumer compliments are most frequently due to *seeking positive response from seller, great satisfaction* and *enjoying giving compliments, flattery* and *ingratiation*.

Compliment management seems to offer profound opportunities to initiate and establish long-term relationships and to reinforce the consuming tendencies of a group with expressed and favorable predispositions towards loyalty (Erickson and Eckrich, 2001). The most motivated, vocal and satisfied customers are natural choices from which to begin constructing long-term and personalized relationships (Schneider and Bowen, 1999). Considering the dynamic and ongoing nature of these relationships (Storbacka et. al., 1994), the firm must be careful to add further value whenever it has interactions with the customer. Thus, when a compliment is received, it seems imperative that the consumer be acknowledged since the costs of complimenting may have not only eliminated any discrepancy perceived by the customer but also put the organization in the debtor position (Erickson and Eckrich, 2001). Since compliments can be excellent indications that the organization's actions have led to customers' satisfaction, compliments should be encouraged, recognized, understood and acted upon (Kraft and Martin, 2001).

Smart and Martin (1992) examined 300 consumers' responses to actual manufacturers' letters addressing complaints and compliments, in order to find out the specific steps businesses can take to satisfy the customers. They found that the respondents tended to evaluate manufacturers' responses to praise letters more favorably than those to complaint letters, suggesting that it was probably easier for a manufacturer to reinforce positive attitudes of a consumer already satisfied, than to placate a dissatisfied consumer. They further assert the importance of organizational commitment in responding to praise letters in a *timely* manner, although the expectations of receiving the responses for complaints are usually higher than praise letters. However, research studies which empirically investigate the importance of response speed for consumer compliments are significantly sparse in previous research literature.

Social media has become a global stage for companies to practice all these traditional notions of successful consumer compliment management. In traditional settings, even though customers would travel that extra mile to make a complaint, it is more than likely that they were reluctant to go into the same trouble of investing their time and money to compliment the brand, even if they would continue to stay silently loyal. Social media has changed this and empowered the consumers to contact the brand on social media in real time, perhaps while enjoying their praiseworthy experience with the brand. Even a friendly reply from the brand may appear in the next few minutes which would multiply their brand loyalty. This is something which was not possible in the pre-social media era, where the companies took days to analyze, assign and draft a letter of appreciation to the customer, where in most cases the same corporate letter template may be used for every customer. As we witnessed in the datasets used in the current study, airlines on social media seem to try adapting into a unique *tone of voice* making each response unique and personal to the customer. On one hand, social media is a free advertising platform for companies where they could capitalize on the opportunity of sharing customer compliments, attracting both current and potentially new customers to their products and services. As Erickson and Eckrich (2001) suggest, complimenting, brand-loyal, motivated customer who feels brushed-off by an organization can become unnecessarily dissatisfied customer who will never be recovered.

On these grounds we raise the question whether consumer compliments on social media stimulate company's choice to respond as opposed to other types of consumer requests for engagements and whether a compliment can effectively reduce the time-to-response. Accordingly, we expect the following hypotheses to hold:

Hypothesis 3A: A company is more likely to respond to a compliment tweet than to a neutral tweet.

Hypothesis 3B: A company is more likely to respond faster to a compliment tweet than to a neutral tweet.

Data

In this study, user tweets were defined as the tweets posted by Twitter users while airline tweets were defined as the tweets posted by the respective airlines. We used Twitter API to collect all tweets mentioning the official Twitter account of United Airlines (@united) or American Airlines (@AmericanAir) from May 1st 2013, until October 12th 2013. In addition, all the tweets mentioning the official Twitter account of Air Canada (@AirCanada) from April 1st 2014 to July 31st 2014 were collected. For American Airlines, after the removal of self-created tweets, there were 220,677 user tweets and 117,887 airline tweets available for analysis. For United Airlines, after the removal of self-created tweets, there were 178,038 user tweets and 57,657 airline tweets available for analysis. Similarly for Air Canada, 59,760 user tweets and 17,699 airline tweets were available for analysis.

In order to determine whether a particular user tweet was responded by the respective airline, each airline tweet was matched with the respective parent user tweet based on twitter meta-data. When a user tweet is matched with one or more replies from the airline, it was considered responded. For all airlines, at least 99.5% out of the responded user tweets had received the response within 4 days. For large airlines, this makes sense because it is very unlikely that a user tweet will be responded by the airline several days later, given the large number of user tweets sent to them every day and the urgency of the customer requests for engagement on social media. Hence, we consider a user tweet as being responded if the airline replied to the particular user tweet within 4 days after the user tweet is posted. For American Airlines, 103,059 tweets, for United Airlines, 49,047 tweets and for Air Canada, 13,624 tweets out of the respective total user tweets were recognized as responded.

A random sample of 2,000 user tweets was manually analyzed first by the researchers to understand the nature of information exchange between the users and the airlines. It was observed that user tweets come in variety of types such as complaints, compliments and personal updates and for the purposes of information seeking and information sharing as well. In our data, the complaints are mainly due to flight delays, flight cancellations and misplaced baggage. Compliments mostly included the cases where the consumer received excellent customer service or when the consumer is excited about particular sales, promotions or rewards.

For this study, complaints and compliments were considered particularly important as they intend direct correspondence between user and the airline. From the sample, complaints and compliments were recognized accordingly and two comprehensive lists of words most commonly used by the users to express either complaints or compliments were prepared. Each list contained both unigrams and N-grams to better reflect the nature of user complaints and compliments. Accordingly, a program was developed to process all the user tweets from the three airlines and to determine whether each tweet was a complaint, a compliment or a neutral tweet. The precisions and recalls of the tweet type classifier are presented in Table 1.

Table 1. Precisions and Recalls of the Tweet Type Classifier

	Precision	Recall
Complaints	80.00	70.59
Compliments	67.74	77.78
Neutral	71.79	71.79

For American Airlines, out of the 103,059 responded tweets, 27,660 tweets were recognized as complaints while 31,730 tweets were recognized as compliments. As for United Airlines, out of the 49,047 responded tweets, 18,599 tweets were recognized as complaints while 12,801 tweets were recognized as compliments. For Air Canada, out of the 13,624 responded tweets, 4,606 tweets were recognized as complaints while 3,653 tweets were recognized as compliments. Data was analyzed at the individual tweet level in order to populate the key variables of interest. Table 2 lists the descriptions of the key variables and Table 3 lists the summary statistics of the final dataset.

Table 2. Variable Definitions

Variable	Definition
Responded	Whether the airline responded to the user tweet
Followers	Number of followers for the user
Followings	Number of followings (friends) for the user
Updates	Number of tweets posted by the user since the user account creation
Mentions	Number of username mentions present in the tweet
Complaint	Whether the user tweet is a complaint
Compliment	Whether the user tweet is a compliment
Retweet	Whether the user tweet is a Retweet
Extrovert	Summation of the three dummy variables indicating whether the user has a location, website and a Twitter bio publicly available
Weekend	Whether the user tweet was created in the weekend
Time-to-Response	Time elapsed in seconds between the user tweet and the response tweet

Table 3. Summary Statistics of User Tweets

Variable	American Airlines			United Airlines			Air Canada		
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
Responded	220,677	0.47	0.50	178,038	0.28	0.45	59,760	0.23	0.42
Log of Followers	220,677	5.73	2.15	178,038	5.38	2.14	59,760	5.08	2.08
Log of Followings	220,677	5.78	1.55	178,038	5.52	1.54	59,760	5.52	1.44
Log of Updates	220,677	7.70	2.20	178,038	7.37	2.21	59,760	6.97	2.26
Mentions	220,677	1.84	1.38	178,038	1.68	0.99	59,760	1.51	0.92
Complaint	220,677	0.25	0.43	178,038	0.32	0.47	59,760	0.22	0.41
Compliment	220,677	0.28	0.45	178,038	0.23	0.42	59,760	0.25	0.43
Retweet	220,677	0.20	0.40	178,038	0.18	0.38	59,760	0.02	0.14
Extrovert	220,677	2.11	0.94	178,038	2.07	0.97	59,760	1.88	1.03
Weekend	220,677	0.21	0.41	178,038	0.24	0.42	59,760	0.21	0.41
Time-to-Response	103,059	9.59	71.82	49,047	50.41	213.99	13,624	45.18	118.66

Econometric Model

Response Choice Model

We assume the perceived value of responding to consumer tweet i created by customer j is Y_{ij}^* where

$$Y_{ij}^* = \beta_0 + C_{ij}\beta_1 + T_i\beta_2 + \varepsilon_{ij}$$

Here C_{ij} refers to the vector of observable characteristics of customer j at the creation of tweet i, including the natural log of the customer's number of followers, followings, updates, and the variable *Extrovert*. T_i refers to the vector of observable characteristics of tweet i, including whether the tweet is a complaint or a compliment, whether the tweet is a retweet, and whether the tweet is sent over the weekend. ε is the error term with cumulative distribution function G such that $G(x) = 1 - G(-x)$. The company chooses to respond to the tweet if the perceived value of responding $Y_{ij}^* \geq 0$.

For simplicity, we use i as the subscript since the unit of observation in our sample is a tweet. We denote the tweet and consumer characteristics and the constant terms as $X_i = [1,T,C]$. Let Y_{ij} equal 1 if the company responded to the consumer tweet and 0 otherwise. Hence, the probability of observing a response from the company for the consumer tweet i is

$$Pr(Y_i = 1|X_i) = Pr(X_i\beta + \varepsilon_i \geq 0|\, X_i) = G(X_i\beta)$$

The density of Y_i given X_i can be written as:

$$f(Y_i\,|X_i,\beta) = [G(X_i\beta)^{Y_i}][1 - G(X_i\beta)]^{1-Y_i}$$

Hence, the log likelihood for a sample of N tweets is given by

$$L(\beta) = \sum_{i=1}^{N} Y_i log[G(X_i\beta)] + (1 - Y_i)log[1 - G(X_i\beta)]$$

After parameterization of G, the coefficients β can be obtained from maximum likelihood estimation.

Time-to-Response Model

In order to examine the effects of tweet and consumer characteristics on *Time-to-Response*, we apply survival analysis using both semi-parametric and parametric survival models. In our case, for a responded tweet, the survival time is the time interval between the creation of the tweet and the receipt of the response. The, dichotomous variable indicating the change of state of the tweet is *Responded*, which represents whether the tweet received a response or not.

First, we formulate and estimate a *Cox Proportional Hazards Model* (Cox, 1972), by far the most popular semi-parametric survival model, which makes no assumptions about the shape of the baseline hazard function over time, but requires the proportional hazards assumption to be tested. All our covariates are fixed over time and let X_i denote the vector of observable characteristics of the tweet and the consumer. Assuming that we have k covariates, X_i is a $1 \times k$ vector. The partial likelihood function of the Cox Proportional Hazards model is given by

$$l_p(\beta) = \prod_{i=1}^{m} \frac{e^{X_i\beta}}{\sum_{j \in R(t_i)} e^{X_j\beta}}$$

where the summation in the denominator is over all tweets in the *Risk Set $R(t_i)$* which consists of all tweets with survival times greater than or equal to the specified time. The partial likelihood function assumes that there are no tied times and excludes right censored observations. The product is over m distinct ordered survival times. Hence, the log partial likelihood function is given by

$$L_p(\beta) = \sum_{i=1}^{m} X_i\beta - log\left[\sum_{j\in R(t_i)} e^{X_j\beta}\right]$$

The coefficients can be obtained using maximum partial likelihood estimation.

Second, we formulate and estimate our time-to-response model using various parametric survival models corresponding to standard distributions such as Exponential, Weibull, Loglogistic and Lognormal. This approach requires pre-selection of the underlying distribution of the survival times and the choice largely depends on the underlying process which generated the failure times in our data, hence specifically on the shape of the hazard function.

In particular, we adopt the accelerated failure time (AFT) metric for the chosen parametric models, where the failure time t_j is given by

$$log(t_j) = X_j\beta + log(\tau_j), \text{where } \tau_j = e^{-X_j\beta}t_j$$

The random quantity $log(\tau_j)$ has a pre-specified distribution. For example, in a log-logistic model, τ_j follows a log-logistic distribution, implying that $log(\tau_j)$ follows a logistic distribution. In the present setting, all parametric likelihoods for tweet j take the form

$$l_j(\beta, \Theta) = f(t_j | X_j\beta, \Theta)$$

where f is the density function of the assumed distribution, β are the coefficients on X and Θ are the ancillary parameters if any, required by the assumed distribution. The likelihood function excludes right censored observations. Hence, the log likelihood function is given by

$$L(\beta, \Theta) = \sum_{j=1}^{m} log[l_j(\beta, \Theta)]$$

The coefficients can then be obtained using maximum likelihood estimation.

Results

Response Choice Model

We estimate both the logit specification and the probit specification for each airline and report the estimation results in Table 4. For all airlines, *ln(Followers)* has positive and significant effects on airline's probability to respond, which suggests that holding other factors fixed, a higher number of followers for the consumer is associated with a higher chance of response from the airline. Moreover, for all airlines, *Complaint* has positive and significant effects, which suggests that companies are more likely to respond to consumer complaints. This result is consistent with the research literature which emphasizes the importance of effective consumer complaint management to avoid negative WOM and potential brand damage. Similarly, for all airlines, *Compliment* shows positive and significant effects on airline's choice to respond, which suggests that companies are more likely to respond to consumer compliments. It is interesting to note that the effect of *Compliment* on airline's probability to respond is slightly greater than that of *Complaint*, consistently for American Airlines and United Airlines. The above results provide evidence supporting Hypotheses **1A, 2A** and **3A**.

For all airlines, the control variables, *Ln(Updates), Retweet* and *Mentions* show negative and significant effects on all airlines' probability to respond. Clearly, it makes sense that companies are less likely to respond to a consumer tweet if it is a retweet because in such case the author of the tweet is not the customer who sent out the original tweet. For all airlines, *Extrovert* indicates positive effects suggesting that companies are more likely to respond to tweets from the customers who reveal more information about themselves on Twitter. It is interesting to find that *Weekend* is positively significant for American Airlines and Air Canada, while it is negatively significant for United Airlines. Hence, posting a tweet during the weekend increases the chance of receiving a response from American Airlines and Air Canada, but decreases the chance of receiving a response from United Airlines.

Table 4. Response Choice Model Estimates

Variable	American Airlines		United Airlines		Air Canada	
	Logit	Probit	Logit	Probit	Logit	Probit
Log of Followers	0.012*** (0.004)	0.009*** (0.003)	0.036*** (0.005)	0.026*** (0.003)	0.160*** (0.010)	0.095*** (0.006)
Log of Followings	0.024*** (0.005)	0.016*** (0.003)	0.027*** (0.006)	0.016*** (0.004)	-0.085*** (0.012)	-0.050*** (0.007)
Log of Updates	-0.063*** (0.004)	-0.039*** (0.002)	-0.084*** (0.004)	-0.054*** (0.003)	-0.084*** (0.008)	-0.051*** (0.004)
Mentions	-0.325*** (0.005)	-0.170*** (0.003)	-1.031*** (0.011)	-0.555*** (0.006)	-0.966*** (0.021)	-0.500*** (0.010)
Retweet	-2.875*** (0.023)	-1.634*** (0.011)	-2.738*** (0.053)	-1.326*** (0.021)	-2.354*** (0.218)	-1.176*** (0.091)
Complaint	0.195*** (0.012)	0.117*** (0.007)	0.368*** (0.013)	0.223*** (0.008)	0.940*** (0.024)	0.551*** (0.014)
Compliment	0.431*** (0.012)	0.263*** (0.007)	0.497*** (0.015)	0.298*** (0.009)	0.455*** (0.025)	0.266*** (0.014)
Weekend	0.050*** (0.012)	0.029*** (0.007)	-0.197*** (0.014)	-0.117*** (0.008)	0.256*** (0.024)	0.155*** (0.014)
Extrovert	0.059*** (0.006)	0.036*** (0.004)	0.009 (0.007)	0.005 (0.004)	0.084*** (0.013)	0.049*** (0.007)
Constant	0.763*** (0.023)	0.419*** (0.014)	0.748*** (0.029)	0.367*** (0.017)	-0.244*** (0.050)	-0.238*** (0.029)
Observations	220,677	220,677	178,038	178,038	59760	59760
Log Likelihood	-125448	-125673	-87763	-88018	-29186	-29248
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Time-To-Response Model

Table 5 and Table 6 report the estimation results for the Cox proportional hazard model, the Lognormal specification, and the Loglogistic specification.

We first look at the results regarding followers. For American Airlines, Cox regression results show negative and significant effects of followers indicating a lower hazard rate and hence a longer time-to-response. This result is consistent with the Lognormal and Loglogistic regression results which show positive and significant effects of followers. On the other hand, for United Airlines and Air Canada, Cox regression results show positive but not significant effects of followers indicating a higher hazard rate and hence a shorter time-to-response. Correspondingly, Lognormal and Loglogistic regression results show negative effects of followers, although the results are not statistically significant. Hence for American Airlines, the *alternative* of **Hypothesis 1B** is supported while for United Airlines and Air Canada, **Hypothesis 1B** is not supported.

Given that the overall response time of American Airlines is fairly low already, taking extra time to carefully respond to tweets from customers popular on social media may be an appropriate strategy. For United Airlines and Air Canada, given that the overall response time is much larger compared with American Airlines, improving on the response time for customers popular on social media may be a better strategy.

Table 5. Time-To-Response Model Estimates for American Airlines and United Airlines						
	American Airlines			**United Airlines**		
Variable	**Cox**	**Lognormal**	**Loglogistic**	**Cox**	**Lognormal**	**Loglogistic**
Log of Followers	-0.009*** (0.003)	0.013*** (0.003)	0.012*** (0.003)	0.005 (0.004)	-0.004 (0.005)	-0.006 (0.005)
Log of Followings	-0.003 (0.003)	0.004 (0.003)	0.005 (0.003)	-0.002 (0.005)	0.006 (0.007)	0.008 (0.006)
Log of Updates	0.019*** (0.002)	-0.027*** (0.002)	-0.026*** (0.002)	0.014*** (0.003)	-0.024*** (0.004)	-0.024*** (0.004)
Mentions	0.003 (0.003)	-0.003 (0.003)	-0.006** (0.003)	-0.028*** (0.009)	0.015 (0.012)	0.017 (0.011)
Retweet	-0.030 (0.022)	-0.063*** (0.021)	-0.085*** (0.020)	-0.104** (0.052)	-0.023 (0.066)	-0.081 (0.069)
Complaint	-0.050*** (0.008)	0.049*** (0.007)	0.053*** (0.007)	0.124*** (0.011)	-0.127*** (0.013)	-0.118*** (0.013)
Compliment	0.058*** (0.007)	-0.051*** (0.007)	-0.057*** (0.007)	0.116*** (0.012)	-0.143*** (0.015)	-0.162*** (0.015)
Weekend	0.034*** (0.007)	-0.023*** (0.007)	-0.015** (0.007)	0.269*** (0.011)	-0.367*** (0.014)	-0.449*** (0.013)
Extrovert	0.015*** (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.016*** (0.006)	0.021*** (0.007)	0.017** (0.007)
Constant		5.889*** (0.014)	5.917*** (0.013)		7.216*** (0.029)	7.230*** (0.028)
Observations	103,059	103,059	103,059	49,047	49,047	49,047
Log likelihood	-1.087e+06	-139518	-137147	-480314	-81256	-80943
AIC	2.173e+06	279058	274315	960647	162533	161908
BIC	2.173e+06	279163	274420	960726	162630	162005
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

In some sense, complaining tweets and tweets from customers popular on social media share the same characteristic as being "high risk" for airlines, because, if these tweets are not handled promptly and appropriately, the brand may suffer from a social media crisis. Indeed, for American Airlines and Air Canada, the results suggest that when the customer tweet is a complaint, a longer response time is more likely. On the other hand, for United Airlines, the results suggest the exact opposite. Thus, the *alternative* of **Hypothesis 2B** is supported for American Airlines and Air Canada while **Hypothesis 2B** is supported for United Airlines.

For all airlines, Cox regression results show positive effects of *Compliment* indicating higher hazard rates and hence shorter response times, while the results are significant for American Airlines and United Airlines. This result is consistent with the Lognormal and Loglogistic regression results of all airlines which show negative effects of *Compliment* with significant results for American Airlines and United Airlines. This means that when the consumer tweet is a compliment, a shorter response time is more likely from all airlines. Hence for both American Airlines and United Airlines, **Hypothesis 3B** is supported.

Although the results are qualitatively the same across different model specifications, comparison of Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC) across model specifications clearly suggests that the Loglogistic specification describe the data the best.

Table 6. Time-To-Response Model Estimates for Air Canada

Variable	Cox	Log normal	Log logistic
Log of Followers	0.007 (0.009)	-0.013 (0.013)	-0.005 (0.011)
Log of Followings	-0.022** (0.011)	0.031** (0.016)	0.023* (0.014)
Log of Updates	0.014** (0.007)	-0.020** (0.010)	-0.016* (0.009)
Mentions	-0.100*** (0.017)	0.130*** (0.025)	0.090*** (0.023)
Retweet	-0.210 (0.214)	0.366 (0.319)	0.454 (0.296)
Complaint	-0.094*** (0.020)	0.157*** (0.030)	0.124*** (0.026)
Compliment	0.014 (0.022)	-0.022 (0.032)	-0.040 (0.028)
Weekend	-0.023 (0.020)	0.026 (0.030)	-0.018 (0.026)
Extrovert	0.003 (0.011)	0.000 (0.016)	0.001 (0.014)
Constant		6.087*** (0.054)	5.890*** (0.057)
Observations	13,624	13,624	13,624
Log likelihood	-116051	24793	24174
AIC	232119	49608	48369
BIC	232187	49691	48452

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Conclusion

Motivated by the increasingly popular trend of running customer service through social media, we collected all tweets sent to and by three major airlines to examine whether a customer's popularity on social media and sentiment towards a brand affect the chance and speed of being responded by the brand after the customer's "request for engagement".

Our findings show that companies are more likely to respond to tweets from customers with a higher number of followers, effectively discriminating customers based on their popularity on social media. The most plausible explanation for this finding is that companies strategically allocate more resources to handle possibly influential customers in order to minimize the risk of becoming the casualty of a social media flub. However, given that a customer tweet will be responded, whether the time to response will be shorter for customers popular on social media and for tweets with complaints depends on company's strategy. For United Airlines, the response time is shorter for customers popular on social media and for tweets with complaints. But for American Airlines, it's exactly the opposite: the response time is longer for customers popular on social media and for tweets with complaints. This counter-intuitive finding for American Airlines hints about an underlying strategy of emphasizing prudence for "high risk" tweets: it may be better to spend more time carefully responding to socially influential customers so that they do not risk making hasty and unplanned responses that could result in escalation of a crisis. On the other hand, Air Canada shows somewhat mixed strategy reporting longer response times for complaints and shorter response times for the customers popular on Twitter. Complaints which require thorough evaluation and appropriate remedial action seem to be the most decisive factor for Air Canada which determines the time to response for a customer tweet. All airlines reporting shorter response times for consumer compliments also makes sense because compliments are inherently nice in nature that do not require thorough evaluation or corrective action. Hence, considering the perceived easiness of responding to customer compliments and the potential positive WOM, companies seem to respond to compliments fast.

It is worthwhile to examine why such different strategies exist among the companies in customer service on social media. Unlike in the traditional organizational settings, thriving customer service excellence on social media can bring enormous challenges to a business organization today. Traditionally, the customers entered into the organizational customer care process by directly contacting the dedicated customer care teams that process the customer request, coordinating with relevant business entities. Also, the communication with the customer was always kept private and confidential and a third party almost never had access to the relevant records. In contrast, social media have enabled the customers to publicly report their requests online directly to the brand and brand's dedicated social media team enters into conversation with the customer openly. Nevertheless, customer service on social media is still in its infancy such that companies tend to experiment with different strategies, usually unaware of the potential strategies that are used by other companies in similar business contexts.

This research has important business implications for the companies experimenting and practicing various strategies of customer service on social media. Our research provides some illuminating insights for them by bringing empirically validated, qualitative comparison of social media strategies among the companies, with evidence from the airline industry. This information can be useful for industry practitioners and social media strategists as well, in investigating the optimal mix of strategies towards effective customer correspondence on social media. However, any company that intends to set policies regarding who/what should get priority and quick response, needs to evaluate very carefully the aftermath of such policies in order to minimize the possibility that a customer feels discriminated, which can be detrimental for customer loyalty and future business success. For instance, there can be several loyal and powerful customers who may not be popular on social media, but who would request for engagement just for the mere purpose of contacting the brand one way or the other while having a difficult brand experience. If the chance that this customer gets a reply is fairly low and a prompt reply is unlikely on the basis of customer's popularity on social media, there is a higher chance that these important customers would consider silently to discontinue patronage. Moreover, the story will even be shared with other powerful people in the society who are not necessarily active on social media. Losing such customers would cost the company a fortune in long term, since the costs of attracting such powerful customers with no active interest on social media will be much larger at a later stage.

Our research provides some important theoretical contribution to the stream of consumer correspondence handling literature. Although several previous studies examined organizational responsiveness to consumer correspondences of complaints and compliments, to the best of our knowledge, all these were conducted within the frame of traditional customer service. Our research reveals a new dimension of CRM research for the digital age and suggests that the traditional notions of CRM theories may be still relevant for customer service on social media. Also, our research methodology does have some important implications for scholars in IS. Although the Survival Analysis models are quite common in medical research and may be to a certain extent in Economics, the use of it in IS research is significantly sparse. Scholars may further investigate its potential in exploring different phenomena in IS research in future.

The findings in this paper clearly open up more research questions. For example, are all major airlines following the same strategies as the airlines we investigated? Airlines of different business models and from different cultures may behave differently on Twitter. What about other industries? A direct extension is to study the Twitter conversation between consumers and companies in other industries to examine similarities and differences between companies' Twitter strategies across industries and relate that to industry characteristics. We hope that our findings will stimulate more studies on the practice of running customer service on social media and also help practitioners to better use social media to improve customers' experience in the digital age.

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