Cell Phone Ethnography: Mixed Methods and the Brand Consumer Relationship

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DEDICATION

To my father
Robert Herbert Dove

and my mother
Gloria Dove

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Abstract

Overall, the goal of this study is to identify and differentiate the various motivations and cultural influences that can be used to explain consumer behavior. In doing so, this study hopes to facilitate the development of new and innovative marketing strategies, providing a new research design for the ethnographer's toolkit. More importantly, this model can give shape to new constructs and new variables for further empirical testing in the field through quantitative and qualitative methods. By blending the two approaches, using qualitative interpretive anthropological analysis by field study with quantitative sentiment analysis adapted from market researcher Jeffery Breen's (2012) methodology, this paper seeks to accurately interpret the complex human element of what creates brand-loyalty and sentiment while uncovering factors that influence the biggest decision of all—the actual purchase.

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Chapter 1: Introduction

Due to the explosion of technological advances and data within the cell phone industry and social media, traditional analyses related to these areas, accompanied by quantitative analysis, can act as an exceptional tool within ethnographic research. By exploring cell phone usage and consumer opinion with qualitative (interpretative analysis) small-scale data in the form of in-depth interviews along with quantitative (sentiment analysis) "big data,"[1] or user posts from Sprints Facebook Page, this paper explores the utility of each for use in marketing research. More broadly, this study aims to advance the field by expanding the application of traditional anthropological research methods into interdisciplinary applications of qualitative and quantitative methods. Similar to most fields of study, the development of an innovative approach to analyzing big data within anthropology, with a specific emphasis on "digital media," will provide a better understanding of the dynamics of culture in ways that cannot be analyzed efficiently with currently existing methods of traditional ethnographic fieldwork.[2] As referenced by communications and media studies researcher and lecturer Christine Lohmeier (2014), big data, in relation to digital media, can embody the spirit of a culture within the innovative digital technologies being developed during this moment of unprecedented change. Findings of this study suggest that not only do brand loyalty relationships vary, they, as well as the attitudes associated with the cell phone in general, cannot be explained under the current assumptions

[1] In a 2011 report by the global management consulting firm, McKinsey Global Institute, big data is defined as:

> , "datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze. This definition is intentionally subjective and incorporates a moving definition of how big a dataset needs to be in order to be considered big data—i.e., we don't define big data in terms of being larger than a certain number of terabytes (thousands of gigabytes). We assume that, as technology advances over time, the size of datasets that qualify as big data will also increase. Also note that the definition can vary by sector, depending on what kinds of software tools are commonly available and what sizes of datasets are common in a particular industry. With those caveats, big data in many sectors today will range from a few dozen terabytes to multiple petabytes (thousands of terabytes)."

(Manyika , et al. 2011, 1).

[2] According to anthropologist H. Russel Bernard (2011), participant observation serves as the founding method of cultural anthropology in regards to fieldwork. It is a process involving the act of building rapport with people so that one can make observations and collect data in an attempt to better understand their lives, how they interact with others. The objective of solving a particular human problem has been its core application for many years. (Bernard 2011, 256-257).

about brand loyalty (such as using age, income, or any other sociodemographic attributes as predictors of brand loyalty).

To learn more about cell phone usage and consumer opinion, this study applies a mixed-methods approach. First, this study uses a methodology that utilizes in-depth ethnographic interviews with 40 college students attending the University of Tennessee that belong to the consumer segment known as Generation Y, individuals born between 1980 and 1994 (McCrindle 2006), to explore the daily role of the cell phone and the relationship between consumer behavior and brand loyalty. Then, the study turns to a quantitative method known as sentiment analysis, involving comment posts collected from the Sprint Corporation Telecommunications' Facebook page, to identify the general themes and trends. As noted by data analyst Georgios Paltoglou (2014), sentiment analysis, also known as opinion mining, attempts to identify the polarity of emotions and opinions within a given document or sentence while featuring the results as positive, negative or neutral. By using both of these methods, together, a clearer picture takes form on consumer opinion and the factors that contribute to brand loyalty within these contexts emerges.

I. Background

To understand the growing importance of interdisciplinary approaches to research for a greater picture as it relates to industry, one must first understand where the technology used by people came from and the techniques for analysis developed. To accomplish this, first this section will examine the emerging interest in mixed methods and how they apply to industry, generally. Then a discussion of how contemporary information communication technologies have developed leading to applications of new emerging tools to analyze the increased amount of data. Third, it will discuss the rise of social media and how that relates to these technological advances. Finally, it will show how these elements can be applied within the cell phone industry.

a. Emerging Mixed Methods

Mixed methods, instead of standard ethnographic methods, were chosen for the study because standard ethnographic methods (participant observation and surveys) only provide a glimpse into the complex interplay between consumer behavior, brand loyalty and company brand performance. Specifically, both outside and within the field, notions of multi-sited research have developed in such a way that they call into question the totality of traditional methods. Building on this theme, the interdisciplinary Ethnographic Praxis in Industry Conference (EPIC) aspires to promote the integration of rigorous methods and theories from multiple disciplines into business practices that promote the public recognition of, and continued practice of, ethnography as a profession in industry. Anthropologist Neal Patel's (2011) discussion topic at EPIC encouraging the merger of interdisciplinary qualitative and quantitative approaches became of particular interest because it addresses an emergent theme among virtually every field of study today. In his discussion, Patel confirms the disruptive nature of big data that defies the parameters of traditional research methods and forces the field to develop new models of study. His presentation was a call to action for professionals to develop innovative ways of data analysis (Patel 2011, 43, 54). Subsequently, this realization led the researcher to search and discover new ways of data analysis and developed one such method that explored big data in ways that did not previously exist.

The application of a quantitative approach is useful in the process of identifying hidden marketing research issues that are bound to arise in the future. Applied to ethnographic methodology, researchers can increase the scalability of qualitative insight from notes in the field to the dynamic discourse of online cultural communities (Patel 2011, 54). Within this context, data mining social media content allows for new opportunities to explore the structural characteristics of those communities and quantify emergent patterns in concert with qualitative themes in hopes of predicting and understanding consumer behavior. This study will show that these two fields can come together by utilizing ethnographic methods within existing business practices.

b. Technological Advances

In order to gain a better understanding of the significance of cell phones in society, an overview of the development of the cell phone industry and emergence of the cell phone is needed. The first part of the discussion will highlight the historical context that facilitated the birth of the cell phone. Next it will track the evolution of the device and current players within the cell phone industry. The final discussion of this section will highlight the unique features of the cell phone's evolution that facilitated the dominance of the device in our society today.

As noted by anthropologist Grant McCracken (2010), change is the only constant, and like culture, the scope, scale, and pace of change has accelerated. In 1971 the first microprocessor was released by Intel. The first video game consoles were released in 1972, which was also the same year that Bell labs developed the first cellular network for commercial use. A decade later, the corporate supercomputer scaled down to a home desktop computer (2010, 48-49). From 1988 to 2010 there was a 40% increase in scientific knowledge. From 1997 to 2002 the amount of patent applications had increased by 700%. Meanwhile, 3D worlds, such as the multi-user virtual world Second Life and the massively multiplayer online role playing game World of War Craft, ushered in the new era of virtual reality. Digital technology disrupted the entertainment industry and restructured industries such as banking and retail. Facebook, Myspace, Twitter, and other social networks redefined the nature of the social group (2010, 49-50).

As the fastest growing industry within the Information Communication Technology (ICT) sector, cell phones epitomize change in the information age as the new digital access point (Lüders 2008; Kosmal 2011). As noted by Economists Claudio Giachetti and Gianluca Marchi (2010), the cell phone industry today is a complex system comprised of four main players: 1) cell phone manufacturers, 2) their suppliers, 3) independent retailers, and 4) wireless network providers. The cell phone manufacturers and their suppliers act as wholesalers to independent cell phone retailers and wireless network providers who sell the cell phone manufacturers' products with contracts for use of their network. When the cell phone was first introduced to the market in the 1980s, there were only two main players: 1) the manufactures, who produced,

marketed and sold their supply directly to consumers, and 2) the network providers, which were formally known as telecom service providers because they only provided telecom services. This time period marks the introduction of the first generation (1G) cell phones, which ran on an analogue network system, which was considered too high of an investment, during that time, for any telecom provider (Giachetti and Marchi 2010, 1128-1129).

In 1995, the first independent wireless network providers emerged with the launch of digital systems and second generation (2G) cell phones, allowing for data and voice encryption, as well as an ability to store larger amounts of memory. During this time, the cell phone industry underwent a growth period alongside other technologies yet to be standardized for proper integration, such as "operating systems, keyboard functionality, software applications and also aesthetics" (Giachetti and Marchi 2010, 1129-1130). By 1997, text messaging capabilities were now standard as one of the most important feature of the cell phone. Additionally, the success of the first video games on cell phones facilitated the birth of the mobile gaming industry. The introduction of the wireless application protocol (WAP) in 1999 allowed cell phone users to browse the web and access additional services on their device, such as group messaging and personal ringtones (Giachetti and Marchi 2010, 1131-1132).

By the 2000s, the introduction of multimedia messaging service (MMS), color displays and cameras on cell phones cultivated the rapid replacement cycle felt today. Generally understood as third generation (3G) technologies, these added features also illustrated the fact that the function of cell phones were evolving from its origins as a traditional mobile phone into a device capable of multi-tasking. With 3G phones, users had the ability to configure certain devices for video chat and ability to use broadband internet. During the first half of the 2000s, the cell phone industry experienced a period of technology firm turnovers and consolidation in response to combative pricing strategies caused by a shift in consumer demand towards entry-level devices and the rapid advances in product innovation, characteristic of 3G cell phone technologies (Giachetti and Marchi 2010, 1136-1137). By 2005, the US had developed into the replacement market where wireless network provider's finance the newest devices and consumers upgrade to those cell phones with the enhanced features by renewing their paid subscription to a network provider (2010, 1138).

If not for the first half of the 2000s, the cell phone industry would have fit perfectly within classic industry life cycle models. These models predict that during the shake-out stage of firm turnovers and consolidation of an industry, which is experienced after a period of rapid growth followed by expansion, firms tend to suppress product innovation over innovation in process (Giachetti and Marchi 2010, 1136). Contrary to these models, during the cell phone industry's shakeout stage, process innovation always occurred along with "unpredicted" advances in product innovation (2010, 1138). As a result, the cell phone industry's shakeout period is generally viewed as "fuzzy" for lack of the theoretical assumption of a "dominant design" resulting from suppressed product innovation (2010, 1138). In fact, the first half of the 2000s is defined as a period of "device diversity," with an increase of 6 to 27 new device models launched per year, on average (2010, 1138-1144).

With nearly 1 billion worldwide end-user cell phone sales by the mid-2000s, saturation began to settle. Characterized by a phenomenon known as "technological convergence" within the cell phone industry, during this time, nearly all cell phone models were fitted with "non-typical" capabilities that included, but where not limited to: internet browsing, radio, MP3's, and digital picture, video and audio recording (Giachetti and Marchi 2010, 1138, 1145). Moreover, this convergence facilitated the emergence of the "smartphone," which is defined by its "advanced operating system," ability to install applications and advanced computing capabilities similar to that of a PC (2010, 1145).

As a result of these continued unpredicted and rapid technological advances, new products constantly saturate the market. This is why the consumer segment Generation Y became a particular interest to this study. They play a vital role in answering the research problem of the role cell phones play in the life of the consumer, as well as the "why" and "how" of their buying decision and use purposes. As pointed out by consumer research consultant Violet Lazarevic (2012), Generation Y represents a unique challenge for advertising departments and marketing research. Unlike previous generation segments, not only are they unreceptive to traditional strategies in marketing, they are also relatively disloyal consumers (2012).

The relationship between companies and their consumers can be limited by what type of information they have about each other. The better understanding a company has of the expectations of current and potential customers, the more successful it will be. Because of this, this study includes in-depth interviews of 40 research respondents from the consumer segment known as Generation Y. Considering grounded theory (Goulding 2005; Bernard 2011), a framework developed for investigating, reframing, and expanding current industry presumptions of consumer behavior and brand loyalty, the results from this study suggest that not only does brand loyalty relationships vary, many of the brand relationships cannot be explained under the presumption of "loyalty," but other categories, such as necessity, fear, attachment, the importance of customization, both relating to programs and outward appearance, and the ability to adapt to one's lifestyle, can be explained under grounded theory.

c. Social Media

In the case of social media, customers post in a multitude of outlets. Twitter, for example, is a microblogging platform that limits the word length of any post. Facebook, on the other hand, was developed to encourage social interaction by allowing lengthier posts, which fosters comments that tend to be more negative relative to other social networks (Moe and Schweidel 2012). One of the main issues associated with comparisons regarding the various forms of social media is that the fundamental structural differences among the various forms of social media can influence posting behavior (Hoffman and Fodor 2010). These more recent metrics, such as likes, followers, tweets, views, and clicks, appear to be compatible with traditional media metrics for analysis. Popular discussion among many academics, however, notes that it can be misleading to employ such metrics at face value and doing so may even harm future business goals (Fader and Winer 2012). In order to develop applicable metrics for a better understanding of customer engagement, a theoretical exploration of the relationship between social media and financial metrics is needed (Peters, et al. 2013, 282).

Anthropologist Daniel Miller (2012) notes that social networking sites hold a special place in anthropological study due to their "extraordinary ability to return the world to the kinds of sociality that were the topic of traditional anthropological concern and, as such, are hugely

important to contemporary anthropology and the future of the discipline" (2012, 148). The reasoning behind his point is that social media, as a result of its mass acceptance, has become the norm in our society and thus a new kind of social institution in its own right. In fact, one of the most important debates surrounding the implications of social media, Facebook in particular, is that, by their very nature, they foster a culture of complete public openness (2012, 148).

In this era of transparency, big data and digital technologies have allowed for new ways of collecting, managing and analyzing vast amounts of qualitative and quantitative data (Fan and Gordon 2014). As a result, researchers today have the ability to monitor social interaction without interfering with the interaction, thereby gathering data in ways that were previously unattainable. Facebook in particular is interesting because it continues to hold the highest rank in popularity among social network websites. Within six years of its inception at Harvard University, Facebook had over a half billion users. Due to the nature of its platform, Facebook cultivates public conversations based on particular interests via pages. Facebook allows for corporate branding due to its position as a popular social media platform by allowing for uninhibited, two-way communication in ways that were not previously possible with traditional media platforms (Miller 2012, 146).

d. Cell Phones and Branding

i. Cell phones

Cell phones were selected for this study because of their popularity and growing importance in today's society. According to Industrial Organization and Business Analyst Suzanne Kirchhoff (2011), virtually every type of cell phone has proliferated at rapid speed. The Microsoft Devices Team (2011), for example, note that with regards to the Nokia 1100, since 2011, 250 million devices have been sold, which makes the cell phone the best-selling product of any electrical gadget ever made. From August 2008 to August 2009, the number of touchscreens sold in the U.S. grew to 23.8 million units. Kirchhoff highlights the claim by research firm eMarketer that forecasted a growth in mobile spending in the U.S. from $648 million in 2008 to $3 billion in 2013 (Kirchhoff 2011, 5-6). Within the last decade, cell phones have become a fundamental element of consumers' daily life and activities. In their discussion of the ways in

which cell phones influence daily patterns of social interaction, social scientists Eva Thulin and Bertil Vilhelmson (2007) point out that cell phones are the most common devices used for scheduling and coordinating group activities among close social networks. This is compounded by the fact that in 2009, two-thirds of the global population on the Internet were connected to some type of social network site, such as MySpace or Facebook (Nielsen Online 2009). Also, text messaging, in particular, has developed into an essential element of young people's lives, as texting has become a tool for maintaining friendships, which would include coordinating group activities (Thulin and Vilhelmson 2007, 249). Now that teens commonly own cell phones, the role it plays in one's life has changed (just as the ways that teens communicate with each other is different) relative to previous generations. These trends have forced companies to rethink branding and change the way in which they present their products, and products features, to the consumer.

ii. Branding

With all the advances in corporate branding strategy, McCracken's (2005; 2011) studies on business, culture, and commerce suggest that corporations still need a better understanding of the nature of brands. The corporation of today has found itself cornered on all sides by the totality, complexity and dynamic nature of contemporary culture because it does not have a systematic way of understanding culture (2005, 175-191). Modern corporations are good at tracking other things, such as finance, operations or technology, but they do not have a similar way of tracking culture. Certainly, this claim may come as a surprise for most people because the general assumption is that in order to be successful in business, understanding the current trends are essential (McCracken 2010).

II. Literature Review

The literature is comprised of three sections to give a better understanding of the context of this study. The first section describes the rise of ethnography within industry and its purpose within business today. The second section addresses the role of big data in market research. The last section highlights the rise of social media that coincides with new tools of analysis and a need for innovative methods of research in industry.

a. Use of Ethnography by Industry

According to anthropologists Timothy Malefyt and Maryann McCabe (2009), ethnographic methods were slowly being adopted by the 1990s in industry as a tool for discovering where there were unmet needs regarding consumer behavior and as a method for maintaining a healthy dialogue between the consumer and the company brand. Much of business anthropology's success can be attributed to the integration of reflexivity in approach. As defined in industry, Malefyt and McCabe note "reflexivity . . . holds that individuals are critical[,] self-aware actors that continually revise and reconfigure their identity to keep up with vast choices and change among the shifting modalities of brand, media, and technology" (2009, 203). Many applied anthropologists have pointed out that the corporate application of ethnography implies less focus on culturally shared norms and more focus on individualism and the self (Mariampolski 2006; Graffam 2010; Miller 2012). This reconfiguration of business marketing strategy has resulted in the institutionalization of reflexivity through effective branding.

Further examination of this trend also reveals a major shift in the relationship between company marketing strategy and the consumer. This shift was a realization that the production of brands, not products, led to the financial success and cultural impact of modern corporations (Malefyt and McCabe 2009, 202). During the last two decades, one major area of development within marketing research has been brand identity. Brand identity is defined as the act of emotionally or symbolically depicting the product of a particular brand in order to facilitate awareness. Here, the brand represents a complex range of meanings and qualities easily accessible to consumers. Another development involves cultivating brand value—the processes of adding value to a brand's image by engaging with the consumers' perception of the brand. In other words, this is an attempt to develop a more intimate relationship between the brand and the consumer. As noted by each Douglas Holt (2006), CEO of the Cultural Strategy Group, and Malefyt, together, these two aspects, known in the industry as brand management, allow the consumer to internalize a brand's superior value (Holt 2006, 332; Malefyt and McCabe 2009).

During this time, many marketing strategists began experimenting with new approaches that played a large part in our current understanding of branding (Malefyt and McCabe 2009;

Akkaya 2014, 288; Bean and Arsel 2013; Taylor and Horst 2013). One discovery within the field of market research was the personal dimension of the brand with which the customer can self-identify. Another subsequent finding was that the reflexive nature of the brand was exemplified by a company's ability to instill brands with attributes that "speak" to the consumer, which also resulted from the current trend towards personalizing brand attributes (Malefyt and McCabe 2009).

Human behavior is complex and intimately tied to symbolism. Likewise, consumer attitudes and behaviors are also closely related to symbolism. Symbols full of abstract meanings that do not conveniently translate into surveys and focus groups.[3] With regards to consumer-brand relationships, businesses try to capitalize on these root behaviors and attitudes through branding. As defined by Holt, a brand is a crucial feature that is used by companies and institutions when distinguishing their trademark (TM) and/or service mark (i.e. goods and services) from the competition's TM and/or service mark.[4] Brands are unique to marketing strategy because they generate revenue by exploiting the established trends within the market (Holt 2006, 299-301).

In truth, these concerns (i.e. human nature, consumer behavior and the saturation of brands) reflect several strong points about ethnography and its utility in marketing research. The human experience has always coexisted with symbolism as a form of communication that predates language. More importantly, symbols serve as the public's primary mode of understanding and interpreting the world. Anthropologist John Sherry (2005) coined the term "brandscape" to describe the synthesis of the two features of brand management (brand identity

[3] Surveys and focus groups are still the predominant methods used in market research, especially in the Tech sector, not to detract from the addition of newer techniques. Among the most common methods of testing consumer behavior are: customer satisfaction scores, (Oliver 2010), "confirmation–disconfirmation of expectations approach, [and] factor- or attribute-based approaches" (Bowden 2009, 63).

[4] This is the TM value of the product. It builds up "Goodwill" (legal term for the value associated with the mark for quality or taste with the public) with the masses and means continued future purchases because of the interest in the goods produced by a specific source. TMs show the origin of the goods. The first TM was Bass (the beer) with the specific red triangle associated with the label. During the middle ages, brands hung over shops, before literacy was more abundant, for what the trade of the shop was. This led to the specialization of designs to distinguish them from their competition. Also see the use of color and shapes of marks to create the symbolic and emotional sentiments in the consumer (Higgins and Verma 2009).

and brand value) as a network of associations that consumers use to make meaning in their lives (2005, 49). Now, more than ever, the world is dominated by brands, and these brands are recognized as one of the most significant types of cultural artifacts or symbolic form of communication in today's society (Sherry 2005). In other words, the brand represents an act of creating meaning, which is also an anthropological construct. If the consumer creates meaning around the brand as they interact with it, this process is thus a cultural phenomenon. In the last two decades, branding has now become a site of dialogue and engagement between companies and the individual consumer on multiple levels, mediated through digital technologies (Malefyt and McCabe 2009).

With all the advances in corporate branding strategy, anthropologist McCracken suggests that corporations still need a better understanding of the nature of brands (2005; 2011). The corporation of today has found itself cornered on all sides by the totality, complexity, and dynamic nature of contemporary culture because it does not have a systematic way of understanding culture (2005, 175-191). Take this quote from Ford Vice President Jim Schroer (as cited in Goldberger 1999, 33) discussing his global marketing strategy regarding the Lincoln Navigator:

> If we were thinking only in terms of demographics, we would have developed another car for the older people who drive the Lincoln Town Car. But if I really understand this brand, Lincoln, then where can I take it? To a minivan? To a truck? What would a Lincoln minivan look like? You define the brand by its intangible psychological essence, not by its demographics.

(McCracken 2005, 182). As noted by McCracken, is the 'intangible psychological essence' the source of its charm? Surely there must be a more practical way of discovering the consumer's tastes and preferences regarding an ideal sports utility vehicle (2005, 182).

Consequently, McCracken reasons that if there is not a precise way of understanding culture, and since contemporary culture is constantly changing, then the corporation basically lives in perpetual state of shock. Modern corporations are good at tracking other things, such as finance, operations, or technology, but they do not have a similar way of tracking culture.

Certainly this claim may come as a surprise for most people because the general assumption is that in order to be successful in business, understanding the current trends is essential. Even so, McCracken points out that corporations are still governed by the early assumptions of economics that separated culture from capitalism (2010). This is illustrated by Adam Smith, "father of modern economics" (Davis, et al. 2011; McCracken 2010, 167), who rejects the influence of culture by stating that, "[to] influence this thing called a market, we need two parties, engaged by interest, in an act of exchange . . . and that's all. The social and cultural context we can leave aside" (as cited in McCracken 2010, 167). Although ground breaking at its time, the assertion implies a subjective view of how individuals engage in the exchange of value (2010).

Businesses that employ successful marketing research practices will develop a closer relationship with their consumers by replacing the concept of consumption as a series of one-time, unrelated purchases, with the idea that the consumer and business are engaging in an ongoing dialogue. As such, companies should now seek to study the relationship between people, products and how people use products in their everyday environments (Morrison, et al. 2011). A purely quantitative approach to marketing often lacks the ability to achieve this insight. Surveys measuring consumer satisfaction, for example, tend to focus solely on product performance. As a result, researchers have claimed that there is a direct link between product utility and satisfaction.[5] More recent studies, however, have questioned the validity of this claim (Oliver 2010, 29). The addition of qualitative approaches to marketing, such as in-depth interviews and empirical observation, would yield a more critical understanding of the consumer brand relationship and the phenomena of customer satisfaction and consumer loyalty because these approaches serve as a type of empirical validation.[6] This, when reinforced with the

[5] Traditional methods used to assess customer satisfaction—i.e. postal and email questionnaires and surveys, telephone surveys, customer comment cards and suggestion schemes—assumes foresight. By this I mean that research participants are expected to be aware, and able to fully describe mind-state, emotion, and specific behavior (Oliver 2010, 29-30).

[6] Take these key questions, for example, when applied to in-depth interviews and observation: What is the purpose and meaning of the "consumer-brand relationship," and how is that meaning created? What assumptions underlie current debates of the "consumer-brand relationship," and by whom? How do these claims shape current marketing techniques—and consumer reception? How do consumers in particular instances of forming a relationship with a brand incorporate that act into their identity on a conceptual, and emotional, level? Under what conditions (such as gender, lifestyle, or place) does that vary? How do variability and the integration of those relationships affect how

massive increase in data accessible to corporations, suggests that more can be learned by analyzing these types of data.

b. Big Data and Market Research

In their critique of big data, Kate Crawford, Kate Miltner and Mary Gray (2014), who are ethnographic researchers at Microsoft, note that the concept of big data is nearly two decades old, but only recently has it gained popular acceptance. This does not mean that big data used for quantitative analysis in relation to a brand and marketing research has no place in industry, but rather to suggest that along with qualitative analysis both approaches can be used to enhance company brands and marketing research. The earliest documented use of the term big data, that the authors cite, is within the Association for Computing Machinery archives (Cox and Ellsworth 1997, 235). Here, big data was described as any set(s) of data too large for computation by a single computer, "taxing the capacities of main memory, local disk, and even remote disk. We call this the problem of big data" (as cited in Crawford, Gray and Miltner 2014, 1664). If this is the description used to define big data, then the complications associated with the analysis of large data sets date back to the 1960's with the development of the Relational Data File system by RAND. With the arrival of cloud computing, these problems have been compounded because advancements in bandwidth or data transmission automatically create a need for more elaborate schemes of compression. This means big data is not a contemporary idea and is still plagued by the same technical problems since the introduction of the supercomputer (Crawford, Gray and Miltner 2014).

Through social media and other channels of digital media, businesses now have ever increasing amounts of data. This data is so vast that the use of more recent digital technologies are now becoming an essential element of data-collection and analysis. Anthropologist Wendy Hsu (2014) maintains that since contemporary culture is also mediated through these technologies, the need for digital mediation within ethnographic practice is inevitable. Rather than ignoring the arrival of digital media, she points out that ethnographers need to seriously

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people create and maintain their identity, the variety of alternative choices, and the criteria used to select amongst the alternatives?

consider the use of software to structure sites of inquiry. Other scholars have also pointed to the usefulness of digital technology and that it is often understood as a needed addition to ethnographic methodology (Maxwell 2015; Boellstorff, Afterword: Consuming the Digital 2012; Boellstorff, Rethinking Digital Anthropology 2012). The role of the ethnographer is to investigate cultural processes such as human expression and interaction. Due to the complexity of these objects of study, a computer may be unable to extract meaning, but they have become increasingly indispensable in restructuring information (Hsu 2014).

Ethnographers Ken Anderson, Dawn Nafus and Tye Rattenbury of Intel Labs – People and Practices Research, and Ryan Aipperspach of Goodguide.com (2009), also discuss the proliferation of data and digital methods, citing behavior tracking technologies. While doing so, they introduce "ethno-mining" as an innovative mixed methods approach that merges database mining techniques and fieldwork methodology (Anderson, et al. 2009). Within their own study, the researchers collect, analyze and blend behavioral tracking data and qualitative data within an exploratory as an analytical framework that contributes to the institutional knowledge of field study. Inspired from anthropologist George Marcus's revisiting of multi-sited ethnography (Peterson 2009, 42-45), the authors focused their research around cultural, social and geographic sites, instead of the one site, place or context (Anderson, et al. 2009).

c. Rise of Social Media and the Need for Mixed-Methods

Marketing research with regards to social media has increased dramatically over the last several years. Among the most influential in broadening our current understanding of the phenomenon are stance analysis and sentiment analysis. Stance analysis in human language deals with user attitudes, emotions, opinions and beliefs (Kucher, et al. 2015). The concept of corpus-based semantic and stance-shift analysis is described by English professor Boyd Davis and market researcher Peyton Mason as a multivariate technique used to identify how consumers

develop preferences for products or services (Davis and Mason 2004; Mason, Davis and Bosley 2005).[7]

Sentiment analysis, also known as opinion mining, falls under this type of analysis and is fundamental to social media, trend-analysis and systems of monitoring behavior. It also attempts to identify emotions and opinions (Paltoglou 2014). It involves the use of natural language processing and linguistic computation to extract user opinion from textual data and has grown in importance within data and web mining. The data extracted for sentiment analysis include reviews (McGlohon, Glance and Reite 2010), discussions forums and blog posts (Yano and Smith 2010), as well as data feeds from Twitter, Facebook pages, and other social networks.

Within this past decade, the consumption activity of online networks has earned increased attention within market research. According to Weiguo Fan and Michael D. Gordon (2014), Facebook, for instance, "has a worldwide market penetration rate over 12% of the entire online population; in North America it is 50%" (2014, 75). What makes Facebook so unique is its heavy integration of offline and online communities (Barkhuus and Tashiro 2010). Just as important is the fact that young users are substituting other forms of online media for social networking sites centered on user content (Barkhuus and Tashiro 2010). If this trend continues, Facebook and other similar online networks may easily become the most popular channels of marketing distribution. Here, the unit of analysis may be a word, phrase, sentence, tweet, post, or even an entire document. The information extracted in sentiment analysis, usually involving consumers, products and services, is often applied to market trend analysis and product development. For example, lists of positive and negative words and phrases associated with a product, when paired with semantic techniques, may be used to calculate the strength of its positive or negative sentiment (Paltoglou 2014).

[7] "Stance analysis is an application combining techniques in content analysis and corpus analysis in order to measure how word usage patterns signal a speaker's emotional response or degree of certainty about a topic and a situation . . . corpus is considered to be a specific collection of machine-readable texts that is representative of the genre or variety its sample contains" (Mason, Davis and Bosley, Stance Analysis: Social Cues and Attitudes in Online Interaction 2005, 264).

To succeed in business and academia, the use of mixed methods research will become increasingly important to develop a more robust understanding of human expressions, such as opinions, emotions, beliefs and general behavior (Slobin and Cherkasky 2010; Hsu 2014; Maxwell 2015; Patel 2011). This first chapter attempts to investigate some of the identified issues evident in the literature of marketing research, ethnographic methodology and mixed methods research, as well as the speed with which specific technology industries have developed. Today, the market is saturated with brands, making it increasingly difficult to maintain customer loyalty. This fact also raises the question of how a business may add value to their products, services and brand image. Companies also deal with the ever changing consumers' wants and needs, making almost standard product customization as a cornerstone of successful branding. In a world of such stiff competition, it is critical for companies and academics to come up with new and innovative marketing research practices that cater to an increasingly diverse modern market before their competitors do. If not, they are bound to fall behind their rivals due to outdated, and thus fundamentally flawed, research practices from the outset. In the next chapter, this thesis discusses the methodology employed in this particular study. One that blends traditional qualitative in-depth interviewing techniques with quantitative sentiment analysis into a new model of exploring consumer behavior in market research.

Chapter 2: Methodology

As a result of the complex nature of brands and the need for a better understanding of consumer behavior, the development of innovative research approaches are essential. Historically, consumer research practices have evolved along with the introduction of newer technologies such as tape decks, cameras and video recordings. This is not a debate that new technologies have accelerated the field in certain directions, but, rather, that knowledge structures, and is structured by, real-world experience. Recently, the field has been given an opportunity to engage with new kinds of technology, social media and user-tracking technologies in ways that did not exist earlier (Hsu 2014).

The purpose of this chapter is to provide a framework for utilizing social media and user-tracking technologies while highlighting a mixed methods approach. Based on the research methods discussed earlier, a theoretical framework for understanding consumer behavior has begun to take form. The techniques that will be used for this ethnography integrate new and traditional qualitative and quantitative approaches. First, the qualitative analysis will discuss the research participants' conceptions of brand loyalty and product use regarding the cell phone. Second, the quantitative analysis will show the common issues associated with conducting a sentiment analysis on social media that future studies should consider.

III. Qualitative

This section will describe the qualitative factors considered for analysis and the method used to analyze the data collected. First, this section discusses the population sample and the reasoning behind why they were chosen. Then, there will be a discussion of how the method is applied to the data collected from the interviews. The interest in consumer behavior, brand loyalty and cell phones stems from the ever increasing focus on consumers, brands and overall popularity of the cell phone as it relates to one's life. This study, in part, is used as a means of deconstructing the presumptions regarding these concepts. Much of the social meanings associated with brands and brand loyalty originally collected while conducting interviews, yielded interesting results in that: 1) many of the research participants interviewed either did not claim loyalty to a particular cell phone brand, or brands, in general; and 2) emergent contrasting

themes of necessity, fear, attachment, and the importance of customization or the ability to adapt to one's lifestyle where also discovered.

The role that cell phones play in the everyday environment of consumers can be explored more suitably with qualitative analysis. Specifically, the target population used in this study is local University of Tennessee, Knoxville (UTK) college students that belong to the Generation Y consumer segment. This segment of the American population was selected because of the high amount of mobility that is identified with this user segment, they are more receptive to cell phones and they have made it an essential tool of their daily activities (Thulin and Vilhelmson 2007, 237). The field study explores the consumer behaviors of 40 cell phone-owning college students in detail. The UTK college campus was chosen as the primary field site because it served as the ideal place for convenience sampling when selecting potential interview informants. Additionally, as a result of the format of the initial interviews, these research participants were given the opportunity to observe and reflect on the behaviors of their peers while being interviewed and provided further insight into consumer behavior.

a. Population

Since this is a regional study, I chose UTK because the population more closely maps the demographics of the state. Investigating a small-scale area of the U.S. population allows for the ability to identify the role that cell phone plays in the everyday lives of that population. The student population at the UTK is ideal because a vast majority of the undergraduate students, and many of the graduate students, are from Tennessee and the greater southeast. The University of Tennessee's main campus is located within the city and serves as the flagship school for Tennessee's University system. It hosts nine colleges for undergraduates and eleven colleges for graduates and has a yearly enrolment of roughly 28,000 students from every state, as well as from over 100 different countries. Regarding ethnicity, diversity is close to the national average. Roughly 80% of the population is Caucasian, 7.2% are African America, 2.7% are Hispanic, 2.6% are Multi-ethnic, 2.6% are Asian, 1.8% are international (non-resident), and 1.7% are unknown (OIRA UTK 2015).

Located several blocks from the historic downtown area, the 560-acre campus is the most dominant feature of Knoxville, Tennessee and serves as a testament to the University's classic college atmosphere. As shown in figure 1, the campus is nestled alongside the North shore of the Tennessee River facing the Great Smokey Mountains National Park to the south and is bordered by the Fort Sanders student housing district on the north side. The campus landscape makes it easy to meet students with plenty of green space to sit and study or socialize with others. The University prides itself as being a pedestrian-friendly campus, boasting a long-term vision known as "the master plan," or road-map, to enhance this feature with the addition of increased green space, classrooms, and laboratory facilities within the next ten years.

The objective of the qualitative portion of the study is to understand the role that cell phones play in the daily lives of consumers from generation Y. Thus a convenience sample of 40 college students (20 males and 20 females) were interviewed who have varied knowledge of cell phones, brands, and the cell phone industry in general. Similar to the demographics of the region, the majority of those students are Caucasian. As detailed in Table 1 and Table 2, the study included interviews from four African Americans, three Asians and three Multi-ethnic students. The respondents ranged between the ages of 18 and 30 and all respondents owned some type of cell phone. Generally, most of respondents were undergraduates, although four of them were working on their master's degree and one respondent was a doctorate student. These interviews were conducted in the UTK library, various residence halls, dining halls, the student Union, and benches outside along the sidewalks and campus walkways.

b. Method

The interview research questions where developed from the theoretical framework discussed in the first chapter. Every question was designed to discover various aspects of consumer behavior, brand loyalty and sentiment with regards to the cell phone usage. As illustrated in Table 3, there are six categories of questions with each category related to different aspects underlying the relationship between the study participants and cell phone brands. The application of this method allows for a better understanding of why or how young people use cell phones within a local context. While conducting the interviews, the entire process was



Figure 1. Campus Aerial (Torchbearer Staff 2014)

Table 1. Research Respondents

Name	Interviewed	Site of Interview	Gender	Duration	Nationality	Birth	Birthplace	Age in interview
Ashely	3/9/2013	Apt Residence Hall	F	23 min	Caucasian	1991	Batavia, NY	21
Becky	3/11/2013	Hodges Library	F	40 min	Afro- American	1993	Memphis, TN	20
Dan	4/11/2013	Fort Residence Apt.	M	15 min	Caucasian	1991	Sacramento, CA	21
Eric	4/13/2013	Apt Residence Hall	M	27 min	Caucasian	1994	Jamestown, WI	19
Erica	9/10/2013	Hodges Library	F	17 min	Caucasian	1991	Maryland	21
Kayla	9/10/2013	Apt Residence Hall	F	26 min	Caucasian	1991	Blacksburg, VA	22
Ida	9/16/2013	Dining Center	F	16 min	Caucasian	1990	Michigan	23
Tara	9/29/2013	Hodges Library	F	20 min	Caucasian	1993	North Carolina	20
Lacey	10/15/2013	Hodges Library	F	38 min	Caucasian	1992	Nashville, TN	21
Maria	10/15/2013	Hodges Library	F	34 min	Caucasian	1994	Memphis, TN	19
Oprah	10/31/2013	Hodges Library	F	25 min	Caucasian	1993	Nashville, TN	20
Olivia	11/1/2013	Hodges Library	F	37 min	Caucasian	1994	Johnson City, TN	19
Peter	11/4/2013	Dining Center	M	35 min	Caucasian	1994	Knoxville, TN	19
Ryan	11/5/2013	Hodges Library	M	20 min	Caucasian	1993	New York, NY	19
Sara	11/12/2013	Hodges Library	F	30 min	Caucasian	1994	Alexandria, VA	19
Tom	3/8/2014	Dining Center	M	32 min	Caucasian	1991	Maryville, TN	18
Emily	3/10/2014	Hodges Library	F	28 min	Afro-American	1994	Memphis TN	20
Gina	4/1/2014	University Center	F	15 min	Asian	1994	Tennessee	20
Nate	4/1/2014	Hodges Library	M	29 min	Multiracial	1992	Knoxville TN	21
Ulla	4/1/2014	WUTK-FM	F	20 min	Caucasian	1982	Frankfurt, Germany	32
Grant	4/1/2014	Dining Center	M	19 min	Hispanic/Caucasian	1994	Nashville TN	19
Oscar	4/2/2014	Campus Walkway	M	15 min	Caucasian	1993	Columbia, TN	20
Brian	4/2/2014	Hodges Library	M	19 min	Caucasian	1989	Florida	24
Daisy	4/4/2014	Hodges Library	F	19 min	NA	1986	Memphis TN	28
Kevin	4/4/2014	Apt. Residence Hall	M	54 min	Caucasian	1993	Nashville TN	21
Eva	4/8/2014	Hodges Library	F	28 min	Caucasian	1994	Memphis TN	19
Zach	4/10/2014	Hodges Library	M	54 min	Caucasian	1991	Atlanta GA	22
Tony	4/19/2014	Hodges Library	M	1hr 42 min	Caucasian	1989	Knoxville TN	25
Luke	5/5/2014	Apt. Residence Hall	M	30 min	Caucasian	1992	Tennessee	21
Xena	10/5/2014	Fort Residence Apt.	F	15 min	Caucasian	1994	Chattanooga, TN	20
Nick	10/5/2014	Fort Residence Apt.	M	30 min	Caucasian	1990	Nashville, TN	24
Morgan	10/5/2014	Fort Residence Apt.	F	15 min	Caucasian	1993	Memphis TN	20
Chris	11/23/2014	Apt. Residence Hall	M	34 min	Chinese/Asian	1991	Nanning, China	22
Paul	1/16/2015	Resident Apt.	M	30 min	Black/Latino	1992	California	22
Zabrina	1/23/2015	PCB Café	F	54 min	Caucasian	1993	New Bedford, MA	20
Phil	1/30/2015	Apt. Residence Hall	M	20 min	Asian	1993	China	21
Preston	1/30/2015	Apt. Residence Hall	M	30 min	Caucasian	1994	Morristown, TN	20
Ivy	2/12/2015	Hodges Library	F	45 min	Afro-American	1994	Atlanta, GA	20
Oliver	2/12/2015	Hodges Library	M	30 min	Afro American	1986	Mississippi	28
Xavier	2/15/2015	Apt. Residence Hall	M	42 min	Caucasian	1990	Riverside, CA	24

Table 2. Research Respondents Part 2

Name	Status	Religion	Provider	Plan	Major	Class	Current Cell Phone
Ashely	Single	NA	Boost Mobile	Solo	Sustainability	Senior	LG Spyder
Becky	Single	Christian	Cricket	Solo Pre-pay	Sustainability	Sophomore	Samsung Galaxy S3
Dan	Single	NA	AT&T	Family	Journalism & Media	Senior	iPhone 4
Eric	Single	NA	AT&T	Family	Chemical Engineering	Freshman	iPhone 4
Erica	Single	NA	AT&T	Solo	Psychology	Senior	iPhone 5
Kayla	Single	Christian	Verizon	Family	School Counseling	Grad. Student	iPhone 5
Ida	Single	Catholic	T-Mobile	Family	College Student Personnel	Grad. Student	HTC One
Tara	Single	Christian	AT&T	Family	Wildlife & Fisheries Science	Junior	Samsung
Lacey	Single	Atheist	Verizon	Family	Child Family Studies	Senior	iPhone 4s
Maria	Single	Methodist	AT&T	Family	Journalism & Media	Sophomore	iPhone 4
Oprah	Single	Christian	Sprint	Family	Psychology	Sophomore	iPhone 4
Olivia	Single	NA	Verizon	Solo Pre-pay	Psychology	Sophomore	Samsung
Peter	Single	Christian	AT&T	Family	Undecided	Freshman	iPhone 5
Ryan	Single	Catholic	U.S. Cellular	Family	Business Marketing	Sophomore	Galaxy 3s
Sara	Single	Catholic	Sprint	Family	Journalism & Media	Sophomore	Galaxy S2
Tom	Single	NA	AT&T	Family	Mechanical Engineering	Senior	iPhone 4s
Emily	Single	Christian	Verizon	Family	Nursing	Sophomore	iPhone 5
Gina	Single	NA	T-Mobile	Family	Chemical Engineering	Freshman	Nokia N86
Nate	Single	Christian	Verizon	Family	Psychology	Freshman	iPhone 4s
Ulla	Married	NA	Sprint	Family	Communications Journalism	Freshman	iPhone 4s
Grant	Single	Christian	AT&T	Family	Music/ History	Sophomore	iPhone 5
Oscar	Single	NA	Verizon	Family	History	Sophomore	Motorola Droid Ultra
Brian	Single	Atheist	AT&T	Family	Computer Engineering	Senior	iPhone 4s
Daisy	NA	NA	Verizon	Family	English	Grad. Student	iPhone 4s
Kevin	Single	Presbyterian	AT&T	Family	Computer Science & Physics	Senior	Samsung Galaxy S4
Eva	Single	Christian	AT&T	Family	Child and Family Studies	Sophomore	iPhone 4s
Zach	Single	Agnostic	Verizon	Family	Mechanical Engineering	Junior	LG Lucid II
Tony	Single	Christian	Verizon	Family	Political Science/Business	Dual Major	Samsung Flip Phone
Luke	Single	Presbyterian	AT&T	Family	Communication Studies	Senior	iPhone 4
Xena	Single	NA	Verizon	Family	Geography	Junior	iPhone 5s
Nick	Single	Presbyterian	Verizon	Family	Industrial Engineering	Senior	iPhone 4s
Morgan	Single	NA	Verizon	Family	Speech Pathology	Junior	Samsung Galaxy S3 Mini
Chris	Single	NA	Verizon	Family	Supply Chain	Senior	Samsung Galaxy 4s
Paul	Single	Christian	Verizon	Family	Music Performance/Business	Senior	iPhone 5
Zabrina	Single	NA	AT&T	Family	Animal Science	Senior	iPhone 6
Phill	Single	NA	T-Mobile	Family	Business Analytics	Senior	iPhone 5
Preston	Single	Christian	Verizon	Family	Pre-pharmacy	Sophomore	Samsung Galaxy S5
Ivy	Single	Baptist	AT&T	Family	Therapeutic Recreation	Junior	iPhone 5s
Oliver	Single	Christian	AT&T	Solo	Education	Ph.D. Student	iPhone 4s
Xavier	Single	Christian	Verizon	Family	College Student Personnel	Grad. Student	iPhone 5c

Table 3. Interview Research Questions

Conception	**Question**
Demographic	Tell me about your current phone Tell me about yourself?
Behavior	Tell me about your phone history? Any issues or instances of how you broke any of your cell phones? How are they better or worse than your current phone? How do you use your phone during a typical day?
Preference	Do you have an affinity towards social media? What are your networks? Can you describe your ideal phone? Include preferences towards design and how it would aid you in your day-to-day activities? Do you have a preference towards a certain cell phone brand, or a type of cell phone product (Blackberry, iPhone, Android) Do you consider yourself to be a brand person in general? How many electronic devices do you have?
Experience	What are the challenges and problematic issues, if any, associated with owning a cell phone? What are the reasons that may cause a person not to own a cell phone at all?
Customer Satisfaction	How is your customer service with your wireless carrier? How did you come to choose your own wireless carrier over others? What kind of things should wireless communication carriers do for their cell phone customers? What services should they provide?
Symbolic meaning	Has the cell phone played a vital role in your life? How has the cell phone played a role in your life? Has the cell phone changed society?

documented using traditional ethnographic methods, such as participant observation and note taking. These methods, grounded in the human experience, allow for a more enriching experience than standard testing methods used to assess consumer behavior and satisfaction while also allowing for the development of in-depth, comprehensive consumer profiles. With a deeper understanding of consumer segments, we can generate a more accurate portrayal of consumer behavior.

The primary source of data gathered from respondents was through semi-structured interviews. The interview agenda was comprised of 17 questions, divided into the six categories mentioned above, related to various issues regarding cell phone usage. They were designed to address the research objectives–to explore the role cell phones play in the daily lives of consumers as well as the cultural implications that can be identified with regards to cell phone use. In doing so, this study was designed to discover new insights about today's consumer and their preferences regarding wireless telecommunication companies, products, services and brands within the cell phone industry. In other words, an attempt to understand how the respondents used their cell phones in their daily lives, the functions that it served and the challenges associated with owning the device. Furthermore, the field study also explored the social implications regarding the impact of the cell phone.

The field research began in early March of 2013 and lasted until March of 2015. On average, the interviews were conducted twice a week and varied between 15 to 90 minutes. The sociodemographic variation in age and experience with cell phone ownership provided a wide range of perspectives about the product category, future directions and an insider's view of the social expectations concerning cell phone use. All of the interviews conducted were audio-recorded and then transcribed. Those transcriptions were then analyzed for themes at a later time and are discussed in the last chapter.

The purpose of the demographic questions for example, is to gain a better understanding of the research participants' background and current cell phone. Questions of behavior explore how they use their cell phone on a day-to-day basis, the purpose of their cell phone now and how they used their past cell phones. Questions of preference seek to determine the participants'

affinity towards social media, brands, and preferences regarding their ideal cell phone. The section of questions of experience are used to understand how individuals might come to a purchase decision and why if none is made at all. The questions covered in the customer service section seek to identify each respondent's sentiment towards their wireless network provider. Finally, questions of symbolic meaning are used to understand the social implications of owning a cell phone. Due to the ubiquitous nature of cell phones, the eagerness of the participants to discuss their attitudes and beliefs regarding the cell phone confirmed that the study would help gain a deeper understanding of consumer behavior. The advantage of qualitative in-depth face-to-face interviews here is that it was used with people who may not provide this type of information otherwise. Additionally, if a respondent didn't understand a specific question, restatements could be made, or, in other words, articulated further. If it was sensed that they could not answer a question fully, the interviewer could probe for a full answer. The results of these interviews are discussed in the next chapter.

IV. Quantitative

When experimenting with the various data analysis software programs at the beginning of the study, the first software program equipped with a content analysis and text mining add-on failed to properly count the words in the study's dictionary and at times would become unresponsive or "freeze up" during analysis. As a result, the MaxQDA miner and SPSS were used. The data set consists of 162,123 comment posts from Sprint's Facebook page and spans from February 2nd to August 3rd of 2013. MaxQDA miner could not analyze all of the data in one data set without running out of memory. Consequently, the data set, was divided into 22 spreadsheets (for each week), then analyzed for content analysis one by one and then merged back together for data analysis in SPSS. This process was extremely time-consuming. Upon, closer inspection of the initial quantitative approach considered for this study, known as stance-shift analysis, the leading researchers of this method (Capriello, et al. 2013) proved to be vaguer on their methodology than originally recognized.[8] When contacting them, they stated that their

[8] With regards to stance-shift analysis, "its codification often reviews relationships and patterns among grammatical features or categories as well as words" (Mason, Davis and Bosley, Stance Analysis: Social Cues and Attitudes in Online Interaction 2005, 264). Here an algorithm, based upon the science of linguistics (Biber 1988) was used to

dictionary was proprietary. So, even though a custom dictionary was created, if the study would have continued with this type of analysis, the results (dimensions of stance, i.e. emotion, personalization, evaluative associations, stance comments, opinions, and narrations) would not have represented a proper reassessment of the authors' methods.

Additionally, as explained earlier, the initial process required MaxQDA miner to split up the data. Just in loading one of the 22 data sets, in the form of a spreadsheet, into MaxQDA miner for the first time took over 4 hours to process before the content analysis. When matching the words from the dictionary to a spreadsheet, each one took an hour to analyze for content. In reevaluating the options, the analysis was narrowed to a sentiment analysis. Sentiment analysis yields much more literature with regards to methodology than stance-shift analysis. Nevertheless, R was the only program that could process and quantify all of the text of the data set properly without needing to split the data into subsets, which is what was needed earlier in order for SPSS to analyze the data. In using R, SPSS is no longer needed.

Why sentiment analysis? Because of the methods simplicity and clarity. Sentiment analysis involves the identification of positive and negative emotion. Applied to a corpus, such as a Facebook page, the application of an algorithm can group posts into positive and negative groupings, yielding insightful data that can be used as a powerful tool of business influence. For example, in identifying the users who post positive sentiment frequently, a company could reward those identified with a discount or some other incentive in hopes of activating them into super fans to spread the company brand to others. Alternatively, in the identification of a user who posts frequently but negatively, a business can easily identify the problem and take the time to tend to the needs that the user identified as problematic of the service. Let's say this user is a Sprint customer whose cell phone contract is almost over. If negative sentiment is detected early enough, Sprint can easily take measures to persuade that customer to stay with the company if it addresses that customer on a one-on-one level, as a special form of customer service.

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code the data into language patterns known as "dimensions of stance" that includes dimensions of emotion, personalization, evaluative associations, stance comments, opinions, and narrations. (Mason 2007; Capriello et al. 2013).

The quantitative approach within this methodology is based on sentiment analysis, also known as opinion mining. First, large amounts of textual data is collected from Facebook posts and comments on Sprint‘s fan page. Here, the textual data was database mined through the Facebook Application Programming Interface (API) of DiscoverText (Shulman 2010). DiscoverText is a cloud-based data mining tool developed with the goal of creating ways to review vast numbers of public comments. Excel and R Studio were the statistical software tools used to code and test the data from DiscoverText to identify groupings and outcomes.

The analysis was mainly conducted through R Studio, the integrated development environment for R, which is a free, open-source, statistical computing and graphics software programing language. Why R? Equipped with a wide array of package libraries for statistical analysis and graphing, R is extremely adaptable when extending the base capabilities of the program through user-submitted packages. As of August 2015, over 7,000 packages are available through the Comprehensive R Archive Network (CRAN). Among the most important package libraries used in this study are: 1) plyr for grammar of data manipulation, 2) ggplot2 for plotting or visual graphics, 2) NLP for natural language processing, and 3) tm for text mining and text analysis.[9]

The method, used to quantify emotional sentiment, is derived from a simple algorithm applied to the sentences within each comment. In spite of the basic nature of the algorithm, the sample of Facebook comment posts are quite large and generated fascinating results. They allowed for the identification of the most negative and positive comments related to the company. First, the large amount of textual data collected from Sprint’s Facebook fan page needed to be cleaned for the algorithm to be applied. Through experimentation, primarily trial and error, a number of algorithms, known as functions in R, were developed to extract, store and remove metadata tags that would otherwise skew the results of the analysis. These include hashtags (#) and at-signs (@), representing replies with the user’s name attached. Unfortunately, these symbols are also associated with other metadata such as URL address and email addresses that would need to be extracted first as a result of the similarity.

[9] https://cran.r-project.org/

After extracting the URL's and emails, an additional set of functions was developed to extract, store and remove the hashtags, as well as storing and removing the emails. Next, each post and comment's sentiment score was derived from the number of "positive" and "negative" word occurrences. An algorithm was employed to subtract the negative word count from the positive word count. A large negative score shows a strong negative sentiment, a large positive score means the post exhibits a strong positive sentiment, and posts that equal zero equate to neutral sentiment (neither positive nor negative) (Breen 2012). The opinion lexicon used to identify and classify sentimental words is sourced from Hu and Liu's (2004) opinion lexicon of roughly 6,800 positive and negative word lists. A number of other keywords were added due to their relevance for positive and negative sentiments, but were specific to the cell phone industry (such as "upgrades" or "fees").[10] After feeding the positive and negative word lists into the algorithm, the posts are then scored. Finally, each conversation is coded into user, Sprint or sponsor categories, time coded and converted into a time-sequence metric used to determine the track of sentiment over time and to identify possible themes with regards to the users. Besides sentiment scoring, key influencers were also identified with regard to the users. Doing so allowed for the identification of important themes related to customer satisfaction and improving customer service.

The main purpose of the quantitative approach to this study is to employ sentiment analysis to explore major trends and factors that can influence company brand performance at the national level. Facebook has become an important feature of corporate branding because the social media platform allows for uninhibited two-way communication. The data mining techniques employed allow for the ability to identify, timestamp and assign a sentiment score to every individual's post or comment. In the chapter that follows, a quantitative analysis will detail the logic behind how these tools were used.

[10] The words added to the opinion lexicon are related to the wireless telecommunications industry and often correlated with specifically either positive or negative sentiment by the poster. For example, "upgrades" relates to a new phone and thus a positive outcome. "Fees", "dropped calls" and "outages" relate to inconveniences.

Chapter 3: Analysis

Recent advances in mobile communication and social media were the primary reasons for utilizing a mixed methods approach in this ethnography. This chapter is divided into three sections. The first part will discuss general themes and findings of the local study. The second part will explain the application of the sentiment analysis in full detail with regards to the users on Sprint's Facebook page and how it can be used in industry. Lastly, a presentation of the experiences gathered while employing both qualitative and quantitative methods will follow.

At the initial phase, the primary research objectives were to determine the factors that contributed to brand loyalty, purchase decisions, practicalities of everyday cell phone usage, sentiment directed towards wireless carriers and affinity toward social media and the social implications of owning a cell phone. These objectives were developed from the literature discussed in the first chapter. The social implications of cell phone usage emerged as a central theme throughout every interview.

As a field site, the UT campus, like many other semi-urban populated areas, is influenced by both the local norms of social behavior as well as outside pressures, such as social media. For this reason, it was decided that social media, and Sprint's Facebook page in particular, would serve as the second site of study. This second part engages with a quantitative method, called sentiment analysis, and explores the sentiment of Facebook users, the complexities of observation and the monitoring facilitated by the growth of new media technology. For companies, social media can be used as a listening tool to identify what general issues are being mentioned, especially for the negative posts. What are the general issues that concern consumers? Is it cancellation issues, service coverage issues or what are the keywords associated with the issues they are talking about? In looking at a typical thread on a corporate Facebook page, viewing all of the comments is no easy task. For viewing a popular thread, one has to expand the section numerous times. The only way to get any idea of what is being said is to apply some type of quantitative analysis. By identifying posts of positive or negative sentiment, this paper seeks to identify topics and keyword associations relating to the issues that are of top priority to companies.

V. Qualitative: Analysis

Conceptually, the cell phone is nothing new or extravagant. It's an ordinary, part of our daily routine and how we manage our social affairs. Sometimes it's how we access information, or determine our location and destination. It's a platform for information, communication and networking. The fabric of our lives. Among all participants in this study, only four respondents had non-smartphones: Ashely, Tara, Tony, by choice, and Olivia, by default (with the intention to upgrade to a smartphone upon joining a new wireless provider). Out of all the participants, Ashely was the only respondent to explicitly state that, "I definitely think you can get by in life without having a cell phone," although she admitted that the cell phone is "important for certain reasons." Everyone else viewed the cell phone as a necessity, including Tara, who checks the time with it and uses the alarm clock function, and Tony, who said that he mainly used the device for "communication." "A whole heck of a lot of the times that's what I'll use it for in everyday life" after being asked if the cell phone played a vital role in his life.

This theme of necessity can be reflected in stories of how and when the respondents received their first cell phone:

> **Becky**: "Because I was staying after school late, and [my father said] if I was going to be [at] school, I would need a phone."
>
> **Erica**: "My first phone was, I think, like fourth grade [because] I went skating on the weekends and my parents wanted me to have a phone . . . when I was there."
>
> **Maria:** "I was 15 [and] it was my first year at a new school. So, for getting picked up and dropped off, my mom and dad . . . wanted me to have a cell phone so [that] they could reach me."
>
> **Luke:** "I was in cub scouts."
>
> **Paul:** "I got the phone when I was [in] eighth grade. I might have been 13, 14 maybe. [It was because] I needed a phone. I needed to communicate. You know, just call up people; friends, parents, girlfriend. I needed that and I need[ed] a cell

phone. I . . . got . . . tired of asking my mom for the phone and sneaking and getting [on] the . . . house phone at night. So I was like . . . 'I need my own phone.'"

Zabrina: "Fifth grade. [It was] 2003. I only had it to . . . call my mom or my dad when I would get home from basketball, [such as] away basketball games, for them to . . . pick me up."

Ulla: "I got it in 2005 and it was just a blue Sprint flip phone. I was just getting into . . . undergrad then."

Phil: "[I got a] flip phone [when] I came to the U.S. when I was about eight. I think 2001. About three or four year[s] later, I just got this flip phone because my parents wanted to make sure [that] when [I was] in grade school, they want[ed] to make sure [I was] okay after school. So I had that flip phone."

Oliver: "I got it when I entered college in 2004. So I probably got it around the early 2000s, . . . [I]t was a Nokia: kind of a chunky, stocky phone."

Xavier: ". . . I actually say [around] 2004, . . . eighth grade. I think it was at the end [of the school year]. I got . . . one of those old school . . . Nokia's. . . . [M]y parents got it for me because I started doing . . . sports and stuff. . . . When I got done with practice or needed to get picked up, I could call them, . . . get in contact with them and ask them to come pick me up."

Notice any commonalities? Each first adoption represents a rite of passage, of sorts. All the respondents received or bought their first cell phone in response to new patterns of behavior, whether it be starting a new school, after school activities, youth clubs or expanding one's social circle. Most respondents now own a smartphone, so, currently, their conception of a cell phone has moved from a place where it was limited in use as a traditional cell phone, described above, to a device with an operating system and the computing power of a personal computer. Today, the concept of the cell phone has evolved into a device defined best by Luke as "a Swiss Army

knife of technology. It's everything you wanted [it] to be and more. I have on my phone right now a decibel tester, weather [app], and radio, Pandora for music and . . . stock prices, right here on my phone."

a. Plugged – in

The cell phone is generally understood as a personal device that is both private and mobile. As such, its utility implies that, in many cases, the cell phone is to be used in public. In a sense, the private domain is being forced onto the public domain in such a way that is often considered offensive to older generations. Consequently, mobile communication tends to challenge the traditional norms of social behavior. Throughout all of the interviews, the respondents took the stance of either one of two perspectives. On one hand, there were those that felt the cell phone represents an invasive force of social change. Conversely, others felt the device represents a natural progression in the advances of information and communication technology. Interestingly enough, the respondents who viewed the cell phone as invasive also held bias towards traditional normative social behavior.

The respondents who held this view were clearly against the pressures and expectations of accessibility in today's society. In some cases the concept can be quite overwhelming. For example, Ashely, who represents the strongest supporter of traditional social behavior, held the strongest opinion. When asked if she ever wanted to check Facebook on her cell phone, she responded:

> **Ashely:** No, because I am actually a little disgusted when I see people on their phones all the time on Facebook. [This is b]ecause I think Facebook and some social media can be a really good thing, but, at the same time, I really think it puts a wedge between a person and the present, . . . enjoying the moment where they are. So I feel like you could easily get caught up in the realm of Facebook and what people's lives seem like on social media, as appose[d] to enjoying life how it is right when you're in it, you know?

Here, Ashely makes it very clear that mobile communication is not acceptable, or natural, in any type of social situation, noted by her disgust in the idea. Although she was born in 1991, Ashely got her first cell phone when she was eighteen and so was accustomed to the norms of traditional social interaction. Tony received his first cell phone at the age of nineteen and also holds traditional interaction with high regard:

> I see all these people saying I'm behind the times and everything. . . . I've noticed I seem less connected with my phone [than other] people. I guess I've developed a sense of pride that I'm living more of "the simple life," or I'm living closer to the simple life, than other people.

Tony's statement implies that there's a different expectation now with the added layers of communication, such as email, text, and social media. His intent to stay less connected shows his understanding that there's more accessibility nowadays than in the past. Similar opinions were expressed by all of the oldest respondents. There was a noticeable understanding among them that they were not interested in being so connected, such as Oliver's sentiment towards texting as a new and rival form of communication.

> [S]mart phones . . . are [what] . . . you see a lot of people on. . . . [Y]ou have the social [media] which leads to social decay. Even though it's just transforming into social media, it's a metamorphosis and I don't think it's a good one. But that's the old person coming out of me. Ask the younger ones and they're good to go. I definitely think that smartphones are especially . . . changing how people communicate: because . . . people are more likely to text you than call you[and] because they don't know how to talk on the phone anymore. It's strange they can't do the face-to-face . . . . [I]t's just different.

Oliver definitely appears to have more on his mind than just a cell phone. His statement reveals a frustration with all new forms of media. He believes that they have conditioned other people in society to not want to talk in person or on the phone any more. Similarly, one of the more notable themes expressed among all respondent interviews is the belief that the cell phone is transforming society; the biggest concern was this change is for the worse, in most cases. This

has to do with new methods of communication. This fear stems from the idea that face to face interaction is being replaced by digital media. The notion is often characterized as being "sucked into" all flows of communication. A good example of this claim can be found in Luke's answer when asked to discuss the issues and challenges associated with owning a cell phone:

> You get really reliant on it. It's a lot easier to get distracted in the virtual world then it would be in the real world. My friend took a really funny picture where we were having a family get together . . . and his family and [he and I] are just sitting on the couch. He takes out his phone real quick and takes a picture of all of them[.] . . . [E]very single one of them has their head buried in their phones: my parents, kids, everyone has their heads buried in there phone. It just feels like everyone is more absorbed in what's going on [with] their phones more than what's really going on, if that makes sense. But . . . I guess you . . . have to take the bad with the good. Take the convenience of the cell phone and lose some of your social life for it. [F]or . . . gaming or the social life, you have to give up some of your social life.

Luke makes a valid point, but what about the same scenario with cell phones taken out of the picture? As illustrated in figure 2, any other type of mass media, including radio, television, computers and newspapers, not to mention video game devices and consoles or personal MP3 players, could have easily replaced the cell phone for the dynamics of the interaction Luke described. In this context, cell phones don't replace face to face communication, they replace other media formats. Thus, as the product of the technological convergence, designers may want to think about ways of making cell phones just as suitable for social consumption of media as it is for personal consumption. We will return to this issue in later discussion.

Xena makes a similar point when asked why someone wouldn't want to own a cell phone at all. "I think people don't want to be sucked into social media that much. . . . [T]hat's why a lot of people have gone against it lately. They feel like it's taken over their lives." In her response to my question asking what life was like before cell phones, she answered: "It used to

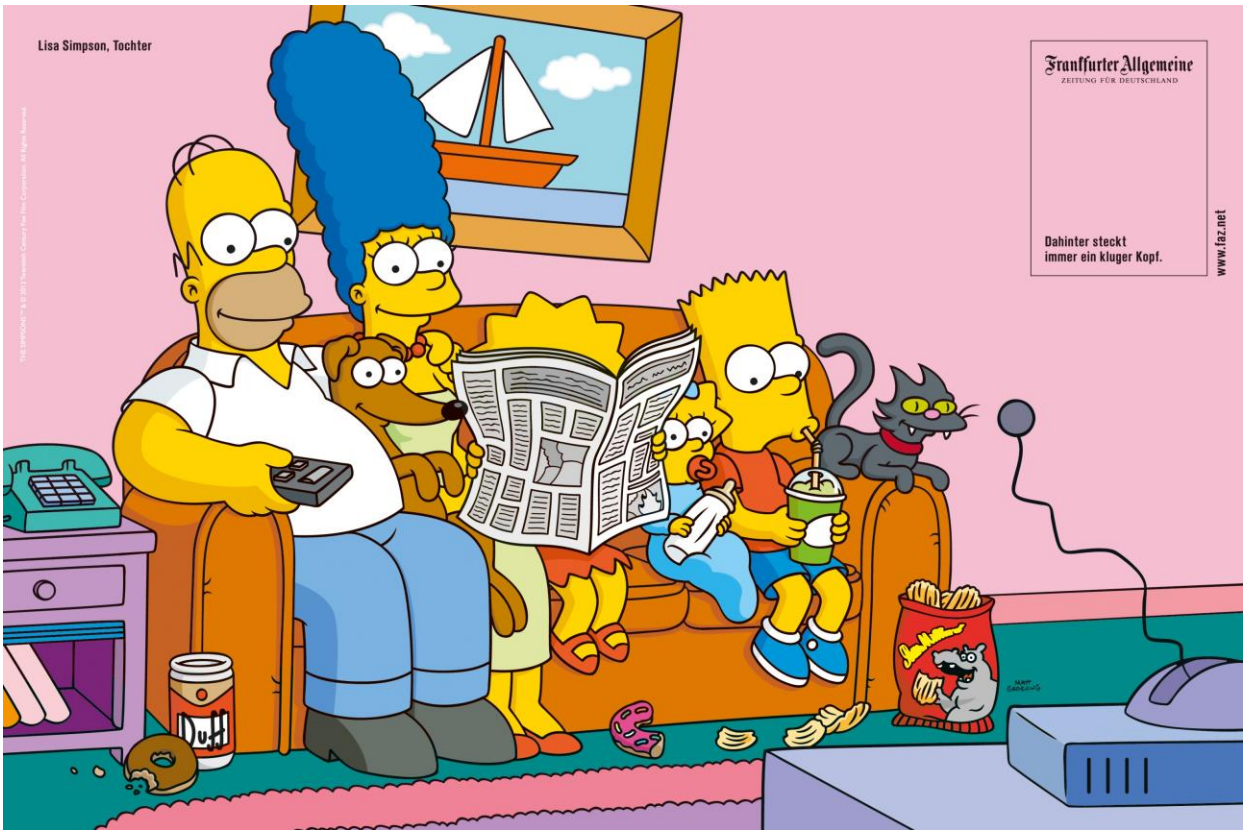


Figure 2. Newspaper instead of watching television: Lisa Simpson as a "good head" (Frankfurter Allgemeine Zeitung (FAZ) 2013).

be you could call someone and that was the only mode of communication, . . . you would only talk to them maybe once a week . . . . [N]ow you can text them every five minutes and tell them what you're doing."

b. Unplugged

Communication devices are a network by nature, meaning that you cannot adopt them unless other people also adopt them. As soon as this occurs, upon joining, you are no longer a unique actor in this respect. You've now bought into a network of connections, responsibilities, and expectations. In the early stages of the network, it used to be a problem for the individual who didn't have access to this technology. They would be unplugged, thereby missing out on information. Nowadays however, if you do not have the technology, it is a problem for other people who are trying to coordinate with you. It is a hassle for them, in fact. A real-world example was pointed out by Nate when asked to discuss some of the reasons that might cause a person not to own a cell phone at all.

> **Nate:** It's funny [you] ask that because . . . in the band that I'm in, the guitarist and . . . other vocalists [did not] own[] a cell phone for like a year. So we could never reach him and he would just [say] "it's not because I just hate everyone, it's just that I hate everyone." . . . [H]e liked having his time. He knew where he needed to be and what time he needed to be there. People knew where he stayed. He was like "I can't deal with a fast paced life, and that's what a cellphone brings." . . . [S]o he just chose not to have a phone until he absolutely had to.
>
> **Robert Dove:** Why did he have to get a cell phone? Did he have to get a job or something?
>
> **Nate:** Um, no. It's because we started getting more gigs and stuff[,] . . . so we would have to be like "dude, you need to be here in like five minutes for sound check." So we couldn't reach him. You ha[d] to just cross your fingers and [hope] maybe he will show up. I don't know.

Here we see that some people still want to hold off on owning a cell phone as an act of nonconformity. It almost can be viewed as a form of social commentary. A statement that they are not going to assimilate or accept the new normative behavior. The problem with this mindset is that this is how the world now works. Mobile communication has become the dominant form of normative social behavior. As pointed out by Sarah, a cell phone plays an important role in her life.

> **Sara:** Um, I feel like they're really necessary, especially for someone my age. I feel like [when] you reach a certain age, you can get away with not having one, but if you're going to be communicating with anyone or have a career, or anything at this point, I feel like it's necessary. Glitches or no glitches, I feel like a cell phone is very important.
>
> **Robert Dove:** Why?
>
> **Sara:** Um, I mean it's the fastest choice of communication right now. . . . [P]eople are honestly switching over to just texting, [so] if you just have a landline, the immediacy factor is gone. . . . People just want that instant gratification where they're . . . thinking of you, call on you, get in touch with you, problem solved. It's just kind of the policy we go by now and if you aren't on board with that, then you're going to fall a step behind in [a] career, . . . friendships, and social aspects. Or just all parts of your life, I think. It's become so vital.

c. Cell phone Relationship

Sara's statement reflects the sentiment of the respondents that identify with the opposing perspective that view the cell phone as a natural progression in the advances of information and communication technology. The most prevalent themes discussed by the respondents that hold this view is that the cell phone enhances social relationships. Because of the lessening of face-to-face interaction, it could be argued that we may lose certain social skills. At the same time, this would mean that we are learning many other social skills. We are able to interact with more

people, we are exposed to more knowledge, and we are able to associate with more groups. Chris notes that because of cell phones, "you can . . . go on social media and connect with people from all over the world . . . and add any one you want, follow any company you want so [that] the company can talk to you. You can talk to a company or whomever the social media manager is . . . on Facebook. So it definitely changes how we connect with each other."

This observation clearly challenges the notion that mobile communication isolates the individual. Take, for instance, an individual in the U.S. that was born and raised in a small rural town. Earlier in history, they would have been bound by space and time limitations and subject to considerable isolation. Today, however, with access to social media, they would not be as bound. Moreover, it doesn't appear as if any of this is going away. However, what we can do is become more knowledgeable about the issues in mobile communication that concern us and, as we experience them, we can take note, reflect and discuss those issues with others. This process allows us to develop the terminology to realize things that would not be known otherwise.

This study is a prime example. Many of the questions and problems that brands face in terms of how to generate cultural capital are governed by the fact that society has changed fundamentally. In looking for the cause of this transformation, much of it can be explained by the consumer's changing worldview as a consequence of the advances in mobile communication. After reflecting on the respondents answers to the question asking them to discuss the purpose of the cell phone in their lives and the role that it served, it was discovered that the respondent's worldview has evolved. For Kala, it changed how she connects with the rest of the world. "I mean, my cell phone is . . . how I stay connected with my emails because they get sent straight to my phone. So, school-wise, work-wise, things like that, they're updated through [my cell phone]. And I use it for . . . my alarm clock. I use it for listening to music. I use it for my watch, really, because I don't wear a watch. So it's handy."

The same is true for Tom. "As a musician[,] . . . I can share concert dates with people, share photos and videos. I like to do that. . . . I like to be connected with my classmates, my family, and my friends. It plays a huge role in keeping [me] connected with those people who

are supporting me. So, I'm very thankful for that." For Sara, discussed above, Xavier and Eva, the cell phone is both a part of, and changes, their own identity.

> **Xavier:** It's almost like a lifeline to some extent. It's become such an integral part to everything that I do. I mean, communicating with my family, my girlfriend, . . . my friends from California, and keeping up with their lives and stuff like that. [Using it as an] alarm clock[] in the morning. Keeping up with what's going on [o]n the Internet. It's really big in my life. I have to stay organized, like having a planner or . . . a calendar to know what's going on and stuff. It's all, like, there. . . . I think the biggest thing [is that my cell phone] has allowed me to keep in contact with my friends from California when I moved. I think without it, I would have lost a lot of friendships that I still have because I can text them, I can call them, and stuff like that. To that extent I am really thankful. To another extent, it's like eating so much of my time in my life. It's pretty bad. I will just sit there and mess with stuff without getting anywhere, and so definitely a time consumer as well.

> **Eva:** In my life, I feel naked when I don't have my phone, to be honest. I say that all the time. I'd feel like something is missing. . . . I definitely feel attached to my phone . . . and some people would say that, you know, they don't need their phone or that they can put their phone down all day. But I would prefer not to. My friends know me as, "oh she has [my] phone in [he]r hands so she should answer my texts." Which is probably a bad thing in some aspects, but I like to be reliable.

For Maria, the cell phone changes her expectation of immediate contact: "Yes, it does. It's the way I talk to everybody. It's the way I get in touch with everybody. Anytime I need to find somebody on campus, or tell somebody anything, my cellphone is right there and I can do it in ten seconds." For Nick, it changes the way that he conducts business. "I use it to take credit card payments. I use it to text people, to order my shirts, to order [inventory]. Very, very key in my business, and using [it] for promotion[s,] too." For Xena, the cell phone changes how she

manages her coursework. "[I use it] mostly [for] communication for school. It's been really helpful. I can . . . email my professors from anywhere. I can check my homework on our online website from anywhere and figure out what it is I have to do."

d. Brand: Quality & Credibility

What was discovered is that for the respondents that were conditioned the most by cell phones, their expectations of brands are higher. They want brands that play an active role in their lives. It is this type of involvement that engages the respondents where expectations extend beyond the product to a perspective or orientation. An active understanding of how the product translates to their everyday activities:

> **Sara:** I think, honestly, I really like HTC phones. I kind of always have. . . . [T]hey're expensive but they're pretty cool. I look[ed at] one several years ago and I really wanted it. The guy told me basically this phone could run NASA. It was so cool. It had this thing where it detected whether you had water droplets fall on it or rain. If it was raining, it had a windshield wiper animation. It was just really cool and . . . I think eventually I'll upgrade, when I can afford it, to an HTC phone. I like the interface . . . because it kind of relates to who I am creatively . . . .

> **Nate:** I thought I did, but once you're on both sides of the fence, you really learn that the grass isn't always going to be greener on the other side. Because I've had an Android[,] . . . Apple products, I've played around with Blackberry's and [phones] like that. They all are great for certain reasons, and then they all suck for a lot of reasons, too. . . . [A]t this point, if someone said "I will give you any phone that you want," I wouldn't even know what to tell them because I'll be disappointed no matter what in some aspect. On my phone that I have now, I was making beats on there, which is super cool. I've never had that on a phone before. But then there's iTunes, a lack of memory so you can only download . . . so much music, and it's a pain because I'm always listening to music all the time.

Eva: Um, I'm not really into brands. . . . [T]here's a few . . . brands that I would prefer. . . . [B]ut with phones, I guess the idea of an iPhone is cooler than a not iPhone. So having an iPhone, I think, is really cool and I definitely . . . pride myself on having an iPhone and I'd be embarrassed if I didn't . . . with today's society.

Chris: Branding is a major element in choosing . . . your technologies in [the] market. I . . . think everyone's biased in some ways for branding. So I've had an Apple. I've had a Samsung. . . . Apple has its faults. Samsung has its faults. One of the faults for Samsung is the photo gallery. Sometimes it's frozen and sometimes, because of black images, [it] doesn't show up. For Apple, sometimes the . . . operati[ng] system [o]n the phone is so slow. . . . [S]o I . . . just roll with whatever . . . has the capabilit[ies] I need and . . . serve[s] what I need . . . . I'm willing to try to new brands, too.

Xavier: I would say I do have an affinity towards brands. I am pretty loyal to certain types. An example: I am loyal to Sony PlayStation . . . . I'[ve] never really considered getting [an] Xbox or [a] Nintendo. As far as . . . TVs go[,] . . . I know Samsung is a great quality if . . . I am going to get something[. I also have an affinity for brands] in general, [like for] shoes and stuff. As far as phones are concerned I would say that my affinity would also be with Samsung . . . . In my experience, in just working with [cell phones], I don't want to say that I am an anti-Apple person because I have an iPhone, obviously, but Apple is usually not the top of my choices [for] products. I think it's a personal thing. I think it's a functionality thing. I know a lot of Apple products are mainstream, per se, but a lot [of other products are] easier to use and . . . features [on Apple products] aren't [as] customizable . . . .

e. Future

One of the most interesting themes discussed among the respondents was the future of cell phones. This is because many of the responses noted a desire to move away from the

handheld device. Most of the respondents wanted to see some type of holographic imaging interface, whether it be from a watch or the phone's screen. Others spoke of a possible future where the interface translated to an ocular view similar to Google glass or contacts with eye motion functionality.

> **Preston:** Yeah, I'm excited for what the Galaxy S6 is going to look like. Like I said, they've already got the watches now. They're already readily available. But I'm excited about what they're going to put in those watches and the new phones next. Are we going to have . . . holograms like off Star Wars . . . ? I feel like that might be in the near future, where you can just have 3D imaging conversations.
>
> **Kevin:** I think we're going to actually move towards [a] kind of . . . Google glass . . . . I think the user interface is going to get more and more integrated with . . . the way we see the world. . . . [E]ventually the machines we'll be talking directly into are . . . just [going to] respond to voice commands or [there will be] computers in contact lenses. Eventually, you could have computers in your contact lenses, which are putting up menus . . . you can select by where you look . . . . Honestly, that's probably going to be better than touchscreens. . . . [T]he main problem with touchscreens is that you're actually limited to this physical space, you know? This many buttons. But just because [of] the way our eyes work, we can make the buttons smaller and further away. So you can actually fill way more abstract space with just a visual sort of thing. So . . . I think once we move away from the physicality of the device, I think that's what's going to happen next and it's going [to] make me happier, at least. I don't know if it's going to make other people happy.
>
> **Xavier:** I think it's [going to] become more and more [about] features. I think eventually . . . I could definitely see [cell phones] replacing laptops in a lot of ways. I think tablets are hitting that way and pretty soon [cell phones] are going to make tablets useless. I mean shorter downloading [times] and being able to type up a [document], which you can do to some extent [currently]. They're

pretty much a mobile laptop. I think they're going to have enough capabilities . . . that they are going to act as such. Eventually, they're going to become like[what] Google has introduced . . . where you can [have] an ocular view for your phone. It's basically [display]ing in front of your eye. I don't want to say phones are going to become like that . . . [,] but I do think technology is heading that way and phones are [at] the forefront of that.

Nate: I just hope that in the future, given this will probably never happened, . . . they can sort of make a median to where [it mimics] true human, natural social interaction [so that] electronic, social networking interaction, like phone use, can more [co-]mingle instead of [social interaction] being dominated by . . . electronic use. That's my biggest [hope] because sometimes it's . . . good to just be and not have to worry about . . . the device in your pocket . . . . But society makes it [so that] you have to use it all the time and it doesn't matter how you feel about it. So that's my hope for the future with phones.

Peter: It's just a little too much . . . . I think Siri is unnecessary actually. That's something that doesn't need to be in [a] phone, really. No one uses Siri . . . . I would like to see some of the holographic stuff. That would be dope. I always dream of holographic everything. This [is] futuristic stuff.

Tony: Maybe people will walk around with headsets all the time. I don't know how much more advanced it could get. It's already . . . fairly darn advanced. I mean, . . . it will get to the point where there's a . . . hologram or something on your cell phone.

Tom: I have come up with a new design idea that integrates [the] cell phone display to your windshield. A sort of holographic . . . cell phone screen where you can control the mouse through pads on your steering wheel.

Zabrina: I hope one day, phones can project holograms from their screens.

f. Qualitative Discussion

In sum, it is asked how a device known for connecting people to the world understood by dissenters as a tool that causes less social behavior? It doesn't. We now have the ability to access information faster, expose ourselves to more ideas, strengthen long distance relationships and organize our personal affairs more efficiently. Regardless of fears and negative sentiment expressed towards cell phones (social decay, less face-to-face interaction, getting "sucked in"), the positives far outweigh the negatives. Upon further inspection, major holes were found in the arguments of the dissenters, especially the need to be "in the moment" for face-to-face interaction. What does one miss when accessing their phone (in moderation) during social interactions in the physical space? If anything, people are more likely to gain a greater awareness of the world around them, with the ability to access the weather, time, local news, directions, etc. As pointed out by Tom, "I don't think that the cell phone impacted society negatively because . . . there's more information [for] individuals on instant[aneous] basis. So kids can learn quicker[,] . . . people can know what's going on around them, where they are at [at] any time. Just a vast wave of information [being] available has . . . pushed our society to becom[e] more advanced."

VI. Quantitative: Analysis

The following section will discuss the application of sentiment analysis in detail. Here, user-generated posts and comments from Sprint's Facebook page are analyzed in an attempt to pinpoint the role of conveyed sentiment regarding online communication. First it will show how the R packages and tools were used. While doing so, this section works through the base R capabilities and add-ons while applying them to the study. After the discussion of the results of the analysis, the rest of the section seeks to explore the various themes that arise from investigating positive and negative groupings while contemplating it's utility as a viable area of company interest.

As shown in Figure 3, the RStudio interface is the code editor window where the code script can be viewed. Below it is the console window where the code commands are run. To the right of the code editor is the environment tab where active data objects are shown and the

history tab where all commands are stored. Below the environment and history tabs is another multi-tab window with the files tab allowing access to files and folders where the directory is set. The plots tab is for viewing the plot outputs. The packages tab shows the list of all packages installed for any procedures outside of R base functions that may need to be ran. The help tab can be used to access additional information regarding R packages and basic functionality. Upon startup, it is good practice to set the working directory (setwd) when working with multiple files from which R will read. Next, we can import (read.csv) the data set into a data frame in R for analysis. DiscoverText's Facebook graph API was used to collect and archive the data used for this study.[11] The data ranges are from February to August of 2013.

Figure 4 represents a sample of the dataset in spreadsheet format. The "Text" represents either an original post or a comment that was a part of a thread. "ReferenceText" represents the post thread that was referenced or commented under. Before the metadata extraction procedure, all non-ASCII characters (example: º˝˝˝) need to be removed. A procedure was developed and used to tag all of the comments by thread, then used with the seq_along function to create a number sequence to group and order comments by post. Doing so allows for a user defined function that will return the threads with the most frequent occurrences of comments.

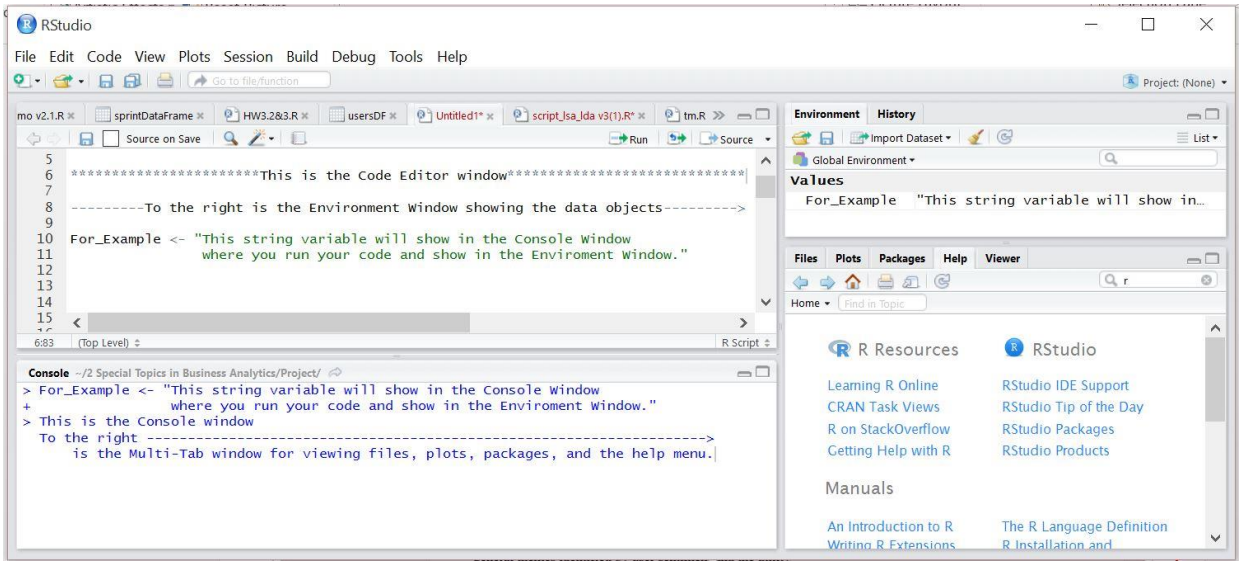


Figure 3. RStudio Interface

[11] http://discovertext.com/

Coded	Text	ReferenceText	DATE	X_M__millitary_time_	timestampM	timestampN	TextID	SequenceID
0	Can anyone tell me where in the bloody world this TR...	NA	2/1/2013	16:46:20	2/1/2013 16:46:20	2/1/2013 4:46:20 PM	NA	NA
0	Sprint's "You're Kinda a Big Deal" promotion is kinda la...	NA	2/1/2013	16:52:07	2/1/2013 16:52:07	2/1/2013 4:52:07 PM	NA	NA
0	Hope I win sumthing!	NA	2/1/2013	16:55:54	2/1/2013 16:55:54	2/1/2013 4:55:54 PM	NA	NA
0	Im paying 90 dollars for a reason, so fix whatever is br...	NA	2/1/2013	17:08:41	2/1/2013 17:08:41	2/1/2013 5:08:41 PM	NA	NA
0	How do you sign up for the Your A Big Deal Sweepsta...	NA	2/1/2013	17:10:08	2/1/2013 17:10:08	2/1/2013 5:10:08 PM	NA	NA
0	http://sprint.promo.eprize.com/sweepstakes/;b=chro...	How do you sign up for the Your A Big Deal Sweepsta...	2/1/2013	17:13:01	2/1/2013 17:13:01	2/1/2013 5:13:01 PM	5	5.1
0	Thanks for your giant mess up. I'm down 370 dollars.	NA	2/1/2013	17:13:17	2/1/2013 17:13:17	2/1/2013 5:13:17 PM	NA	NA
0	When will the blackberry 10 be available ?	NA	2/1/2013	17:15:17	2/1/2013 17:15:17	2/1/2013 5:15:17 PM	NA	NA
0	Thank you for the link but should the email get you th...	How do you sign up for the Your A Big Deal Sweepsta...	2/1/2013	17:19:01	2/1/2013 17:19:01	2/1/2013 5:19:01 PM	5	5.2
0	Wait, Could it be Joseph is upset cause his Milkshake d...	Can anyone tell me where in the bloody world this TR...	2/1/2013	17:36:39	2/1/2013 17:36:39	2/1/2013 5:36:39 PM	1	1.1

Figure 4. Data frame Screenshot

The "Coded" variables are integer representations either of the user (0), Sprint (1) or a sponsor (2). Before conducting the sentiment analysis, it is important to clean the data as much as possible by removing any metadata tags that would otherwise skew the results of the analysis. Through experimentation with common string operations and regular expressions (abbreviated as regex or regexp) from R's base functions, a series of user-defined functions were used to identify, extract and store the metadata.

As depicted in figure 5, the regular expression gregexpr() finds all matches in every string and returns a vector, which is a simple array or list of elements, with the same length as the defined string pattern, known as the input vector. If regmatches() is used in the second part of the argument, it will return a character vector of every string that was matched and unlist() can be used to reveal all of the matches returned. With paste() and collapse= " ", all of the strings extracted with the first two arguments are returned as a collection of strings. The regular expression gsub() will also be used in a user defined function to clean the data of the metadata extracted. After all of the functions are defined, lapply() can be used to apply those functions to all of the observations in a variable.

After extracting the URLs and emails, an additional set of functions were developed to extract, store and remove hashtags and at-signs. Only after the cleaning procedure was applied was the data suitable for Sentiment analysis. For the analysis, two packages were used: (1) plyr, for splitting, combining and applying functions to the data, and (2) stringr, to manipulate the string data (understood as data).[12] After loading those packages, the sentiment scoring function is

[12] https://cran.r-project.org/web/packages/plyr/index.html, https://cran.r-project.org/web/packages/stringr/index.html

```
# Function to extract example
findExample <- function(x){
  m <- gregexpr("input vector", x)
  w <- unlist(regmatches(x,m))
  op <- paste(w,collapse=" ")
  return(op)
}

y <- "this input vector an example of a string with 'input vector' to be extracted"
findExample(y)
[1] "input vector input vector"
# Example function to remove elements
cleanExample <- function(x){
  x <- gsub("input vector", x)
  x
}

y <- "this input vector an example of a string with 'input vector' to be extracted"
cleanExample(y)
[1] "this  an example of a string with '' to be extracted"
```

Figure 5. Coding example

ran as a function first so that it is active for use. Next, the dictionaries are loaded, followed by the csv file. Third, the scoring function is ran in order to match the words in the positive and negative dictionaries to the words of every sentence in each post and comment. After doing so, a sentiment score was derived from the number of "positive" and "negative" word occurrences. In order to do so, an algorithm was employed to subtract the negative word count from the positive word count resulting in the output represented by figures 6 and 7. A large negative score equals a strong negative sentiment. A large positive score means the posts exhibit a strong positive sentiment. Posts that equal zero equate to neutral sentiment (neither) (Breen 2012).

Using RStudio's base hist() function, histogram plots of the sentiment score distributions can now be plotted. The first histogram, as shown in figure 8, is the total distribution of sentiment (users, Sprint, and sponsors). Figure 9, the second histogram, is the distribution of sentiment among the 34,979 users representing the total population sample size for this study. The users in this figure contain slightly less positive sentiment relative to the first histogram containing the total distribution of all posts. Given this fact, it appears the sponsors' and Sprint's comments contain a bias toward positive sentiment. It is important to separate the user's total of 125,959 comments from the 162,123 total comments overall for further analysis.

	score	text
108187	-8	Sprint, I hate to break it to you, but you have let your ...
108461	-8	Randi, the number one issue I have is that I don't get g...
108596	-8	Dear Sprint, I know that everyone in my area is compla...
108680	-8	After months of dropping calls and not able to use dat...
108692	-8	So i commented about your service being horrible yes...
108745	-8	Anyone have ANY clue as to when my POS Sprint servi...
108749	-8	How do I request a transcript of a phone conversation...
108810	-8	Wow... I see that my post has been deleted. I didn't cu...
108938	-8	Sprint is a JOKE and they should be ashamed of thems...
109019	-8	I don't really find my Account being secure a problem. ...
109049	-8	I used to be a Sprint customer and had nothing but pr...
109074	-8	Jaime, don't bother sending another email. It will get pa...
109097	-8	My last post was so long ago I cannot even find it...an...
109156	-8	I live in Tucson and I have the same issues. Can't make...
109159	-8	So disappointed in you Sprint.. never had issues and if...
109643	-8	Can someone tell me pleaseeeee. What is going on. T...
109728	-8	so this is my families second pot because they never d...
110369	-8	FB friends beware!! I have been a loyal Sprint customer...
110456	-8	I don't know where I will go. I think my mechanic said ...

Showing 2,703 to 2,722 of 162,123 entries

Figure 6. Negative Sentiment Screenshot

	score	text
55708	6	You get a 21% discount on AT&T through work! Cover...
58157	6	Thank you for your help. I finally after 2-3 hrs on the p...
58545	6	Wow, Tim! Interesting life you lead! I see that you joine...
60860	6	Ladies and Gentlemen The time is finally here, the Web...
62166	6	Different places offer free devices like Best Buy, etc. Ju...
62433	6	You want, Sprint will in most cases provide you with o...
66908	6	I'm curious what a Nokia Phablet might look like... Thei...
68322	6	Work from home opportunity available for BUSINESS-MI...
69650	6	Original Question: Question: I really think it's bad PR th...
71185	6	Regardless of what people say I have had great Sprint ...
73168	6	Congrats Cochran! You were great, and deserving of t...
74632	6	I love sprint and I have this phone and its awesome...b...
76436	6	which company should i go with if you guys dont like ...
78161	6	Welcome, most of the sunshine state is being upgrade...
78249	6	Usually since the phone has reached EOL (end of life) ...
79574	6	Wow. You aren't even 12 months into your 24 month c...
81136	6	Sprints doing a wonderful job keep up the good work...
81561	6	have been a Sprint customer for over two years after l...
81562	6	have been a Sprint customer for over two years after l...

Showing 266 to 285 of 162,123 entries

Figure 7. Positive Sentiment Screenshot

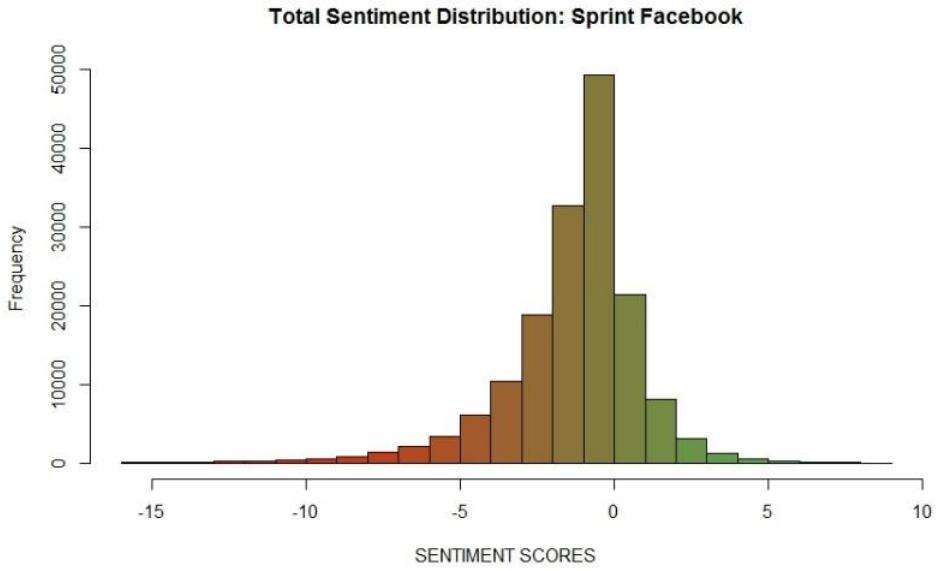


Figure 8. Total Sentiment Histogram

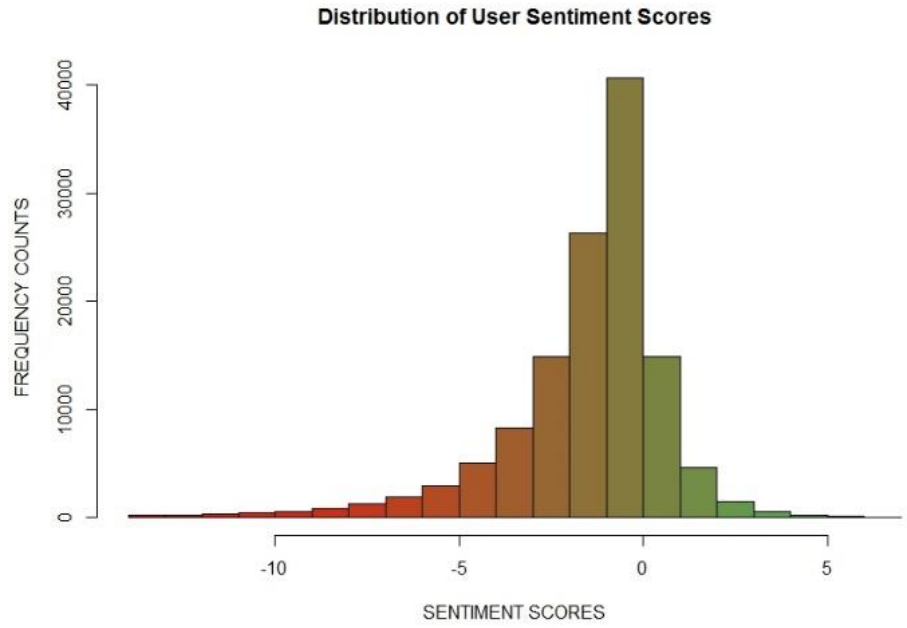


Figure 9. Total User Sentiment Histogram

The sentiment scores allow for an aggregation of the user scores into daily averages, as shown in figure 10. Figure 11, the daily adjusted closing Sprint stock index for the same time period, was also explored to determine any correlation between the sentiment over time and Sprint's company stock value. When plotted together in the correlation scatterplot, there appears to be no positive correlation, but a small chance for a negative correlation. However, as confirmed by the correlation scatterplot in figure 12 and a basic correlation analysis with a Pearson's correlation coefficient of -0.16, there appears to be little to no correlation at all. It should be noted, however, that this is a simple correlation and other variables probably need controlled for, which will be considered for future study.

Turning to industry applications, it would be interesting to know what types of words are used, if the positive and negative sentiments are divided and explored separately, so that a company can identify its user defined strengths and weaknesses (essentially). By creating two Boolean columns in R, the sentiment categories can be separated into both negative (score < = -1) and positive (score > = 1) sentiment scores. With the tm package, they can also be put in their

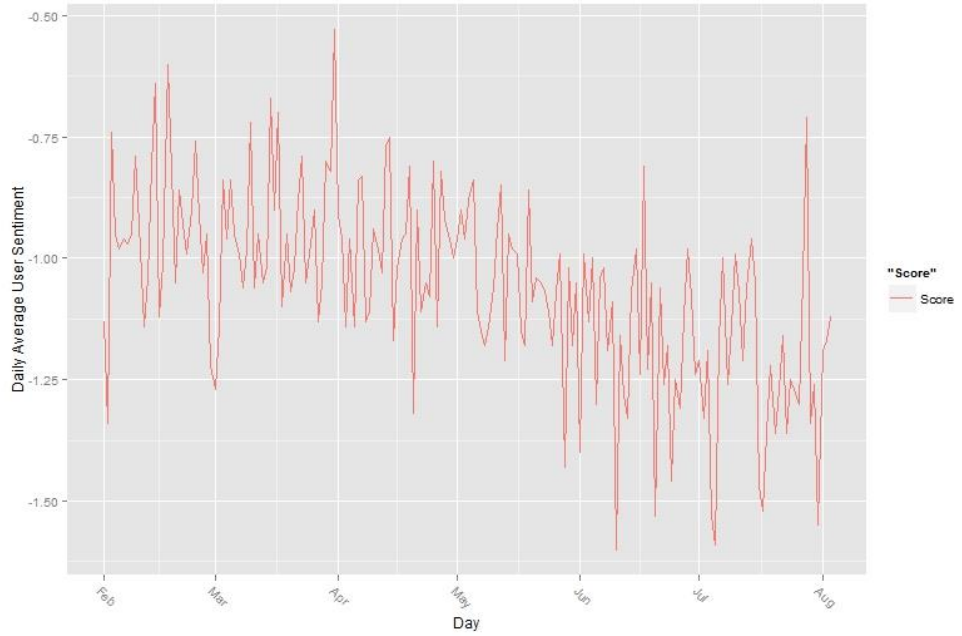


Figure 10. Daily User Sentiment Line Graph

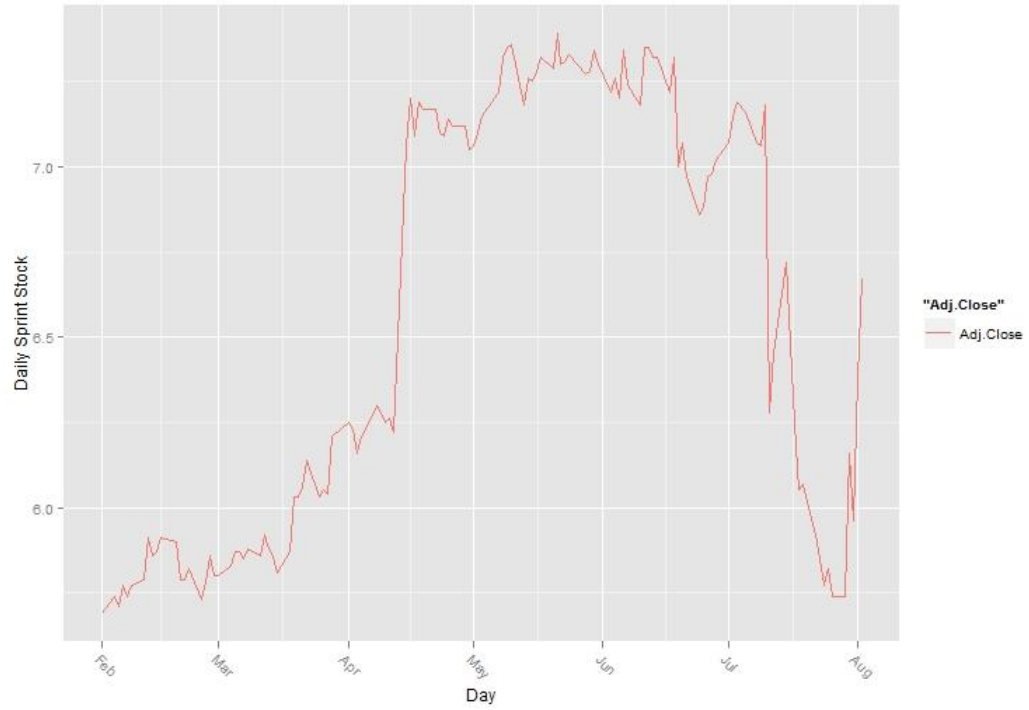


Figure 11. Daily Adjusted Closing Sprint Stock Index Line Graph

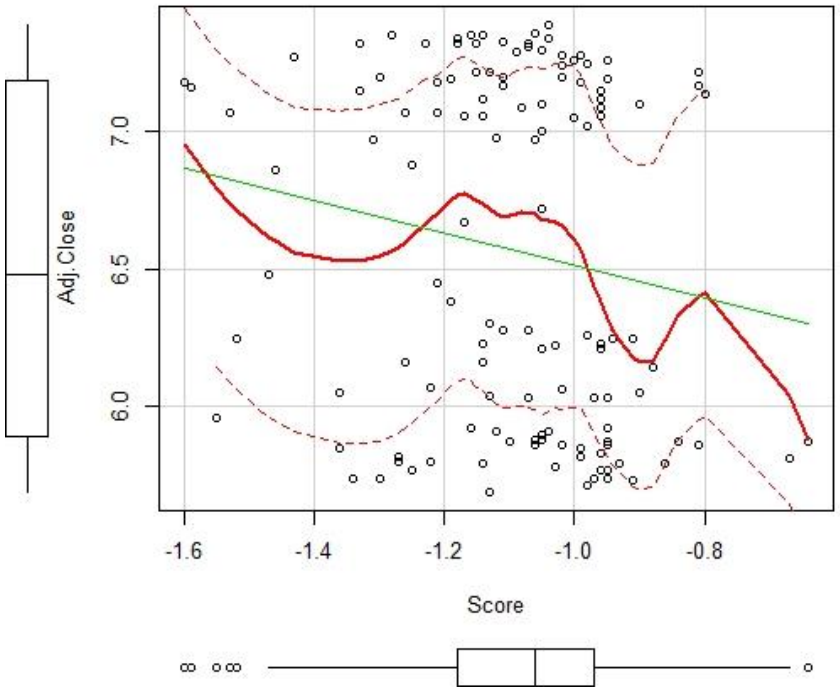


Figure 12. Correlation Scatterplot

respective corpuses (pos.corpus and neg.corpus).[13] Before doing so, with R's scatterplot function, it is highly informative to first examine the cumulative frequency of posts by user, among the 33,798 users, with a sentiment score of either less than -1 or more than 1 sampled from the total user population so that we can determine the nature of posting frequency overall.

In figures 13 through 20 every dot in the scatterplots represents a particular user. Their place along the Y-axis of those plots represents the cumulative number of times that a user has posted a comment. While figures 13, 15, 16, and 19 represent the users with posts that contain negative sentiment, figures 14, 17, 18, and 20 represent the users whose posts contain positive sentiment. For posts scored negatively, there is a total of 63,467 posts among 22,256 unique authors of those posts, as depicted in figure 13. For the posts scored positively, there is a total of 21,850 posts among 11,542 unique authors of those posts, as depicted in figure 14. This means that users who post negative sentiment tend to post more often than users who post positive sentiment. More precisely, on average, a user from the negative sentiment grouping posts 3 times for every 2 times a user from the positive sentiment grouping posts.

Combine that ratio with the fact that the total sample size of users is 33,798, it tells us that around 66% of the users post negative sentiment showing there is a definite problem that must be addressed. Even though the ratio of negative to positive posters looks grim, the negative posts in relation to the entire amount of posts looks more depressing. As a ratio, the 63,467 negative posts amount to 74.39% of the total 85,317 posts analyzed. Not only does this show that people are more likely to post when unhappy, they also post more frequently. But that doesn't show the whole story. The picture becomes clearer with further examination of how frequently the users with negatively and positively scored comments post.

According to physicists and network theorists Albert, Réka and Albert-László Barabási (2002), larger networks tend to feature highly skewed partner or degree (Facebook comments in this case) distributions. Said another way, amongst large networks, only a handful of unique actors tend make the most noise. This is why figures 15 and 17, featuring the 30 most frequently

[13] https://cran.r-project.org/web/packages/tm/index.html

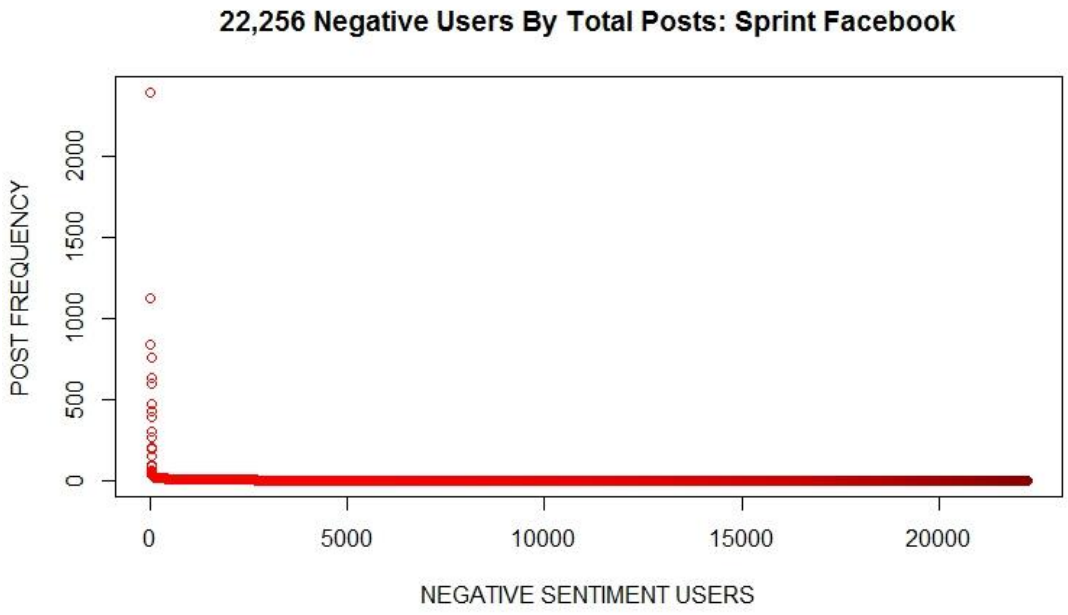


Figure 13. Total 22,256 Negative Users' Cumulative Posts Scatterplot

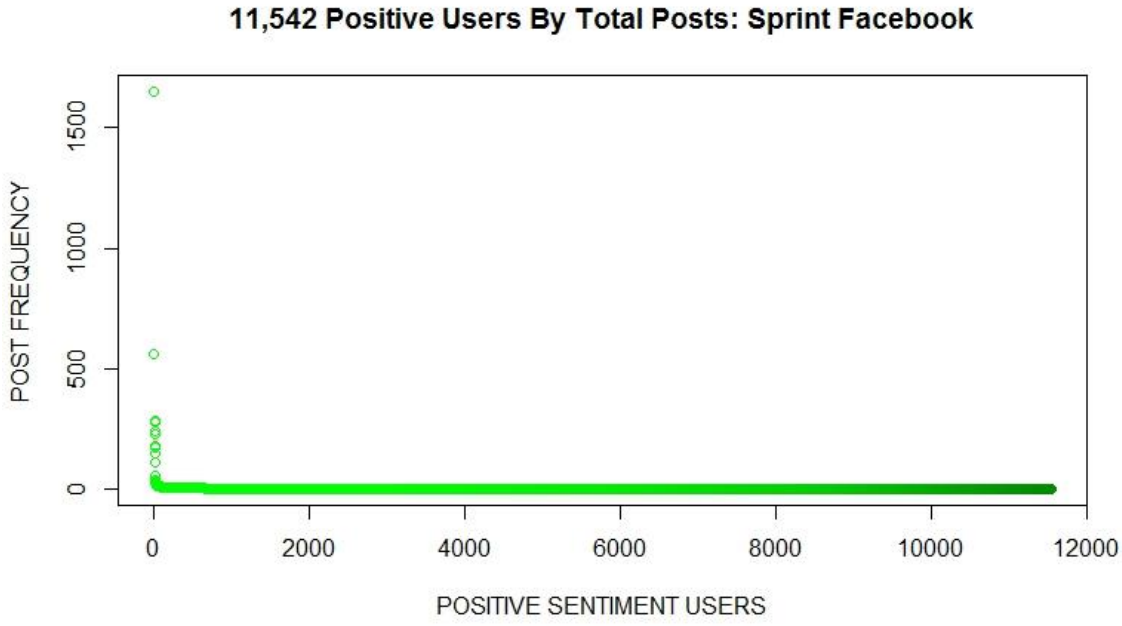


Figure 14. Total Positive Users' Cumulative Posts Scatterplot

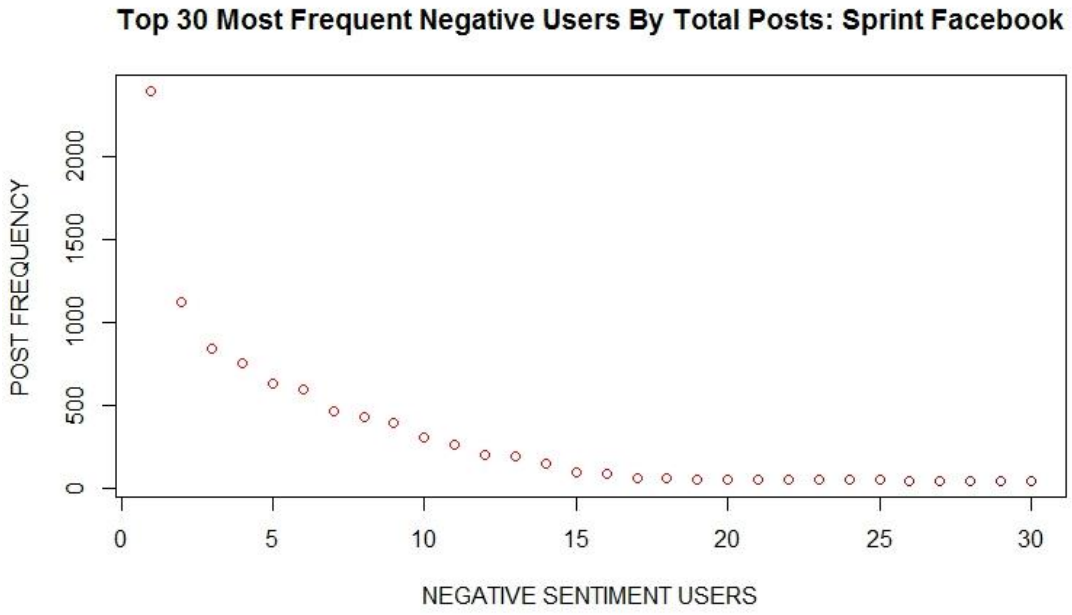


Figure 15. Top 30 Negative Users' Cumulative Posts Scatterplot

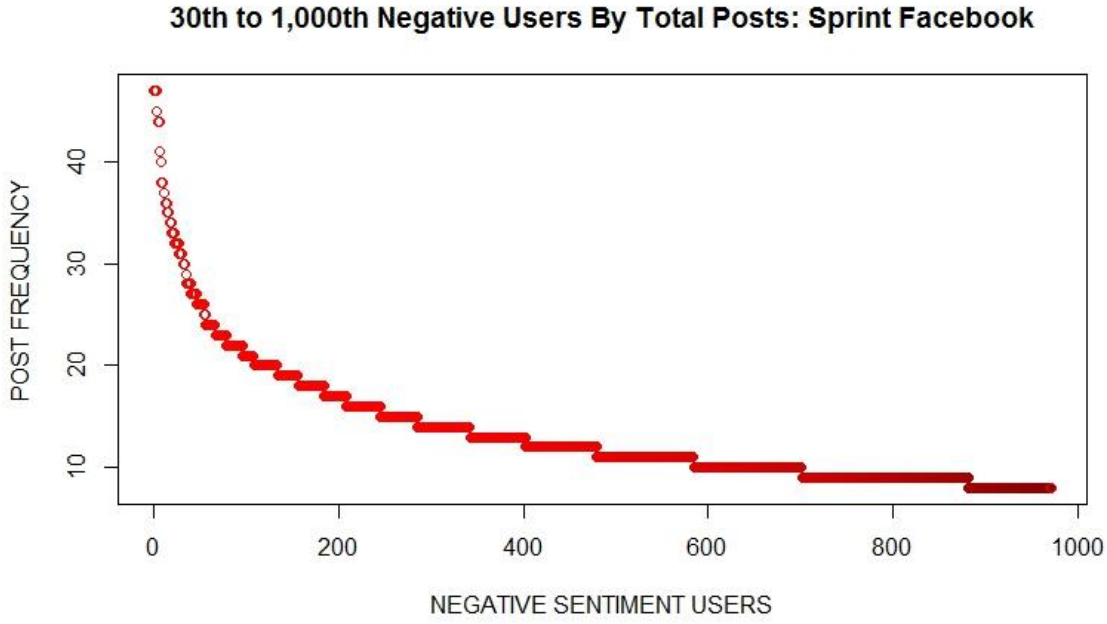


Figure 16. 30th to 1,000th Negative Users' Cumulative Posts Scatterplot

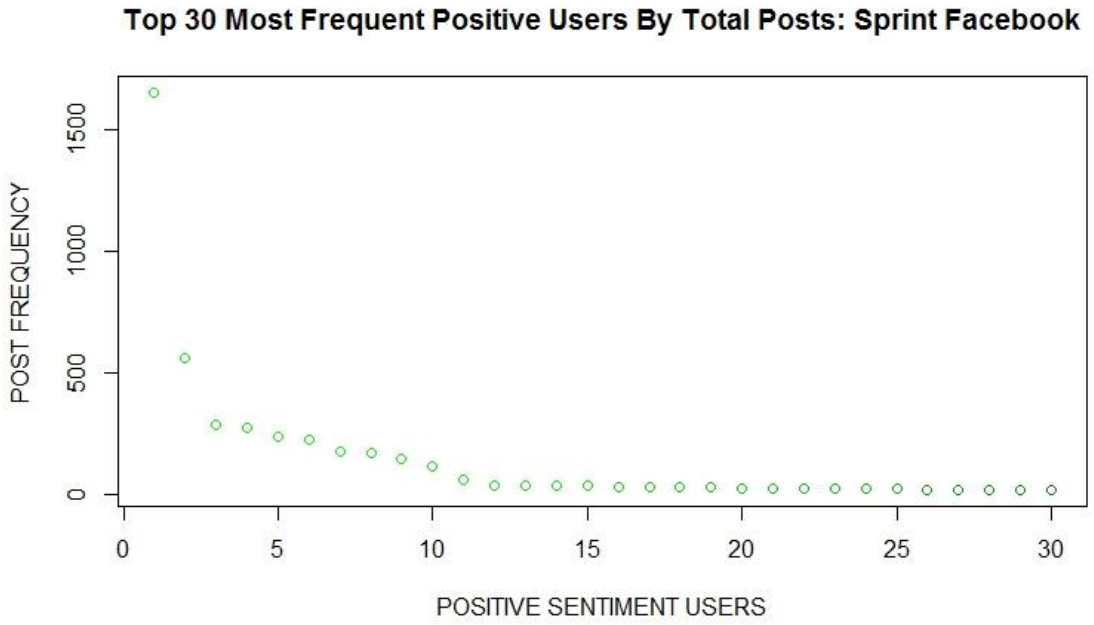


Figure 17. Top 30 Positive Users' Cumulative Posts Scatterplot

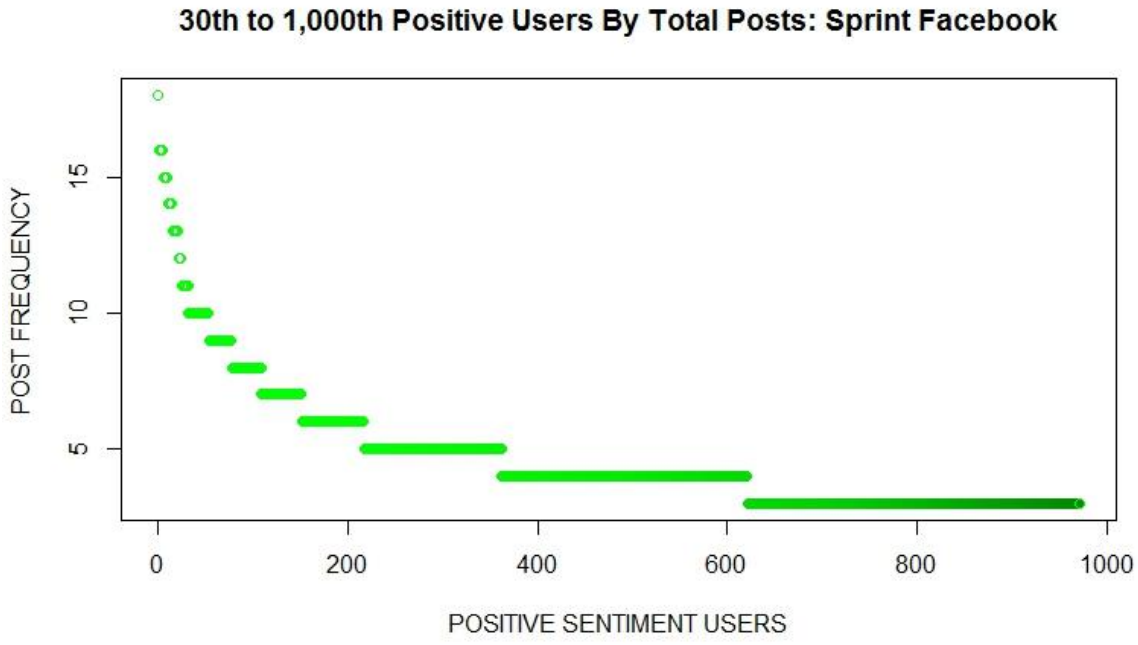


Figure 18. 30th to 1,000th Positive Users' Cumulative Posts Scatterplot

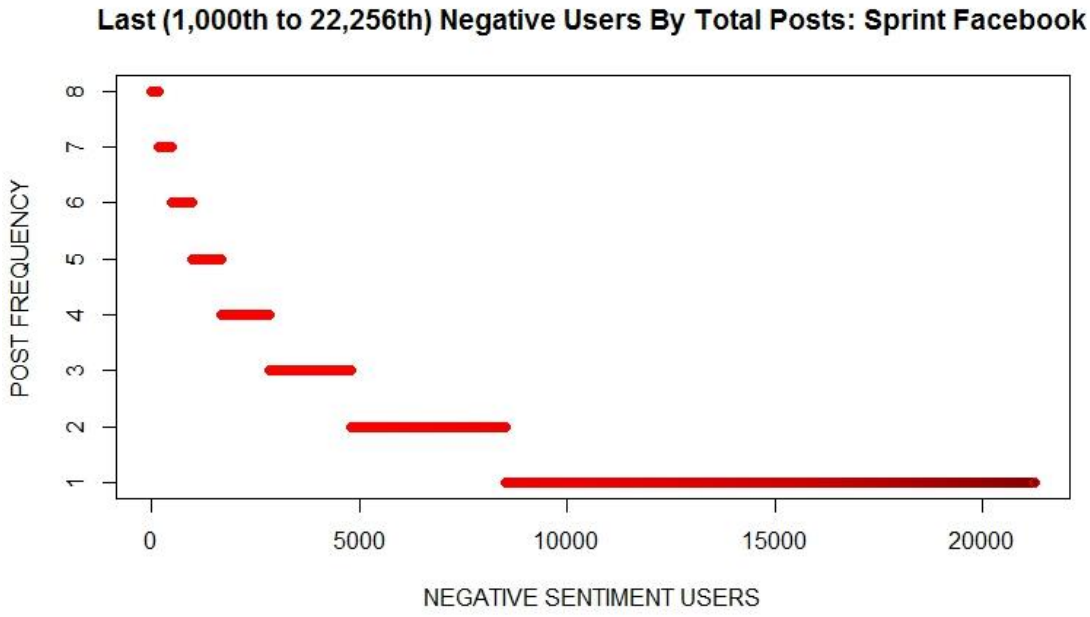


Figure 19. Last (1,000th to 22,256th) Negative Users' Cumulative Posts Scatterplot

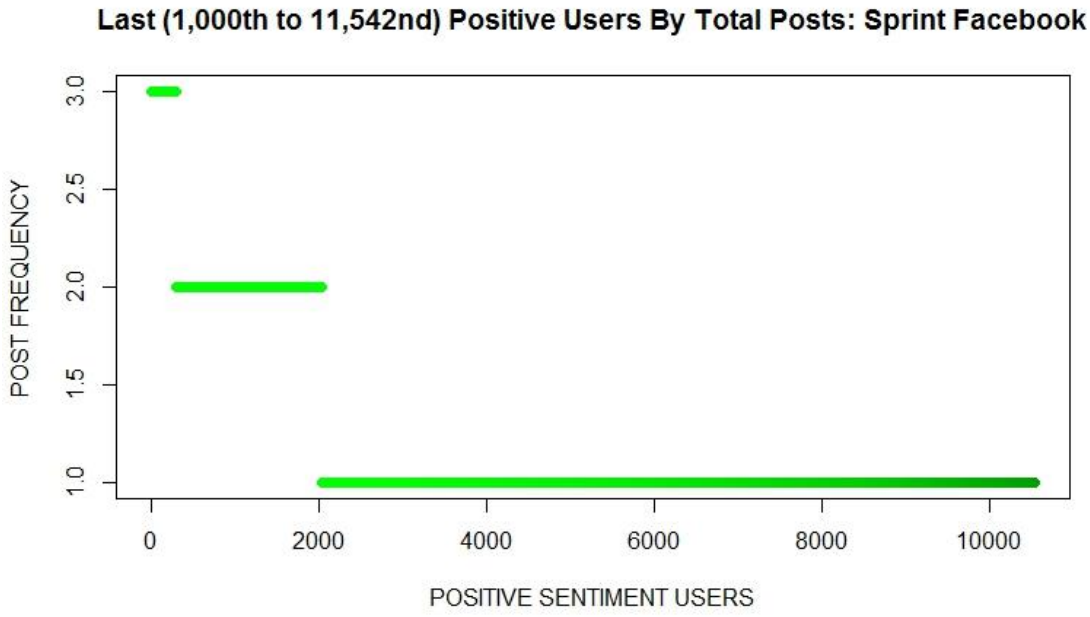


Figure 20. Last (1,000th to 11,542nd) Positive Users' Cumulative Posts Scatterplot

appearing users, and figures 16 and 18, which feature the 30th through the 1,000th most frequently appearing users, are so important. Using the plyr library one can remove the 30 most frequently appearing authors in the data sets. In doing so for the negative sample, the previous total of 63,467 posts drops to 53,821, which means that only 30 users account for 15% of the total number of negative posts. When looking at the percentage of the top 30 negative posters compared to the total number of posts, they represent 11.31% of the total posts on Sprint's Facebook page. After the 1,000 most frequently occurring users in the negative data set are removed, a new total 40,644 emerges, meaning that the top 1,000 users represent over 36% of the total number of negative posts. Further, the top 1,000 negative users account for 26.75% of all posts to the Facebook page, meaning that by addressing that 1,000 people's concerns directly, Sprint could address more than 25% of their social media press.

When the same procedure of removing the 30 most active users in the positive sample is performed, the remaining total of 17,472 posts means that the top 30 users represent 20% of the total positive posts. Even though the top 30 posters account for 20% of all positive posts, they only represent 5.13% of the total number of posts for the Facebook page. By removing the top 1,000 most frequently occurring users in the positive data set, a new positive posts total of 12,862 emerges, which means that over 40% of the overall positive posts come from only 1,000 users. As shown in figures 19 and 20, the last half of the negative and positive samples, the trend discussed earlier that the cumulative number of posts tend to be higher for users who post negative sentiment becomes less pronounced.

So by addressing a relatively small number of users, Sprint could make a huge comeback in branding by offering incentives to the top 30 users and taking special care in addressing all concerns of the top 1,000 users with negative sentiment. It should also be noted that even though the top 1,000 positive users amount to 40% of the positive posts, they still only amount to 10.53% of all posts. In other words, the most efficient way of extinguishing negative social media perceptions would be to address the concerns of the top 1,000 negative users rather than to try to increase the brand value of the company in the eyes of the top 1,000 positive posters. This has been seen in the celebrity branding arena.

In his 2013 Forbes magazine article, social media consultant Andy Karuza notes that "superfans" represent the best secret weapon for any marketing strategy (Karuza 2013). In a study by research firm Hotspex comparing Facebook fans versus non-fans, by investigating product spending habits, loyalty to brands, recommending likelihood, acquisition cost, and affinity toward brands from over than 2,000 participants conducted over the course of a month, results show that a Facebook fan is worth $174 to a brand on average (Wasserman 2013). With this new ability to identify these top priority users/consumers, a business can narrow their focus on turning them into superfans. They could do so by launching campaigns that would ask questions developed from general themes that this study's quantitative sentiment analysis yields.

According to Pew Research Center, findings from a survey study show that 50% of all adults on Facebook have over 200 friends in their network (Smith 2014). If that's the case, imagine, as avid users of Facebook, as the top 30 or top 1,000 posters would be considered, how many more friends these users are likely to have. When everything is considered, addressing the concerns of the top 1,000 negative users could potentially reach over 250,000 individual users or more (upwards of a million users). In addition, activating the already avid posters into super fans can translate to a major reduction in the number of negative posts over time, moving the public sentiment toward a brand to either be neutral or to become positive. Considering the growth of advertising on social media, based on a rudimentary analysis of whether someone looked for an item on Google, EBay, or Amazon, regardless whether the person has a positive or negative view of the item searched for, this type of sentiment analysis allows for a unique understanding of what the person wants to see and why they want, or don't want, to see a specific brand of merchandise.

Changing directions, word clouds can give a basic visualization of issues allowing for a company to know better how to address a specific customer's concerns. Moreover, with an N-gram analysis, one can explore the context behind specific words and word phrases. For better clarity in uncovering general themes among the text, data scientist Yanchang Zhao (2012) notes that it is important to clean corpuses by removing numbers, punctuation and stop words (common English words that distort the analysis such as: I, she, he, to, the, it, that, etc.), followed by converting all words to lower case (2012, 107).

In using the world cloud package, a word cloud for each corpus can be produced to observe the most frequently used words within each corpus.[14] The negative and positive word clouds, seen in figures 21 and 22, feature 100 of the most frequently used words. The larger the word appears, the more frequently it was mentioned. Nevertheless, word clouds represent the most basic type of visualization. Using a tokenizer approach from the package RWeka (machine learning algorithms for data mining tasks) allows for the ability to create four N-grams: 1-gram, 2-gram, and 3-gram, and 4-gram phrases. [15] By looking at the most frequent 1-grams from the negative corpus, Verizon was listed as the most frequent mentioned competitor. The find associations (findAssoc) function can be used to find the most frequent words associated with the provider. In doing so, as shown in figure 24, the top action verbs associated with Verizon are "switch" and "switched." Based on this trend, we could say that a campaign comparing the benefits of switching to Sprint to the disadvantages of switching to Verizon is needed.

The first impressions of the results from an N-gram analysis reveal that N-grams from the negative corpus include very clear and direct negative sentiment, especially when all four negative N-grams, shown in figures 23 and 25 through 27, are explored in relation to each other. The bigrams "no service" and "dropped calls" are easy to classify as negative, but "customer service" leaves something to the imagination. However, trigrams of "worst customer service," "poor customer service" and "horrible customer service," as well as the second most mentioned quadrigram, "worst customer service ever," confirms the negative sentiment was directed toward customer service. While other issues, such as upgrading the towers to 4G LTE and installing more towers, are obvious priorities of any network provider, all Sprint has to do, in this case, is contact the top 1,000 posters and ask them to articulate their concerns with customer services. Doing so would make customers feel more appreciative of the company's service (Dholakia, et al. 2009). The reason why the accuracy for the negative sample is higher than that for the positive one may be due to the sample size of the negative sentiment corpus relative to the totality of all posts. Nevertheless, customer service appears to be the biggest issue that Sprint should address for its high priority and most efficient solution for social media management.

[14] https://cran.r-project.org/web/packages/wordcloud/index.html
[15] https://cran.r-project.org/web/packages/RWeka/index.html

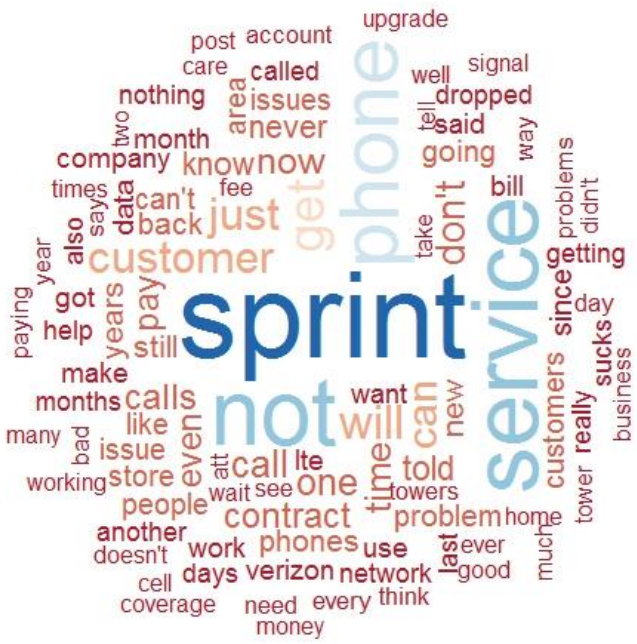


Figure 21. Negative Corpus World Cloud



Figure 22. Positive Corpus World Cloud

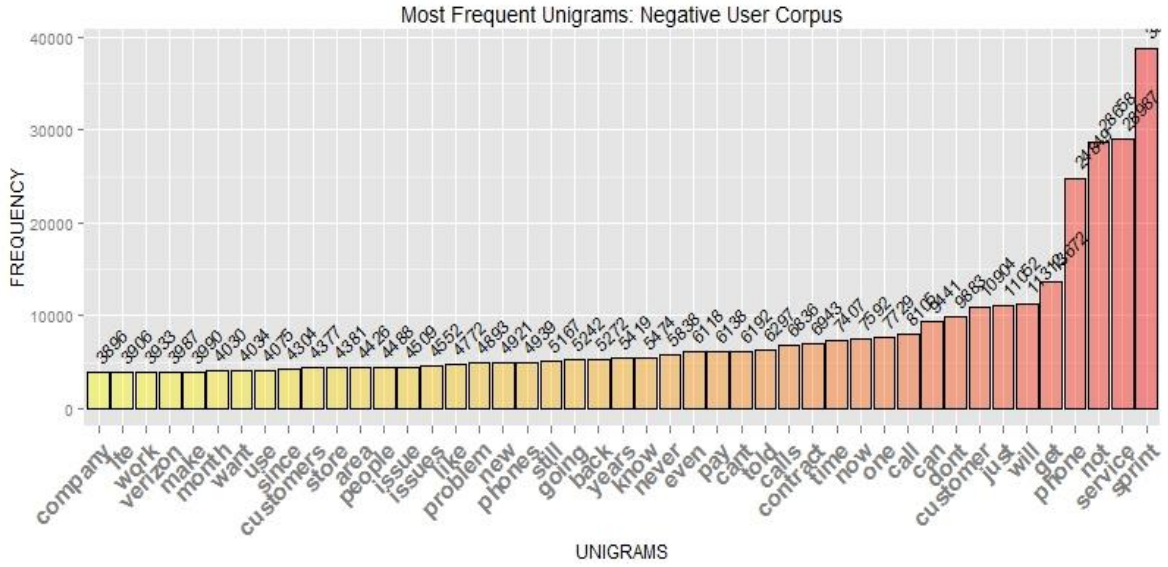


Figure 23. Negative Corpus 1 N-gram Bar Plot

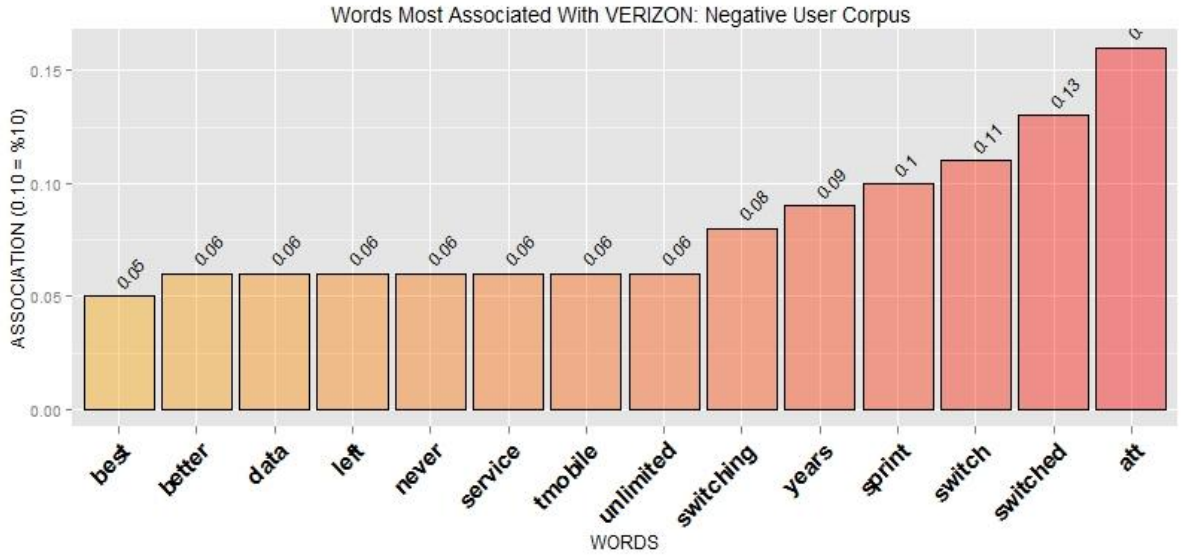


Figure 24. Negative Corpus "Verizon" Word Associations Bar Plot

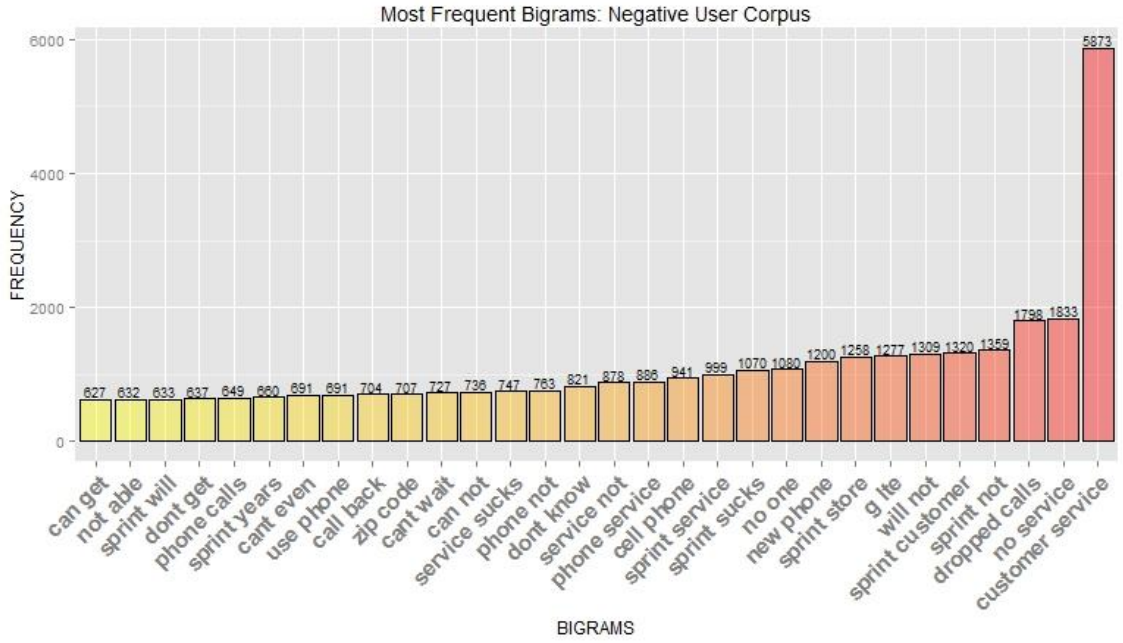


Figure 25. Negative Corpus 2 N-gram Bar Plot

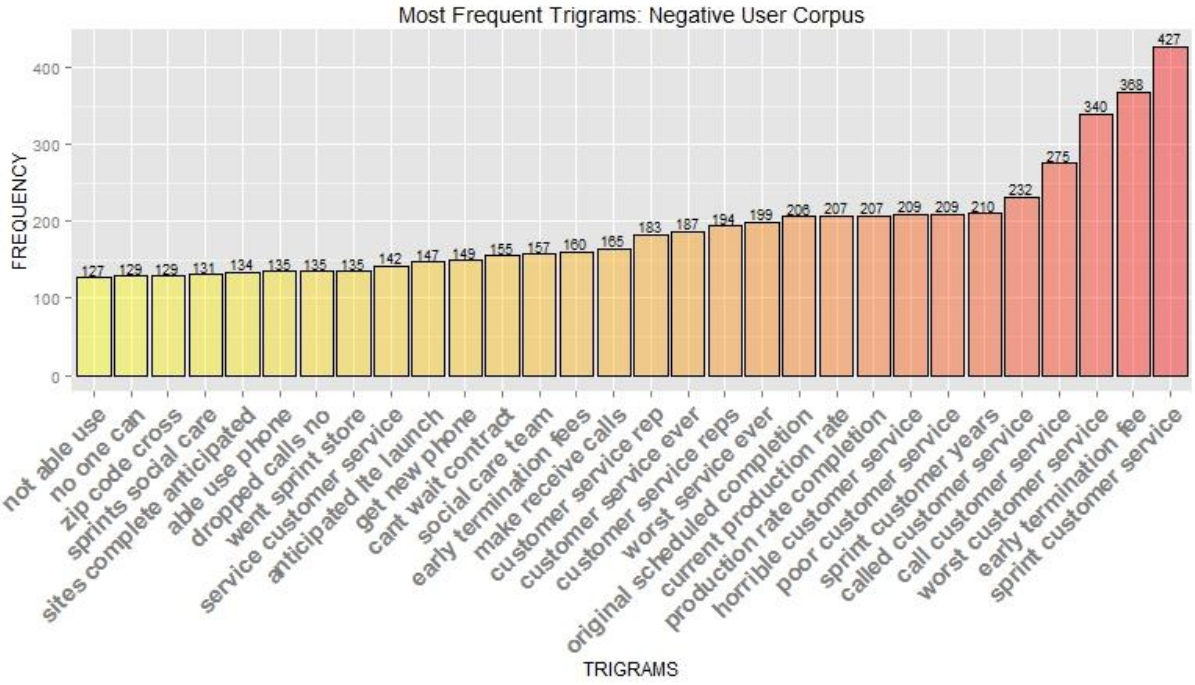


Figure 26. Negative Corpus 3 N-gram Bar Plot

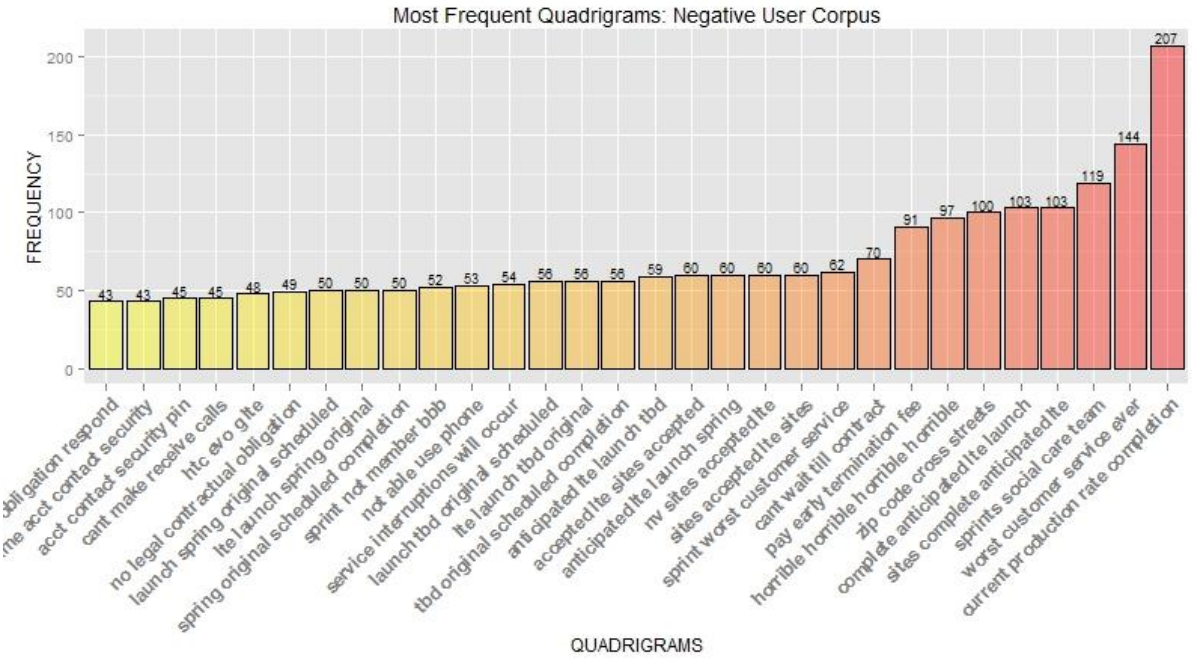


Figure 27. Negative Corpus 4 N-gram Bar Plot

With regards to figures 28 and 29, visualizing the positive unigrams and bigrams, cellular network site upgrades and customer service appears to be most frequently discussed issues. Moreover, it is difficult to tell why most of the N-grams were classified under the positive sample. With a word associations list, by using the find associations function on the positive sample with the word "service", as shown in figure 30, the associated words "area", "coverage" and "sprint" confirms that cellular network sites are discussed just as much as customer service.

When examining the most common trigrams and quadrigrams, as shown in figures 31 and 32, at first glance, the top ranked phrases associated with the words "vision", "completion" and "production" were difficult to discern precisely what they were referencing. Through further examination, by creating frequent association lists, a clearer picture begins to take form. For instance, the words associated with "vision", as shown in figure 33, are "network", "sites", "lte", "towers" and "upgrades", implying that network vision upgrades are Sprint's cellular network sites.

Similarly, the words associated with "completion", such as "sites", "rate", "process", "towers", "upgrade" and "upgrades", as shown in figure 34, means that "completion" is referring

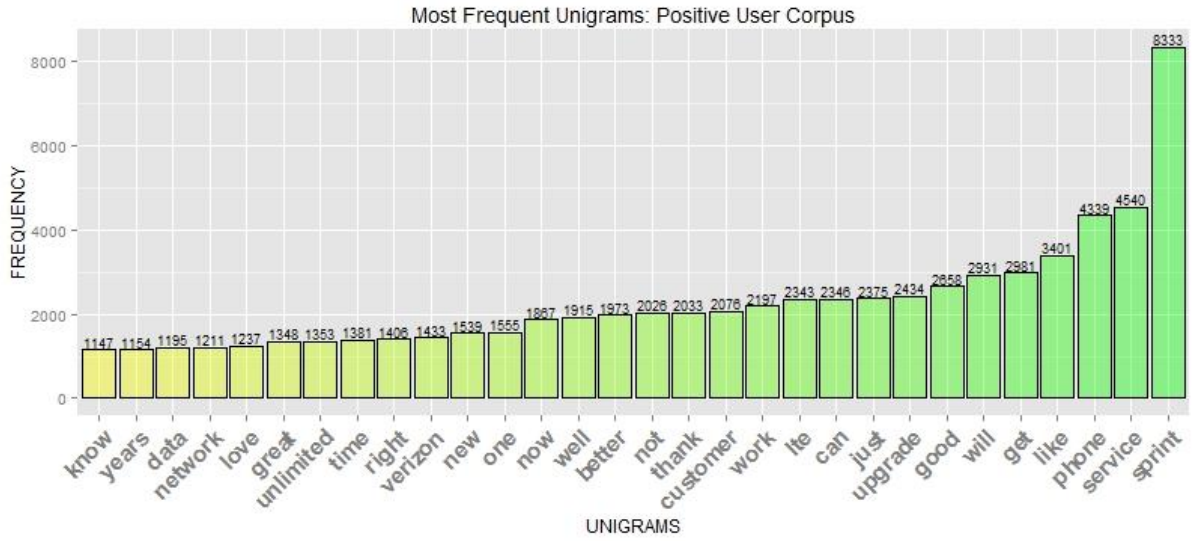


Figure 28. Positive Corpus 1 N-gram Bar Plot

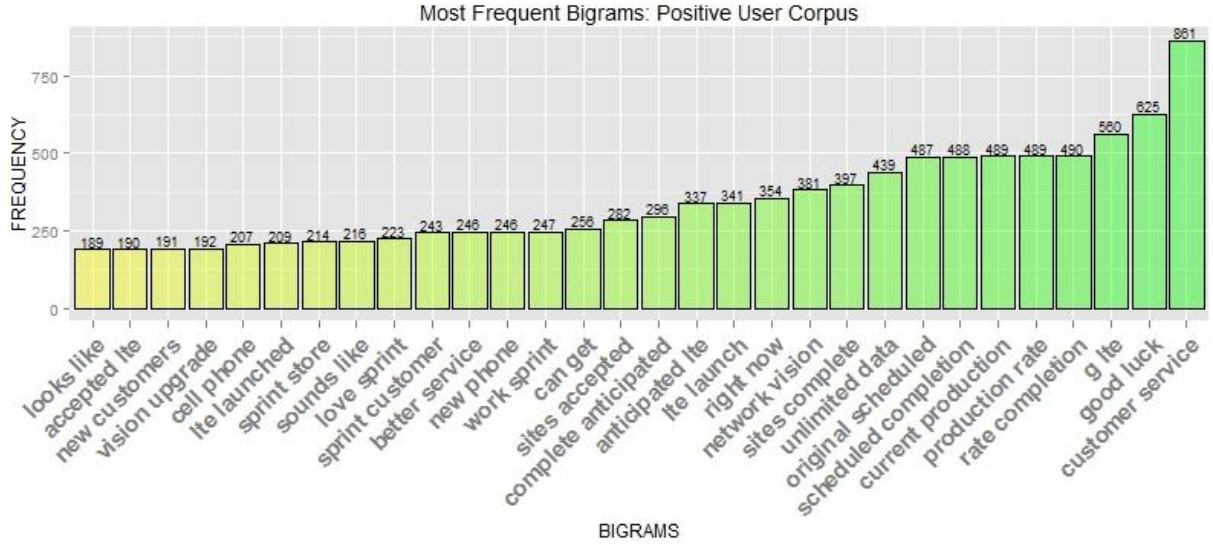


Figure 29. Positive Corpus 2 N-gram Bar Plot

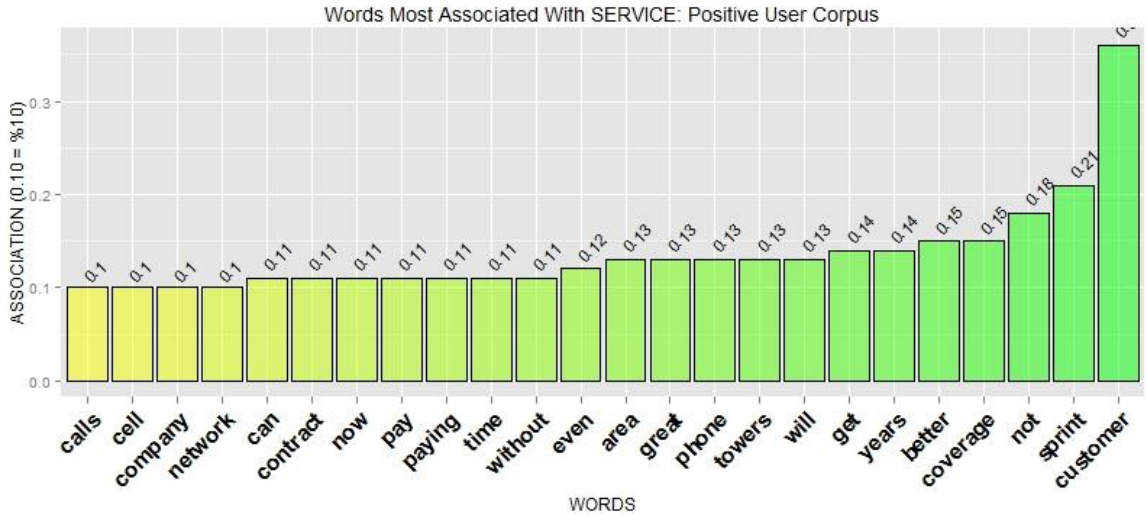


Figure 30. Positive Corpus "service" Word Associations Bar Plot

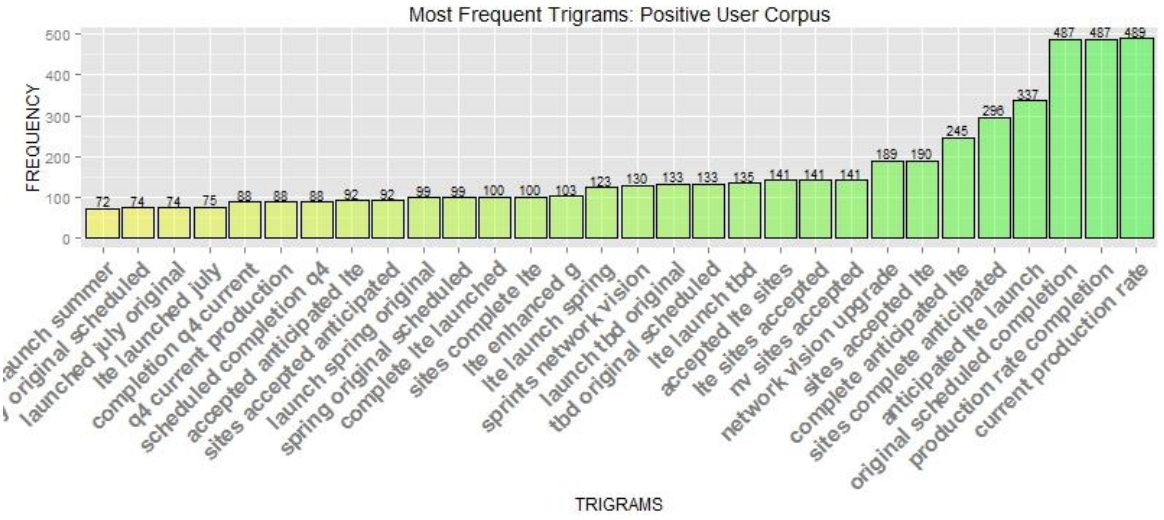


Figure 31. Positive Corpus 3 N-gram Bar Plot

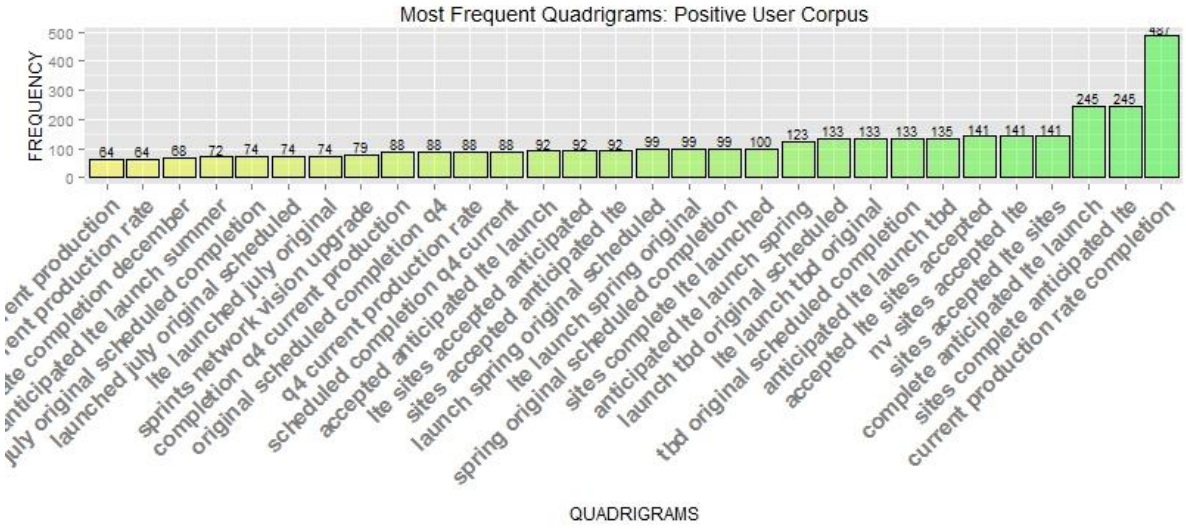


Figure 32. Positive Corpus 4 N-gram Bar Plot

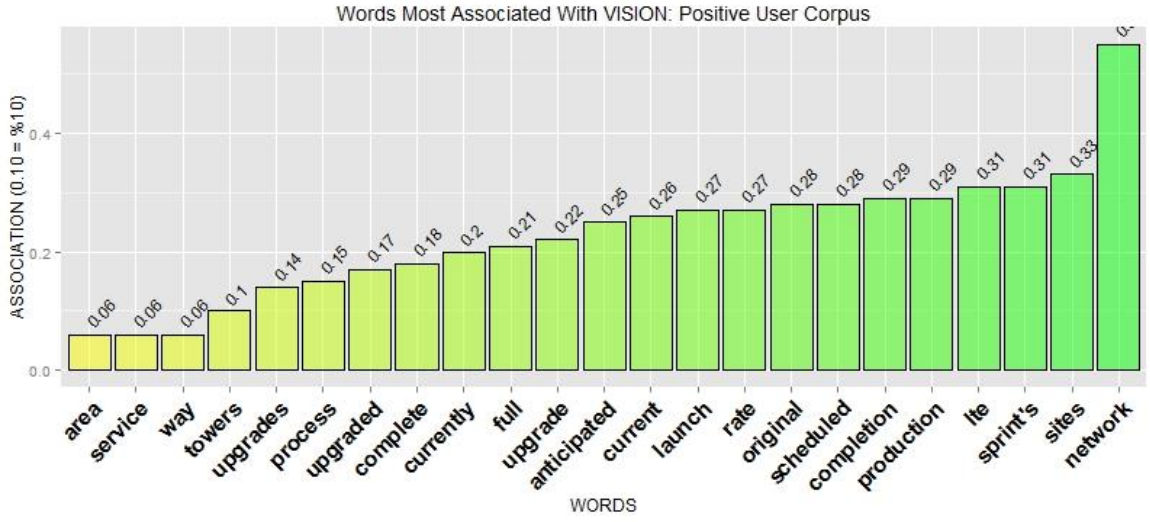


Figure 33. Positive Corpus "vision" Word Associations Bar Plot

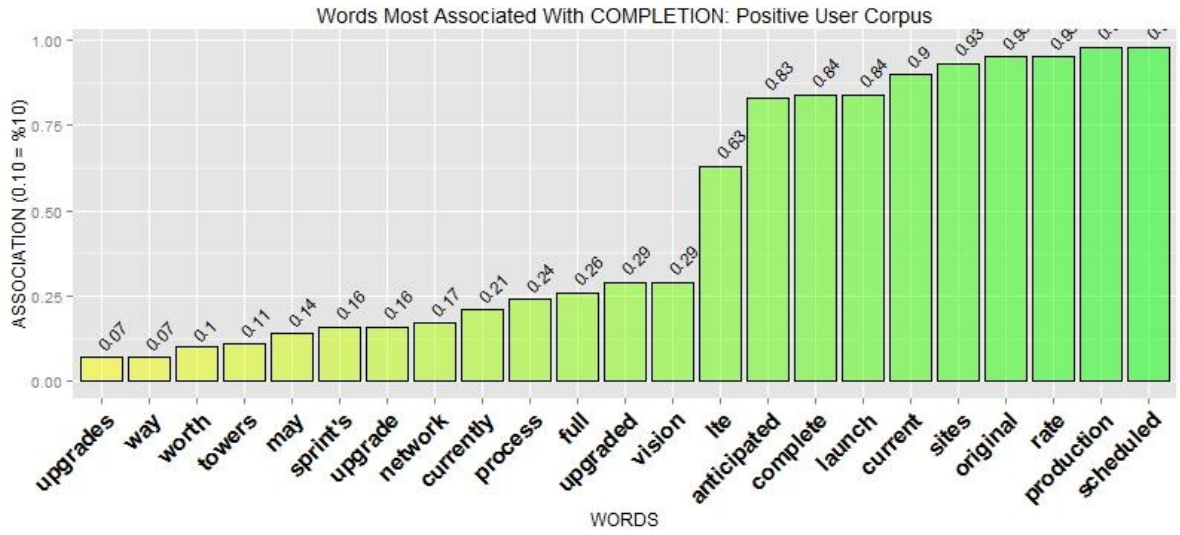


Figure 34. Positive Corpus "completion" Word Associations Bar Plot

to the upgrading of Sprint's cellular network. Also, figures 35 and 36, showing the frequency associations bar plots for "launch" and "production", confirm the discussion trend since they are associated with "vision" and "completion" and their word associations contain the same type of terms. The fact cellular network upgrades is the most frequently discussed topic shows that Sprint would benefit by increasing engagement with customers, specifically articulating the progress of cellular network upgrades in greater detail and more often when launching new comment threads.

VII. Conclusion

In conclusion, a purely quantitative approach cannot address the everyday pressures of family members, friends and employers in shaping consumer perceptions, responsibilities and preferences regarding cell phones that a qualitative approach can. However, it does allow for a general overview of a company brand's image, general themes, emotion and sentiment. As social media platforms allow customers to engage more with each other, the act of generating influential content confirms the theoretical concept that consumers create meaning around company brands as they interact with them as a definite fact in today's age (Sherry 2005, 40-49). Therefore it has become essential for companies to actively monitor and engage with customer conversations on social media. Employing the methods discussed in this study, a company can

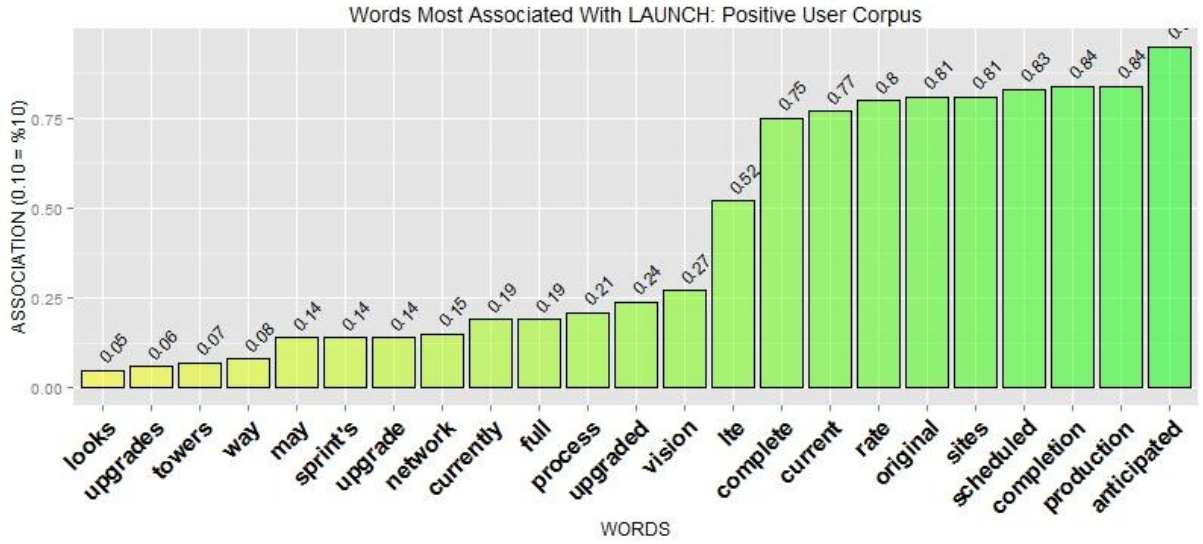


Figure 35. Positive Corpus "launch" Word Associations Bar Plot

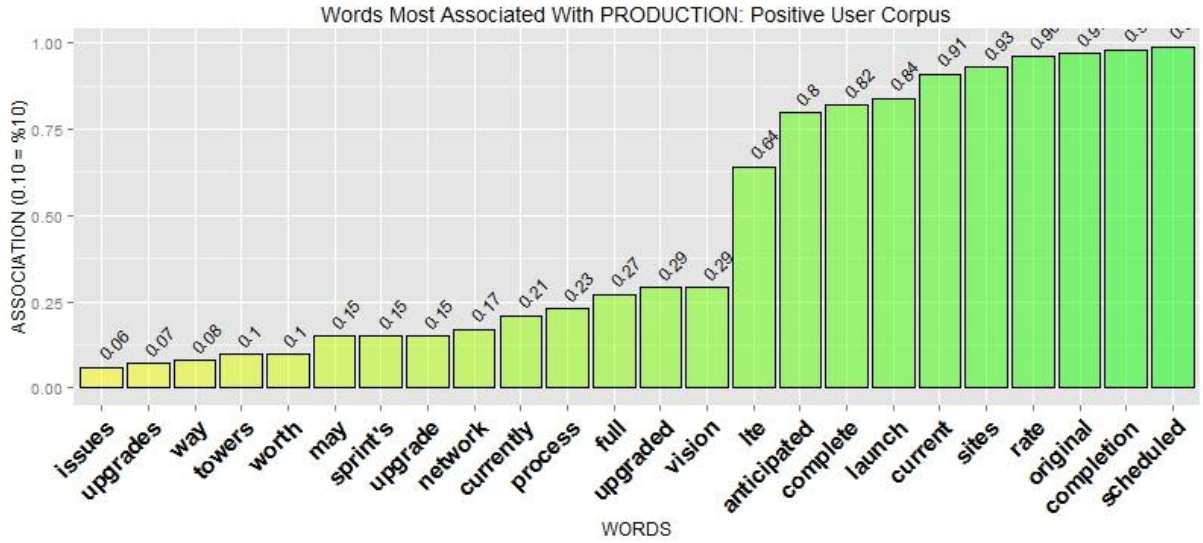


Figure 36. Positive Corpus "production" Word Associations Bar Plot

gain a general overview of consumer's perceptions of a company brand's image, general themes, emotion and sentiment. Future work will employ ways to evaluate the accuracy of scoring for clearer comparisons. Additionally, since N-grams seem to represent the general nature of the negative and positive sentiment groupings, they will be used in future studies as a source of word prediction. The samples for this study include up to 4-gram frequencies that can be used in a predictive language modeling. What was realized from this study is the need to first use a quantitative approach to gain a general understanding of public sentiment. Then, with these general understandings, a qualitative approach, like focus groups or an interviewing technique, can be used to drill down and pull the details of those findings from consumers. Doing so allows company brands to gain a more nuanced view of the consumer. More importantly, by actively tracking customer behavior, companies can use this information to address consumer complaints and concerns and strengthen consumer dialogue.

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