

How do ‘big birds’ tweet about CSR?

Exploring the corporate social responsibility communication characteristics and strategies of four large IT companies on Twitter



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Research Integrity Form - Master Thesis

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How do 'big birds' tweet about CSR? Exploring the corporate social responsibility communication characteristics and strategies of four large IT companies on Twitter

Brief description of the study:

This study investigated how companies use social media for CSR communication in this moment of time. In doing so we researched the CSR communication on Twitter from four large multinationals from the information technology (IT) industry.

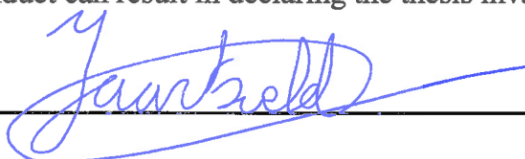
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Abstract

The introduction of the internet and different social media enabled people to find and share almost anything, almost anywhere, with almost anyone. The ever-increasing diffusion of internet (Internet World Stats, 2017a; Internet World Stats, 2017b) and these social media (Statista, 2017a; Statista, 2017b) around the world make them useful broad-based tools for companies, whether it is to disseminate information or engage in a conversation with various stakeholders. Within the context of these changes in communication, people have grown to have social and ethical expectations of companies (Moreno & Capriotti, 2009). With this being the case, corporate social responsibility (CSR) has become a popular topic. CSR deals with ‘the continuous commitment by businesses to make proactive efforts to improve the quality of life of the community and society at large (both ecological and social)’ (Cho, Furey, & Mohr, 2017; World Business Council for Sustainable Development, 1999). To be successful and fulfill the expectations of stakeholders, communicating the CSR agenda and CSR efforts in the right way is key (Dawkins, 2005), bringing us to the importance of corporate CSR communication. Companies nowadays will have to engage in effective CSR communication to gain the trust and likes of the public, increasing image and reputation, ultimately ensuring corporate survival (Dawkins, 2005). In recent years, much has changed in the communication context, and social media bring both great potential as well as great challenges for corporate CSR communication. Previous studies have looked into CSR communication in social media (e.g. Capriotti, 2011; Colleoni, 2013; Etter, Plotkowiak, & Stanoevska-Slabeva, 2011), however, it is not clear how (large) companies use social media for CSR communication at this point in time.

This is why this study investigated the situation and portrayed to what extent large multinationals use Twitter for CSR communication. The results suggest that these large multinationals perform well when it comes to CSR communication intensity, using interaction, and using sentiment in their CSR communication. However, the results show these large multinationals fall behind on the aspect of responsiveness in their CSR communication. These CSR communication characteristics make that the overall coordinated CSR communication strategy used is not ideal, and should be changed by companies improving their CSR communication responsiveness.

Keywords: corporate social responsibility (CSR), CSR communication, social media

1. Introduction

1.1 Introduction

Ever since the introduction of the internet and social media, stakeholder's and general society's awareness has been dramatically enhanced (Colleoni, Arvidsson, Hansen, & Marchesini, 2011). The internet and different social media enable people to find and share almost anything, almost anywhere, with almost anyone. The ever-increasing diffusion of internet (Internet World Stats, 2017a; Internet World Stats, 2017b) and these social media (Statista, 2017a; Statista, 2017b) around the world make them useful broad-based tools for companies, to disseminate information, (try to) control image and reputation, and communicate with various stakeholders. The introduction of the internet and different social media, like Facebook and Twitter, subsequently contributed to a great change in communication, moving from a one-way communication model to a two-way communication model (Capriotti, 2011). Traditionally, companies were merely disseminating information (for example, through television and advertising), and stakeholders were simply receiving this information (Capriotti & Moreno, 2007). But with the increasing popularity of social media, it enabled stakeholders not only to be passive receivers anymore but to engage in, for instance, the creation and evaluation of content (Dellarocas, 2003). This kind of 'empowerment' can be partly explained through a greater consumer access to information and media outlets than ever before (Kesavan, Bernacchi, & Mascarenhas, 2013). Especially the introduction of these different social media, like Facebook and Twitter, enabled, or maybe even pressured companies to engage in a dialogue with different stakeholders, because of their changed role in the whole communication process. Another interesting thing about social media is that it is increasingly perceived by consumers as being a more trustworthy source of information and knowledge than traditional media, such as television and advertising (Foux, 2006).

Within the context of these great changes in communication, people have grown to have ethical expectations of companies, along with a set of social responsibilities they expect companies to fulfill in society (Moreno & Capriotti, 2009). With this being the case, corporate social responsibility (CSR) has become a popular topic. CSR deals with 'the continuous commitment by businesses to make proactive efforts to improve the quality of life of the community and society at large (both ecological and social)' (Cho, Furey, & Mohr, 2017; World Business Council for Sustainable Development, 1999). This suggests that companies will have to engage proactively in setting a CSR agenda and making efforts for this matter. However, the deception here is that it is actually not sufficient for companies to merely engage in setting a

CSR agenda and making CSR efforts. To be successful, and fulfill the expectations of stakeholders and the more general public, communicating the CSR agenda and efforts in the right way is key (Dawkins, 2005), bringing us to the importance of corporate CSR communication. Companies nowadays will have to engage in effective CSR communication to gain the trust and likes of the public, increasing image and reputation, ultimately ensuring corporate survival (Dawkins, 2005). In recent years, much has changed in the communication context, and social media brings great potential for corporate CSR communication.

Despite all the aforementioned facts, most companies still use the internet and social media as if it were traditional media, to (only) disseminate information for corporate self-presentation. This is the case, because of great fear of stakeholder's skepticism (Insch, 2008). Opening up about CSR is a very sensitive issue because it can have a major impact on a company's image and reputation. If companies do open up about CSR in social media, "they open the arena for possible criticism and face the risk of attracting critical stakeholders that openly question the legitimacy and harm the reputation of corporations." (Etter, 2013, p. 608). In this case, the same characteristics from social media which can bring forth benefits (things like open access and interaction, enabling an open dialogue), can also work the other way around, and prevent companies from aiming for interaction with their stakeholders about different CSR issues (Etter, 2013). Therefore, using social media for corporate CSR communication means both great potential as well as great challenges to companies. Companies, now more than ever, need a strategy on which content is used and how to present their CSR commitment towards stakeholders (Dawkins, 2005). This is what the theory states about the matter at hand, but the question is: How do companies actually try to reap the benefits from using the power of social media for CSR communication?

Although there are different communicational strategies for companies to choose from, which have all received substantial attention (Capriotti & Moreno, 2007; Dawkins, 2005; Etter, Plotkowiak, & Stanoevska-Slabeva, 2011; Morsing & Schultz, 2006), there still remains a lack of knowledge about these strategies in the context of social media. The literature describes strategies varying from classic theory, focused on communicating through traditional media such as advertising and television, to communication strategies that are more specific about the use of internet or even social media. One clear distinction that can be made between different strategies is the direction of communication. As previously suggested, companies will have to try and move away from the more traditional one-way model of communication, focused on information dissemination and control, to a more integrated CSR communication strategy, based on dialogue and interaction (two-way model of communication). There have been

previous studies (e.g. Capriotti, 2011; Colleoni, 2013; Etter, Plotkowiak, & Stanoevska-Slabeva, 2011) looking into CSR communication in social media, however, these date back some years now, as far as to 2013. Since 2013, much has changed in the number of internet and social media users, and therefore possibly also in CSR communication characteristics and strategies. To illustrate this point, between December 2013 and June 2017, the number of worldwide internet users has grown by 38.7% (Internet World Stats, 2017a). When looking at the use of different social media, like for example Twitter, we also see a growth since these earlier studies. To explicate, between Q3 2013 and Q3 2017 the number of active Twitter users worldwide per month has grown by 42.4% (Statista, 2017a). When we make the same comparison for Facebook, we see that the number of monthly active worldwide users has grown by 68.7% (Statista, 2017b) from Q3 2013 to Q3 2017. This demonstrates the need to extend earlier research on CSR communication in social media into this moment in time.

As discussed, we want to extend these earlier studies into this moment in time, to see and describe how companies use social media for CSR communication nowadays. Consequently, this study tries to fill the knowledge gap between the great challenge/question for companies: ‘How to make your CSR efforts known’, and the situation in reality: ‘How are companies nowadays making their CSR efforts known’, specifically in the context of social media.

1.2 Purpose of this study

As a result, the main research question raised is: *How do companies use social media for CSR communication?* This makes the purpose of this study to investigate corporate CSR communication in social media as it really is. To do so, this study will first start off describing what is defined as CSR, to have a clear definition of what corporate CSR communication is about. Next, this study will empirically analyze the corporate CSR communication in social media by several large multinationals. What are the characteristics of their communication, do they use social media to the full potential, leveraging the characteristics of openness and interactivity? And what would be the coordinating CSR communication strategy matched to these communication characteristics? To portray the current situation of corporate CSR communication in social media, this study thus has the following research sub-questions:

RQ1. *What do we define as corporate social responsibility (CSR)?*

Before we take a look at corporate CSR communication in social media, we first have to define what is meant with CSR itself. This is the foundation of what is to be communicated with

corporate CSR communication, in social media. To answer this first question we will look into the background of CSR, and discuss what we define as CSR in this study.

***RQ2.** What are the characteristics of corporate CSR communication in social media?*

The following research question makes up for the first layer of corporate CSR communication in social media. This layer consists of several components which can be empirically analyzed. Answering questions like: Do companies communicate once a month about CSR, or do they communicate once a day (intensity)? And, when they communicate about CSR, do they (merely) disseminate information, or do they also react to questions/statements by the public, taking part in an open dialogue (interaction/responsiveness)? Finally, what is the sentiment used in corporate CSR communication in social media, do they use positive sentiment, playing on ‘virality’ and people identifying with this positivity, or do they follow classic theory, which holds that negative sentiment is better to communicate news content? By answering these questions, we can describe the CSR communication characteristics in social media.

***RQ3.** What communication strategy is used for corporate CSR communication in social media?*

Following these different characteristics of corporate CSR communication in social media as just described, one can identify a more overall, coordinated CSR communication strategy. When the first layer of corporate CSR communication in social media is drawn up by answering the second research sub-question, we will identify the CSR communication strategy based on the demonstrated CSR communication characteristics. By answering this question we complete our description, and portray how social media is used for CSR communication by companies at this point in time. It might also prove to be interesting to see if the used CSR communication strategies have changed compared to previous studies on CSR communication in social media (e.g. Etter et al., 2011).

1.3 Relevance

After reviewing existing literature on the use of social media for corporate CSR communication one could say that the theoretical/academic relevance of this study is to provide academics and practitioners with more recent insights into how companies use social media for CSR communication. This is the case, because previous studies on social media usage for (corporate) CSR communication date back some years now, as far as to 2013. With the changes in the communication context, like the increasing diffusion and usage of internet and social media,

there might also have been changes in the use of social media for corporate CSR communication. The key contribution of this study will thus be a more recent empirical evaluation of how companies use social media for CSR communication. This is done by analyzing the characteristics and strategies of corporate CSR communication in social media.

In addition to this theoretical relevance, this study also has practical relevance. The practical relevance of this study lies in portraying the situation around social media usage for CSR communication by large multinationals. In doing so, we create more recent knowledge on how social media is used for corporate CSR communication nowadays, providing an example for other companies, and possibly a start for a benchmark. This research could thus help spread the (practical) knowledge on the use of social media for corporate CSR communication. For the companies from our sample, this study might also prove to be a critical review of their social media usage for CSR communication.

1.4 Outline of thesis

This introductory chapter is followed by chapter two: Literature review. In this chapter there is a more extensive literature review on the topic. After this chapter, the research methodology is discussed in chapter three. In the fourth chapter there is a report about the analyses and the results derived from it. Lastly, chapter five draws conclusions, discusses managerial implications and contains a discussion about this study.

2. Literature review

2.1 Corporate social responsibility (CSR)

At this point in time, corporate social responsibility (CSR) is a popular topic. This is the case because it has become an important factor for a company's image and reputation, in its turn further relating to a corporate's legitimacy (Colleoni, 2013). Expectations have changed over the years, and at this point in time people have ethical expectations of companies, along with a set of social responsibilities they expect companies to fulfill in society (Moreno & Capriotti, 2009). This particularly applies to the large multinationals of this world, for which the international standards of production, as well as things such as labor regulations often fail to regulate (bad) behavior (Scherer & Palazzo, 2011). This thus leaves large companies with a gap to fill with the (corporate) social responsibility to regulate themselves.

As a result of different cases in the news such as Volkswagen, images and reputations of large multinationals have been challenged (Palazzo & Scherer, 2006). The case of Volkswagen, which has been dubbed the 'diesel dupe' (Hotten, 2015), strongly represents a failure in terms of CSR. In this case, Volkswagen deliberately designed means to circumvent emissions control, with the aim of gaining competitive advantage. Volkswagen carried out a message of supposedly environmentally friendly cars, whereas in reality their cars were actually emitting 40 times the legal limit of nitrogen oxide (Dans, 2015). Cases like this in the news combined with the ever-changing society lead consumers to increasingly demand that companies justify their social and environmental actions in this world. This has redefined the relationships between consumers and companies, suggesting that companies should think better about their environmental and societal footprint, and open up the dialogue about what they do. Leaving us at the concept of corporate social responsibility.

This concept of corporate social responsibility (CSR) is a concept which is widely discussed, especially in today's society. Because of its evolution over several decades, there are a great deal of different definitions of the concept to be found in the literature. One early definition that is often used throughout the literature is the one from Carroll (1979), which states that "the social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time." (p. 500). Another definition that is commonly used is the definition of the World Business Council for Sustainable Development (1999): "CSR is described as the continuous commitment by business through behaving ethically in their trade and contribute to economic development, at the same time improving the quality of life of the workforce and their families as well as the local

community and society at large.” (p. 3). Although both of these two definitions of CSR might be commonly used, there does (still) not exist one widely accepted definition of corporate social responsibility (Cho, Furey, & Mohr, 2017). This lack of one overarching definition of CSR leads to varying CSR perceptions also in management, which in its turn impedes the full understanding of what CSR should comprise (Farrington, Curran, Gori, O’ Gorman, & Queenan, 2017). What is, however, widely agreed upon in literature, is the fact that the essence of CSR is about making proactive efforts to facilitate both business success as well as social well-being (Cho et al., 2017). In answering our first research sub-question, “*What do we define as corporate social responsibility (CSR)?*”, we combine what we discussed as widely agreed upon in literature about CSR with the definition from the World Business Council for Sustainable Development (1999), and define CSR in this study as ‘the continuous commitment by businesses to make proactive efforts to improve the quality of life of the community and society at large (both ecological and social)’.

There can be numerous reasons underlying a company’s motivation to engage in CSR. In addition to the obvious reason that stakeholders and society as a whole are demanding it from them nowadays, there are several other reasons/benefits for companies to engage in CSR. First of all, there are actually philanthropic/altruistic companies out there, that do believe in their CSR efforts being part of being a good global citizen (Sprinkle & Maines, 2010). Another reason might be that redesigning operations because of CSR might actually end up saving money in the end, by operating more efficiently (Sprinkle & Maines, 2010). A third reason for companies to engage in CSR is that it can help attract, motivate and retain employees. In this light, CSR can win the best new employees from competitors, and also motivate and retain the existing employees (Coombs & Holladay, 2012; Porter & Kramer, 2006). Just like certain employees want to work at a company they are proud of, some customers do also like to shop at a company they are proud of. As a result, CSR can also help companies attract and retain customers (Bhattacharya & Sen, 2004; Coombs & Holladay, 2012; Porter & Kramer, 2006). In addition to the obvious ‘shopping’ at a company, making purchases, consumers can also support a company through positive word of mouth and online communication (Coombs & Holladay, 2012). Finally, CSR is sometimes seen as an integral part of a company’s risk management (Sprinkle & Maines, 2010). From this perspective, CSR can be seen as a way for companies to ease legal or regulatory constraints. In that case, CSR is simply another cost of doing business; sometimes you just have to do things in order to, for instance, avoid bad publicity or actions from non-governmental organizations (NGOs). Again, it is also being (ab)used from this perspective by certain companies, for the sole purpose of so-called ‘greenwashing’. When doing

so, companies merely try to appear (more) socially/environmentally responsible (Sprinkle & Maines, 2010). However, no matter of the reasons for a company to engage in CSR, in the end there is a positive relationship between a firm's engagement in CSR and performance. This positive relationship has been previously documented in the literature (Bhattacharya & Sen, 2004; Madueño, Jorge, Conesa, & Martínez-Martínez, 2016; Wu, 2006), and is also known as the concept of 'doing well by doing good'.

2.2 CSR communication

Since CSR is such a popular topic, the concept of CSR communication has also become more and more discussed in the literature (Moreno & Capriotti, 2009). This given the fact that it has been showed that only acting responsibly is not enough to improve image and reputation, companies should really communicate their CSR agenda and efforts the right way to be successful (Dawkins, 2005). The great challenge companies thus face is: How to communicate CSR efforts (Morsing, Schultz, & Nielsen 2008)? This makes communication a key element in the management of CSR. Yet there are still many companies out there doing well on the CSR agenda and efforts aspect, but failing to communicate this (Lewis, 2003).

According to Coombs and Holladay (2012, p. 111), these failures are due to the fact that companies face the 'CSR promotional communication dilemma'. The CSR promotional communication dilemma represents a dilemma between stakeholders wanting to know more about CSR efforts, while at the same time they are skeptical of companies that commit too much time and effort to CSR communication (Coombs & Holladay, 2012). This problem is also often referred to as stakeholder skepticism. Trust in businesses has fallen to an all-time low (Waddock & Googins, 2011). Because of this lack of trust, the more a company spreads the message about its CSR, the less likelihood there is that it will be believed by the stakeholders, hence the problem of stakeholder skepticism (Farooq, Merunka, & Valette-Florence, 2013). In this case, the stakeholders, or society as a whole, perceive the CSR efforts of a company as merely an instrument to improve their image (Lee, Oh, & Kim, 2013). There is a strong movement of consumers denouncing this use to merely improve a company's image, which is often referred to as 'greenwashing' (Bradford, 2007). 'Greenwashing' is defined as tactics that mislead consumers regarding the environmental practices of a company or the environmental benefits of a product or service, but it may also be used for other types of misleading, such as unfair communications about the CSR of a company (Laufer, 2003).

Another problem companies might face, is conflicting expectations of different stakeholders (Cho et al., 2017). To prevent, and possibly overcome such problems, companies

should carefully develop a communication plan for their CSR efforts, aiming to provide the right information, to the right stakeholders, through the right channels. This should ultimately build their image and reputation, and strengthen the corporate legitimacy.

When looking at (CSR) communication, companies have an extensive choice in communication channels of doing this through. Starting off with the more traditional media channels which are often used for corporate self-presentation, such as advertising and television. Companies have used these channels for years, traditionally mainly focused on disseminating information to the public (Capriotti & Moreno, 2007). Since the further evolution of technology, especially hinting at the introduction of the internet, the ways of communication, however, have greatly expanded. As a consequence, the communication models have also drastically changed. Companies started using the internet, and different social media, as channels to communicate their messages to a wide audience and engage in conversations. The following numbers give a small illustration of why companies are using these newer communication channels more and more nowadays. To start, already 51.7% of the world population uses the internet (Internet World Stats, 2017b). However, to explicate, this worldwide average is lower because of Africa and Asia, falling behind the rest of the continents. When looking at, for instance Europe, we see a usage of 80.2% of the population, and in North America even an astounding 88.1% of the population uses the internet (Internet World Stats, 2017b).

However, no matter of the specific channels that are used for CSR communication, a company must develop an overall coordinating CSR communication strategy. In doing so, still many companies anchor their CSR communication strategy onto the annual report (Coombs & Holladay, 2012). However, CSR-related activities, especially nowadays, occur continuously throughout the year. Thus, it would be better, some might say only logical, for companies to continuously communicate their CSR efforts. This way companies can keep their stakeholders updated, and have an ongoing conversation about CSR. Given the nature of social media, this is a perfect channel to use for this kind of periodic CSR communication. This is the case because in the context of social media the periodic messages will not appear as an over promotion from the company (Coombs & Holladay, 2012), stakeholders do expect regular updates in the form of, for instance, ‘tweets’ or Facebook posts in this context. This way companies can prevent stakeholder skepticism, or maybe even circumvent the whole CSR promotional communication dilemma.

2.3 (CSR) Communication strategies

All the possibilities and challenges concerning (CSR) communication urge companies to develop a (good) communication strategy. Although companies are increasingly translating their corporate values into tangible corporate social responsibility practices, “a correspondence of values between stakeholder and corporate is not guaranteed; a mechanism of communication and feedback must be established with the audience and society as a whole.” (Colleoni, 2013, p. 231). To be able to do so, companies should develop a sense of their values which are to be communicated, but still be willing to revise these based on the feedback from stakeholders. Companies have been seeking legitimacy and support by incorporating structures and procedures that match general cultural models for ages (Meyer & Rowan, 1977). Vice-versa the stakeholder theory lays its emphasis on how the link with the external environment must be conceived not only as a one-way flow of info but more as a two-way communication channel through which companies can co-create (Andriof, Waddock, Husted & Rahman, 2017). These two different ways of corporate communication; one-way versus two-way, have been researched extensively.

One early developed model describing different communication strategies, ranging from the one-way model of communication to a two-way model of communication, comes from Grunig and Hunt (1984). They developed a model containing four ways of corporate communication, handling public relations. Their model describes the various management and organization practices concerning these four different strategies. These strategies then serve companies as guidelines to create programs, strategies, and tactics regarding public relations. These four strategies of public relations constructed by Grunig and Hunt (1984) are (1) press agent/publicity, (2) public information model, (3) two-way asymmetrical model, and (4) two-way symmetrical model. Both the first two strategies from the model are categorized as one-way communication models. The difference between the two is in the different techniques of information distribution and influencing the audience. The first strategy uses persuasion and manipulation to influence the audience, whereas the second strategy uses press releases and other ways of distributing organizational information to influence the audience in a more ‘honest and fair’ way (Grunig & Hunt, 1984). Both the last two strategies from the model are categorized as two-way communication models. The difference between the two is in the symmetrical or asymmetrical relationships. The third strategy still remains a sort of persuasion, with the organizational communication focusing on itself and their wants and needs, whereas the fourth strategy actively seeks the dialogue and promotes mutual benefits (Grunig & Hunt, 1984). This fourth model, being the two-way symmetrical model, is the ideal model for

corporate communication out of these four. It is considered the ideal strategy out of the four because it indicates a company that is committed to honest and ethical practices, promoting mutual benefits, and still remains willing to adapt practices to improve public perception.

This early model of communication from Grunig and Hunt (1984) described corporate communication thus with the focus on ‘public relations’. Morsing and Schultz (2006) developed a model integrating the fundamental ideas from stakeholder theory into this early model from Grunig and Hunt (1984), sketching the transition from the old, one-way model of corporate communication, towards a more modern and open, two-way model of corporate communication. One of these fundamental ideas from stakeholder theory is the importance of stakeholder relationships, moving the old emphasis on stakeholders being ‘managed’ by companies in a way, to a more open two-way dialogue between stakeholders and the company (Andriof et al., 2017). This development implies an increased interest in understanding how companies and managers can manage the relationships with their stakeholders. These stakeholder relationships consist of “interactive, mutually engaged and responsive relationships that establish the very context of doing modern business, and create the groundwork for transparency and accountability” (Andriof et al., 2017, p. 9). This quote from Andriof et al (2017) captures factors as participation, involvement and open dialogue as the core of stakeholder theory. In this context, the open dialogue with stakeholders can be seen as a tool to co-create shared understanding, in this way improving the stakeholder relationships. From this perspective, CSR and stakeholder theory have a close affiliation. When companies are expected to show corporate social responsibility towards their stakeholders, and society in general, stakeholder theory offers an operationalization of the complex concept of society, by focusing on different groups of stakeholders within this society. This is why Morsing and Schultz (2006) developed their model in such a way that it integrates the changed view on stakeholder relationships (more recent stakeholder theory) into the old model from Grunig and Hunt (1984). The model from Morsing and Schultz (2006), however, consists of three main corporate communication strategies, instead of four like the model from Grunig and Hunt (1984).

These three main communication strategies according to the model from Morsing and Schultz (2006) are the (stakeholder) information strategy, the (stakeholder) response strategy, and the (stakeholder) involvement strategy. These three strategies cover the general evolution from the traditional monologue, merely the company ‘talking’ (one-way), to a more mutual understanding, and the dialogue with stakeholders (two-way). These three strategies are based on a model consisting of two dimensions: (1) The interpretation of corporate values, and (2) the integration of stakeholder feedback. Discussing the three communication strategies according

to this model we start with the information strategy. The information strategy has as goal to disseminate CSR corporate information. The interpretation of corporate values and making up the CSR agenda is mainly defined by internal parties, meaning external feedback is not integrated. The response strategy has as goal to give ‘response’ to stakeholder reactions to CSR activities. This thus means the interpretation of corporate values and making up the CSR agenda is still mainly defined by internal parties, but external feedback is in this case integrated, in contrary to the information strategy. The involvement strategy (rooted in the organization-stakeholder dialogic relationship) has as goal to be ‘involved’ a step further than only responding, breaking down boundaries to co-creating together with stakeholders. These dialogical relationships affect both the interpretation of corporate values, making up the CSR agenda, as well as the CSR practices.

2.4 Online communication in social media

While we just discussed the somewhat general evolution of (corporate) communication, moving towards the more specific CSR communication strategies, there has been an important change in the context of communication. This being the introduction of the internet, and subsequently different social media, bringing new channels and tools for communication. Online communications through the use of internet and social media have become important ways of communication used by companies to communicate in general. Relating it to corporate CSR communication again, it is used to increase stakeholders’ awareness about CSR efforts and at the same time creating the opportunity for feedback. This makes that online communication actually has become one of the most important information channels for relating CSR issues (Moreno & Capriotti, 2009).

The most strategic benefit of (CSR) communication through the use of internet and social media is that it allows an ongoing and interactive communication process (e.g. two-way symmetrical strategy from Grunig & Hunt, 1984, or involvement strategy from Morsing & Schultz, 2006), rather than the more traditional static information disclosure process (e.g. press agent/publicity strategy from Grunig & Hunt, 1984, or information strategy from Morsing & Schultz, 2006), for instance done via advertising or television (Capriotti & Moreno, 2007). Traditionally, the mass-media were based on a one-way communication, with a clear distinction between the company producing and disseminating the information, and the stakeholders being the consumer of this information, merely receiving (Capriotti & Moreno, 2007). With the internet and different social media such as Facebook and Twitter, the stakeholders and the general crowd became empowered, creating a public sphere where everybody can create and

spread content, engage in a dialogue, and therefore also contribute to the composition of a company's CSR agenda, and activities (Jenkins, 2006). It will be interesting to see in this study if large multinationals actually use social media as the interactive tool it is.

“Organizations can use social media to (1) learn what CSR issues are important to stakeholders (find emerging issues), (2) determine if stakeholders are aware of CSR initiatives, (3) assess stakeholder reactions to CSR initiatives, (4) increase awareness of CSR initiatives, and (5) provide an avenue for stakeholder engagement.” (Coombs & Holladay, 2012, p. 120).

Or do companies from our sample connect with the great list of companies, not using the new media to their full potential, still using it as if it were traditional mass media, merely disseminating information? As previously mentioned, there have already been studies looking into this matter (e.g. Capriotti, 2011; Colleoni, 2013; Etter et al., 2011), however, these date back some years now. Because this is the case, it is interesting to see in this study if things have changed since then, especially because of changes in the context, like the increase in internet users and social media users (Internet World Stats, 2017a; Internet World Stats, 2017b; Statista, 2017a; Statista, 2017b), and cases of CSR failure in the news such as Volkswagen.

The positive effects of the use of social media have been extensively mentioned in previous literature (e.g. Capriotti, 2011; Moreno & Capriotti, 2009). These positive effects were, for instance, shown in the relationship between the company and the public, the brand/corporate attitudes and obtaining support from the public (Capriotti, 2011). Social media has a positive effect on these because it allows companies to set and present their CSR agenda and activities without being modified by traditional media, being censored in a way. Social media also changed the communication from a one-way communication model to a two-way communication model, enabling the dialogue and the possibility of integrating feedback. When different polls/surveys asked executives of major companies what the benefits from social media are, it revealed (1) the great impact on capturing customer insights, (2) communicating CSR efforts, and (3) driving engagement with customers in an effective way (Kesavan et al., 2013).

In addition to these benefits communicating via internet and social media can have, it can also create challenges/problems for companies. Since a great deal of the networks in the social media environment are organized around a network of peers, however, without centralized entities of control, companies seem to be thrown into a wild stream of communication. In a way, a company can become a stakeholder itself of this stream of communication, thus not really having the power to control it, but merely can try to have an

impact on it. In these kind of networks, communication can be referred to as ‘viral’ since communications spread like an epidemic through the network (Colleoni et al., 2011). Another possible problem for companies is that the communications through these networks are quickly perceived as highly trusted by the actors, because these networks are often based on personal similarities (Colleoni et al., 2011). One could imagine that if it is negative, but possibly not truthful communication about a company, this can be really problematic. The problem here might be that people don’t do fact checks themselves, but simply perceive almost everything said as to be the truth.

Despite the aforementioned challenges, and because of the (great) benefits shown in the literature, in the end, it is advised for companies to utilize social media to communicate their CSR agenda and activities. One could say it gives companies a channel to leverage interactivity to their advantage, engage in the dialogue with stakeholders and society, and receive feedback. Others even see social media, when used properly, as a ‘window to a firm’s soul’. From this perspective, social media can be transformative in getting CSR right for a firm and can be used as one of the most important brand pillars (Kesavan et al., 2013). Capriotti (2011) agrees to assign an even greater role for social media than it merely being a channel of communication, and states that social media is not only to be used to communicate CSR, but that it will become the soul of CSR itself, and therefore it will be embedded as part of the brand and its message.

Yet, as discussed, research shows that the use of social media for CSR communication by companies is still very limited, and otherwise often still utilized as traditional mass media, only to disseminate information, instead of utilizing the interactivity (Capriotti, 2011; Capriotti & Moreno, 2007; Cho et al., 2017; Moreno & Capriotti, 2009). More recent research on how social media is exactly used for corporate CSR communication still remains pretty limited. This is exactly why this study tries to shed more light on how social media is actually used for corporate CSR communication, by studying large multinationals.

2.5 (CSR) Communication characteristics and strategies in social media

According to Birim (2016), CSR and social media are the key indicators of communication strategy. It could thus well be that companies adjusted the old, traditional communication strategies into new ones, fitting for using the internet and social media for CSR communication. In doing so, there have been several studies looking into communication strategies for social media. The previously discussed model of Morsing and Schultz (2006) has been the starting point of some of these follow-up studies on CSR communication in social media (Capriotti, 2011; Colleoni, 2013; Etter et al., 2011). From these three mentioned follow-up studies on CSR

communication in social media, the study from Capriotti (2011) did not describe a specific model of CSR communication in social media. Capriotti gave an overview on the development of communicating CSR through internet and social media. Regarding the different strategies from the model of Morsing and Schultz (2006), Capriotti discussed that the internet gives technological support, facilitates implementation, and consolidation of the (stakeholder) involvement strategy, which is seen as the ideal strategy, and “that people participate and engage in dialogue with organizations through social media tools” (Capriotti, 2011, p. 362-363).

The studies from Colleoni (2013) and Etter et al. (2011) did, however, both describe different communication models for (corporate) CSR communication in social media. The study from Etter et al. (2011) focused on exploring how companies use Twitter for CSR communication. In analyzing this they put the focus on exploring different strategies regarding intensity, interaction, and responsiveness in corporate CSR communication on Twitter. Based on the theoretical foundations (e.g. Morsing & Schultz, 2006) and the empirical findings, they were able to identify four CSR communication strategies on Twitter (Etter et al., 2011). By doing so they created a new model/framework of CSR communication on Twitter, focused on CSR communication characteristics (intensity, interaction, and responsiveness) and identifying a more overall CSR communication strategy. Colleoni (2013) also explored how companies use Twitter for CSR communication. However, Colleoni focused more on the relationship between an organization and its environment. By doing so, this study adopted an institutional approach and focused on investigating which CSR communication strategy is most effective in creating convergence between a company’s CSR agenda and the expectations of stakeholders. Colleoni (2013) tested a constructed model/framework, outlining three CSR communication strategies based on the model from Morsing and Schultz (2006). In testing these constructed strategies, their method involved network analysis, topic analysis, and sentiment analysis. The results included some unexpected findings, for instance, that none of the explored strategies created the wanted alignment between companies and stakeholders. Even when engaging in a dialogue, CSR communication in social media was still conceived as a marketing practice.

To answer the second and third research sub-questions, “*What are the characteristics of corporate CSR communication in social media?*” and “*What communication strategy is used for corporate CSR communication in social media?*”, we want to extend the study from Etter et al. (2011) on CSR communication in social media (Twitter). We chose this study because, as discussed, Etter et al. (2011) looked at several characteristics of CSR communication on Twitter and concluded with a framework containing four CSR communication strategies. By doing so

they created a good model/framework to look at CSR communication characteristics (on Twitter) and identify a more overall CSR communication strategy (on Twitter). To be able to answer our research questions, we also study CSR communication characteristics and strategies on Twitter. As a result, the model of Etter et al. (2011) seems the perfect fit for this study to explore the CSR communication characteristics and strategy from our sample. A more comprehensive discussion of the method and sample will follow in the next chapter.

In using the framework from Etter et al. (2011) the focus lays on the CSR communication dimensions of interaction and responsiveness. These two CSR communication characteristics are the basis to define the used CSR communication strategy. They came up with the following four CSR communication strategies in social media: Information strategy, personalized information strategy, reactive strategy, and engagement strategy, like shown in Table 1. The operationalization of the dimensions is discussed in chapter three.

Table 1. CSR communication strategies for Twitter (Etter et al., 2011)

	Information strategy	Personalized information strategy	Reactive strategy	Engagement strategy
Interaction	Low	Medium/high	Medium/high	Medium/high
Responsiveness	Low/medium/high	Low	High	Medium

So as stated, these CSR communication strategies are based on two dimensions, which are interaction and responsiveness. However, the original study also took into account another CSR communication characteristic, which is the intensity of CSR communication. In this original study, the intensity of CSR communication consisted of two dimensions (Etter et al., 2011): The frequency of CSR related tweets/month and the percentage of CSR related content. In our study, however, it is based solely on the frequency, since our selection of companies and their Twitter accounts consists of Twitter accounts dedicated to CSR. We do this because Etter in a later study (2013) showed that the percentages of CSR-related tweets are significantly higher for CSR-dedicated Twitter accounts (70.7%), compared to more general corporate Twitter accounts (14.5%). Next to this, Etter (2013) also showed that the frequency of these CSR related tweets/month is higher for CSR dedicated Twitter accounts compared to general corporate Twitter accounts. The ‘old’ results of the study from Etter et al. (2011) showed that on average the frequency of CSR related tweets/month was low. However, as discussed, because the selected Twitter accounts in this study are dedicated to CSR, the study from Etter

(2013) suggests the frequency will be higher now. In addition to this, we also discussed the strong increase in monthly active Twitter users worldwide. Comparing the monthly active Twitter users worldwide in Q3 2012 with Q3 2017, we see an increase of 98% (Statista, 2017a). In combining this strong increase in active Twitter users with the results from the studies from Etter (2013) and Etter et al. (2011), we expect that the intensity of corporate CSR communication on Twitter will be of a high level, giving us the first hypothesis of this study:

H1: High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter

Coming back to the other two CSR communication characteristics, relating to the CSR communication strategy, interaction and responsiveness, we first discuss interaction. The level of interaction is based on the percentage of tweets containing an interaction, addressing other members on Twitter. The results from the original study (Etter et al., 2011) showed that on average there was a medium level of interactivity. Because the selected Twitter accounts in this study are dedicated to CSR, the study from Etter (2013) suggests that the level of interaction will be higher. This because Etter (2013) showed in his study that CSR-dedicated Twitter accounts have significantly higher levels of interaction than general corporate Twitter accounts. This makes us expect high levels of interactivity in corporate CSR communication on Twitter, giving us the second hypothesis of this study:

H2: High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter

Related to this dimension of interaction, is the dimension of responsiveness. The responsiveness is analyzed by looking at how many tweets containing interaction are actually a response (to another tweet). The results from Etter et al. (2011) showed on average there was a medium level of responsiveness. The more recent study from Etter (2013) showed that CSR-related tweets are significantly more reactive than non-CSR related tweets. As previously discussed, Etter (2013) also showed with this study that the percentages of CSR-related tweets are significantly higher for CSR-dedicated Twitter accounts, compared to more general corporate Twitter accounts. Since our sample consists of CSR-dedicated accounts, we expect it will hold significantly more CSR-related tweets than non-CSR-related tweets, and thus could be expected the CSR communication from our sample is ‘more’ responsive, compared to the results from Etter et al. (2011). However, because we expect an increase in the number of tweets sent (communication intensity) and the percentage of tweets containing interaction, we expect

the proportion of tweets being a response to level out. In other words, we don't expect the percentage of tweets containing interaction being a response to change so much that it would become high level responsiveness. In taking all these things together, we expect medium levels of responsiveness in corporate CSR communication on Twitter, giving us the third hypothesis of this study:

H3: Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter

There is another communication characteristic that we would like to add to this study, to confirm previous results in this context. This is sentiment, relating to how the messages are conveyed, with what emotion/attitude behind it (negative, neutral or positive). Previous studies that looked into the complex role of sentiment (e.g. Hansen, Arvidsson, Nielsen, Colleoni, & Etter, 2011) showed that positive sentiment has a positive effect on the probability that a message is being shared, also referred to as 'virality', but merely in the context of non-news communication. When it comes to news communication, the classic theory still holds that negative sentiment enhances 'virality'. Relating back to the study from Hansen et al. (2011), we propose that most of the corporate CSR communication is not in the news segment, and it is thus suggested to use positive sentiment to increase 'virality'. A more recent study from Colleoni (2013) showed that both the stakeholders and the companies indeed used positive sentiment in their CSR communication on Twitter. "This is coherent with other studies of online communities, which have shown how people tend to associate themselves with positive content" (Colleoni, 2013, p. 240). So apart from the fact we propose that most of the corporate CSR communication is not in the news segment, there is another reason given for companies to use positive sentiment, because people associate themselves with positive content. In the end, this is also the goal of CSR and corporate CSR communication one could say, to gain association, improving image and reputation among other factors, increasing the so wanted corporate legitimacy. We thus expect that positive sentiment is used more than negative sentiment within corporate CSR communication on Twitter, leading us to the fourth hypothesis of this study:

H4: Positive sentiment is used more than negative sentiment in corporate CSR communication on Twitter

Now turning back to discussing the different CSR communication strategies for Twitter, which were shortly mentioned before and depicted in Table 1. The information strategy is

characterized by low interaction, independent of the degree of responsiveness. Companies that use this strategy mainly disseminate information about their CSR efforts, with none, or fairly little interaction, and therefore also no, or fairly little responsiveness (Etter et al., 2011). Etter et al. (2011) concluded that “these companies – for whatever reason - have no interest in interaction about CSR on Twitter, but rather have the aim to inform stakeholders in a one-way communication approach” (p. 22). The personalized information strategy involves a medium to high degree of interaction and low responsiveness. Companies using this strategy also mainly disseminate information about their CSR efforts, however, partly towards more specific Twitter members (Etter et al., 2011). Still, they hardly answer any questions asked, thus the low responsiveness. Both these information strategies accordingly demonstrate no or little interest in replying to other Twitter members. With this rather ‘monologic policy’, these first two strategies from the framework (information strategy and personalized information strategy) use a one-way communication approach (Etter et al., 2011). Moving on now to discussing the other two strategies from the framework, which use a two-way communication approach. The reactive strategy includes medium or high interaction and high levels of responsiveness. Companies using this strategy still disseminate information fairly equal to the information strategies, however, they do communicate much more ‘with’ the other Twitter members (Etter et al., 2011). Etter et al. (2011) called this strategy an “asymmetric two-way communication approach” (p. 15), this because the companies using this strategy do not actively engage personally with stakeholders on Twitter, but focus on replying when they are approached. Finally, the engagement strategy is characterized by medium or high interaction and medium responsiveness. Companies using this strategy disseminate information towards other members personally, and also show interest in responding to Twitter members publicly (Etter et al., 2011). By doing this they can establish an interpersonal dialectic relationship, creating symmetric two-way communication.

We can conclude there is a clear distinction in the framework, between the two strategies with a one-way communication approach (information strategy and personalized information strategy) and the two strategies with a two-way communication approach (reactive strategy and engagement strategy). The results from Etter et al. (2011) actually showed the exact same number of companies using a strategy with a one-way communication approach as companies using a strategy with a two-way communication approach. However, we believe that changes in the communication context such as the increase in internet and social media users, but also the cases of CSR failure in the news, such as the Volkswagen case we discussed, made

companies adjust or maybe even drastically change their strategy. In doing so, we expect companies to move more to the strategies encompassing a two-way communication approach.

When looking back at the theory and the table containing the four strategies we depicted earlier, and their corresponding levels of the two dimensions (interaction and responsiveness), we see that our previous expectations regarding the CSR communication characteristics lead us to expect that companies use the engagement strategy for corporate CSR communication on Twitter (Table 1). In addition to the expectation of companies moving more to the strategies that encompass a two-way communication approach, we consequently expect companies use the engagement strategy, which is considered the best option out of the four CSR communication strategies from this framework (Etter et al., 2011). The engagement strategy encompasses the symmetric open dialogue with stakeholders and society as a whole, leveraging the power of social media for optimal CSR communication. The results from Etter et al. (2011) further strengthen our expectations by showing most of the companies using the engagement strategy. In summary, we expect that the companies moved more to using strategies encompassing a two-way communication approach, and that the engagement strategy is the dominant strategy for corporate CSR communication on Twitter, leading us to the fifth and last hypothesis of this study:

H5a: *The strategies encompassing a two-way communication approach are used more than the strategies encompassing a one-way communication approach for corporate CSR communication on Twitter*

H5b: *The engagement strategy is used more than any other CSR communication strategy for corporate CSR communication on Twitter*

3. Method

3.1 Research design

Two of the most popular social mediums are Facebook and Twitter (Smart Insights, 2017). This study researches corporate CSR communication on Twitter. “Twitter is a micro-blogging service launched in 2006 that allows users to describe their current status via short posts” (Colleoni et al., 2011, p. 234). Twitter has become an important medium for social networking and content sharing. As a result, it presents a large-scale of information about how consumers feel and what their opinions are on certain things in society, for example, organizations (Colleoni et al., 2011). Kesavan et al. (2013) dare to even go a step further, and state that “in every continent except for Asia, Twitter is the most used and, hence, the most impacting social medium.” (p. 59).

In order to investigate CSR communication characteristics and strategies from large multinationals on Twitter, their messages on Twitter, called ‘tweets’, about CSR, had to be analyzed. To do so we used the method of text-mining in this study, to create a data set containing corporate CSR communication tweets. Text-mining refers to deriving (useful) information from textual resources such as internet pages, articles, document archives, or in our case Twitter. The text was mined by using a program that connects with the Twitter application programming interface (API). This program ‘pulled’ the tweets from these accounts from the Twitter API and put them in a data set. In doing so, Twitter did limit us to retrieve a maximum of 3,200 tweets per account. The collected tweets make up our data set for this study. After cleaning and preparing the data sets, they were analyzed. The analysis was based on different aspects such as the intensity of the corporate CSR communication, interaction and responsiveness in the corporate CSR communication, and sentiment used in the corporate CSR communication. Following this analysis, we determined the CSR communication strategy used according to the model of Etter et al. (2011). In doing so, all the constructed hypotheses were tested.

3.2 Sampling procedure

For the sample, we chose to focus on four large multinationals in the information technology (IT) industry. The IT industry is an industry which is currently dealing with environmental and social issues, relating the industry to the (heightened) importance of CSR. The IT industry, for example, plays a great part in the issue of climate change. This due to the high electricity demand of the industry, which even continues to climb because of developments such as data

centers, growing between 12% and 19% annually (Greenpeace, 2013). “Without a significant increase in the use of renewable energy, the IT industry’s environmental footprint will continue to grow at a rate of concern, and will increase the demand for electricity produced from coal and other forms of dirty energy.” (Greenpeace, 2013). Because of this, the IT industry is pressured from different sides to improve on aspects concerning CSR. This makes that research also reports that “environmental concerns are increasingly exercising the minds of business and IT executives.” (Butler & Daly, 2009, p. 1855). However, the IT industry thus also has great opportunities to drive transformative change in society. Greenpeace’s (2013) ‘Cool IT’ report shows that many IT companies are putting in the extra effort to make the change needed. By looking from this perspective, one could say IT companies are doing well, or at least trying to, in the area of corporate social responsibility. But the question remained how they communicate this to their stakeholders and the more general public, because as we previously discussed, this is vital to successful CSR.

After the created interest in this industry, we started analyzing large multinationals in the IT industry to see which had a Twitter account dedicated to CSR/sustainability. In the end, we found dedicated CSR/sustainability Twitter accounts for four major players in this industry: HP (@HPSustainable), Dell (@Dell4Good), Intel (@Intelinvolved) and Microsoft (@Microsoft_Green). We think the selection of these companies is interesting for multiple reasons, other than the reasons given in the general introduction to this industry. First of all, all of these four companies are in the top 25 greatest tech companies according to the 2017 Fortune 500. When turning to (CSR) reputations of these companies, we first consulted the more general ‘2017 Global Reptrek 100: The world’s most reputable companies’. This reputation institute ranked Intel on the 8th place, Microsoft on the 11th place, HP on the 36th place and 68th place (Reputation Institute, 2017). This means they are all mentioned in the 100 world’s most reputable companies, an achievement on itself. When turning more specific to CSR (reputation), we found the ‘CR’s 100 best Corporate citizens list’. On this list the order of our selected companies is the same, however, Dell is not on this list. When looking at the exact position we see that Intel is rated 2nd best corporate citizen, Microsoft 3rd and HP 26th (Corporate Responsibility Magazine, 2017). All taken together, it seemed an appropriate and interesting selection for this study, in order to receive generalizable and valid findings. We will now shortly introduce and further describe these four companies from our sample.

3.2.1 Dell

Dell is an American multinational computer technology company that was founded in 1984 (34 years ago) (Encyclopædia Britannica, 2017a). Dell is, amongst other things, active in manufacturing, selling, repairing, and supporting personal computers (PCs) and servers. Dell is known for its innovations in supply chain management and e-commerce, referring to its direct-sales model, in which Dell builds and delivers PCs configured to customer specifications. Building and selling PCs is also their core business (Economic Times, 2017). When looking at the four companies from our sample we can divide them into two subgroups: The first subgroup has its core business in manufacturing and selling PCs, and the second subgroup has its core business in manufacturing and selling software/hardware for PCs. As discussed falls Dell in the first subgroup. When looking at the market share from Dell in the PC market (PC Vendor Unit Shipment), it had a worldwide market share of 15.2% in Q4 2017 (Gartner, 2018), giving Dell the third place in the worldwide PC market. Dell had a global revenue of 61.6 billion USD in 2017 (PR Newswire, 2017).

3.2.2 HP

HP is an American multinational information technology company that was founded in 1939 (79 years ago) (Encyclopædia Britannica, 2015). HP is, amongst other things, active in developing personal computers (PCs), printers, and 3D printing solutions. HP has been long known for its printers, but moved on to also make personal computers their core business (HP, 2017). Turning back again to the distinction we made between the four companies in our sample, HP thus also falls into the first subgroup, having its core business in manufacturing and selling PCs. When looking at the market share from HP in the PC market (PC Vendor Unit Shipment), it was worldwide market leader in Q4 2017, with a market share of 22.5% (Gartner, 2018). HP had a global revenue of 52.1 billion USD in 2017 (GlobeNewswire, 2017).

3.2.3 Intel

Intel is an American multinational technology company that was founded in 1968 (49 years ago) (Encyclopædia Britannica, 2018). Intel is, amongst other things, active in manufacturing and selling semiconductor chips, microprocessors, and processors. Intel is most known for their processors, which are found in personal computers (PCs) from great brands such as Dell, HP, Apple, and Lenovo. This PC division from Intel is also their core business division (Forbes, 2016). Turning back again to the distinction we made between the four companies from our sample, Intel thus falls into the second subgroup, having its core business in manufacturing and

selling software/hardware for PCs. When looking at the market share from Intel in the PC processor market, it was worldwide market leader in Q4 2017, with a market share of 78.9% (Passmark Software, 2018). Intel had a global revenue of 62.8 billion USD in 2017 (CNBC, 2018).

3.2.4 Microsoft

Microsoft is an American multinational technology company that was founded in 1975 (42 years ago) (Encyclopædia Britannica, 2017b). Microsoft is, amongst other things, active in developing, manufacturing, licensing, and selling computer software. Microsoft is the largest software maker (by revenue) worldwide (Forbes, 2018). Microsoft is also most known for this core business, software products, think for instance of their line of operating systems: Microsoft Windows. Turning back again to the distinction we made between the four companies from our sample, Microsoft thus falls into the second subgroup, having its core business in manufacturing and selling software/hardware for PCs. When looking at the market share from Microsoft, it was worldwide market leader in the operating system market in 2017, with a market share of 88.9% (Net Marketshare, 2018). Microsoft had a global revenue of 90 billion USD in 2017 (Microsoft, 2018). In Table 2 is depicted a short summary of the companies we just described.

Table 2. Companies from sample

	Subgroup: Core business	Core market	Market share in core market Q4 2017	Total global revenue 2017 (billion USD)
Dell	PCs	PCs	15.2%	61.6
HP	PCs	PCs	22.5%	52.1
Intel	Software/hardware	PC processors	78.9%	62.8
Microsoft	Software/hardware	Operating systems	88.9%	90.0

3.3 Operationalization

3.3.1 CSR Communication characteristics

To be able to empirically assess CSR communication characteristics we made a subdivision. The different communication characteristics which were assessed in this study were based on previous research from Etter et al. (2011) and Colleoni (2013): The intensity of CSR communication, interaction used in the CSR communication, responsiveness in the CSR communication, and sentiment used in the CSR communication.

First off, the intensity of corporate CSR communication was measured by analyzing the number of tweets per month. In the study from Etter et al. (2011), the intensity of CSR communication was measured by two dimensions, as previously discussed, namely the frequency of CSR related tweets/month and the percentage of CSR related content. In our study, we, however, based it solely on the frequency, since our selection of companies and their Twitter accounts consist of Twitter accounts dedicated to CSR. Because of this, we expected all the tweets, or at least the significant part, to be CSR related content (Etter, 2013). For the operationalization of the different levels of corporate CSR communication intensity, we followed the original study from Etter et al. (2011). As a result, low intensity of corporate CSR communication was defined as sending less than 15 tweets each month, medium intensity of corporate CSR communication was defined as sending between 15 and 30 tweets each month and high intensity of corporate CSR communication was defined as sending more than 30 tweets each month.

The interaction used in the corporate CSR communication and the responsiveness in the corporate CSR communication were both also measured to determine the CSR communication strategy. As a result, the operationalization of both these variables is found in the next paragraph, discussing the operationalization of CSR communication strategy.

The sentiment used in the corporate CSR communication was measured by performing sentiment analysis. Sentiment analysis refers to the process of categorization of unstructured human-authored documents, based on affective orientation (Colleoni et al., 2011). Since we used the software program LIWC2015 for the sentiment analysis, we followed the operationalization of LIWC2015, from Pennebaker, Boyd, Jordan, and Blackburn (2015a). In their study they further described the operationalization of LIWC2015 software and the different included variables. We focused on the ‘tone’ variable from the LIWC 2015 software (Cohn, Mehl, & Pennebaker 2004). This variable puts the two dimensions of both positive emotion and negative emotion into a single summary variable. This variable was derived from previously published findings and converted to percentiles based on standardized scores from large comparison samples (Pennebaker et al., 2015b). The score on this variable represents the emotional tone, below 50 suggests negative emotion (sentiment) and above 50 suggests positive emotion (sentiment), the farther from the 50 the stronger this emotion (sentiment), “a high number is associated with a more positive, upbeat style; A low number reveals greater anxiety, sadness, or hostility” (Pennebaker, Booth, Boyd, & Francis, 2015b, p. 22). We used the score on this variable to code each individual tweet into containing positive, neutral or negative

sentiment. After doing this we were able to analyze the percentages of tweets using positive sentiment to test our hypothesis.

3.3.2 CSR communication strategy

To empirically assess the different CSR communication strategies on Twitter, we used the original variables and measures from Etter et al. (2011). This model translated the conceptual artifacts from Morsing and Schultz (2006) into four measurable CSR communication strategies on Twitter. These strategies are identified according to two different dimensions, which are on their turn measurable Twitter communication characteristics.

The first dimension is interaction. To assess how interactive companies communicate on Twitter, this dimension was measured by the usage of @-signs in tweets. The @-sign implies the interaction function from Twitter is being used. However, certain people use it also to indicate what location they are at, this is of course not an interaction. We thus only measured the tweets that were actually addressed to other Twitter members by using the @-sign Twitter interaction function. For the operationalization of the different levels of interaction, we followed the original study from Etter et al. (2011). As a result, low interaction was defined as less than 5% of the tweets containing @-signs (addressing Twitter members), medium interaction was defined as between 5% and 30% of the tweets containing @-signs (addressing Twitter members), and high interaction was defined as more than 30% tweets containing @-signs (addressing Twitter members).

The second dimension is responsiveness. To assess how responsive companies communicate on Twitter, this dimension was measured by analyzing if the tweets containing @-signs (addressing Twitter members) were actually replies. This information was gathered through the Twitter API. The collected meta-information stated if a tweet was a reply or not. For the operationalization of the different levels of responsiveness, we followed the original study from Etter et al. (2011). As a result, low responsiveness was defined as less than 20% of the tweets containing interaction being a response, medium responsiveness was defined as between 20% and 80% of the tweets containing interaction being a response, and finally, high responsiveness was defined as more than 80% of the tweets containing interaction being a response.

Finally, we used the outcome levels on both of these variables (interaction and responsiveness) to identify the CSR communication strategy used for corporate CSR communication on Twitter, like shown in Table 1 (Etter et al., 2011) and test the matching hypothesis. Firstly, we expected that the strategies encompassing a two-way communication

approach (reactive strategy and engagement strategy) were used more than the strategies encompassing a one-way communication approach (information strategy and personalized information strategy). To test this first part of our hypothesis we thus had to identify the used strategies, and see if the strategies encompassing a two-way communication approach were indeed used more than the strategies encompassing a one-way communication approach. More specifically, we expected the engagement strategy to be the dominant strategy used for corporate CSR communication on Twitter. For this second part of our hypothesis, the interaction level should thus be medium to high, and the responsiveness should be on a medium level (Etter et al., 2011). The operationalized levels of the first three CSR communication characteristics (intensity, interaction, and responsiveness) are presented in Table 3.

Table 3. Operationalization levels of CSR communication intensity, interaction and responsiveness

	Intensity	Interaction	Responsiveness
High	More than 30 tweets sent each month	More than 30% tweets contain interaction	More than 80% tweets containing interaction are a response
Medium	15 – 30 tweets sent each month	5% - 30% tweets contain interaction	20% - 80% tweets containing interaction are a response
Low	Less than 15 tweets sent each month	Less than 5% tweets contain interaction	Less than 20% tweets containing interaction are a response

3.4 Data gathering process

3.4.1 Retrieving data

In the first step of the actual data gathering, the tweets were retrieved by using ‘Tweepy’. “Tweepy is a Python library for accessing the Twitter API” (Rigden, 2018). Python is a computer language which is useful for a wide variety of things, including text-mining. Tweepy is open-source and is hosted on the popular software website ‘GitHub’. Tweepy enables Python to communicate with the Twitter platform by using its API. In doing so, we parsed the Twitter data from our selected sample in CSV files. As mentioned before, the Twitter API limited us to retrieve a maximum of circa 3,200 tweets for each company. The actual data collection was performed between the 23rd and 28th of November 2017.

3.4.2 Preparing data

The next step in the process was cleaning the CSV files which were retrieved using Tweepy. The retrieved CSV files at this moment contained raw data, which for example included UTF-8 code and other HTML code. We had to clean the data sets, changing the UTF-8 code to the matching characters, and deleting UTF-8 code and other HTML code for symbols and emoji's which were not supported for analysis by text programs such as Microsoft Excel and LIWC 2015.

The data was cleaned according to the SAGE Handbook of Social Media Research Methods, written by Sloan and Quan-Haase (2017). This meant removing, for instance, the 'RT' from tweets, which indicates a 'Retweet', a repost of something that was originally posted before. These RT tags had to be removed because they do not affect the content of the tweet (Sloan & Quan-Haase, 2017), and are not relevant for text analysis purposes. Next up the @-signs and the usernames that go with them were removed. The use of the @-signs in combination with a username indicates an interaction on Twitter. These had to be removed because they are often not directly related to the content of the tweet (Sloan & Quan-Haase, 2017), and they were often also words that cannot be recognized by text analyzing software. The URLs in all the tweets were another issue. The gathered URLs were sometimes used as external links to content, but also retrieved by Tweepy at the end of a tweet as a reference to the original tweet. These URLs were also removed because they were often also words that cannot be recognized by text analyzing software, and are not relevant to the content of the tweet. Finally, the issue of hashtags is a more complex one, like Sloan and Quan-Haase (2017) described: "Dealing with hashtags can be a little trickier in the sense that they can be part of a phrase, or can be added to the tweet arbitrarily to indicate the content of the tweet." (p. 136). Because of this, we removed the hashtag symbols, but not the words, because the matching words often are actually relevant to the content of the tweet (Sloan & Quan-Haase, 2017), and therefore relevant for text analysis.

Lastly, more specific cleaning of the text was done according to the LIWC 2015 operator manual (Pennebaker et al., 2015b). This operator manual from the LIWC 2015 software described specific instances which had to be cleaned to ensure analysis was as accurate as possible. For example, the abbreviation 'w/' was substituted by 'with', and the abbreviation of 'b/' was substituted by 'between'. We checked the cleaned data sets for any of the problems presented by the LIWC 2015 operator manual, and it seemed fit to accurately analyze using this software.

3.4.3 Coding data

In retrieving the data via the Twitter API, certain information was already coded automatically by given meta-information. Like, for example, if a tweet was a reply, was already coded by true or false. However, some of the coding was performed by us, after cleaning the data. This was for instance the case for the coding of interaction. The meta-information from the Twitter API did include the Twitter usernames used in the interactions, however, not a coding like for the variable responsiveness, whether it was a reply (true or false). For coding purposes, we therefore also created a coding column about interaction (true or false). After performing the sentiment analysis using the LIWC 2015 software we were also able to include a coding for the sentiment used in the tweets, being positive, neutral or negative. This coding was done by using the score for each individual tweet on the 'tone' variable.

3.5 Data analysis

The cleaned data sets were analyzed using Microsoft Excel 2016 and IBM SPSS Statistics 23. Using Microsoft Excel and SPSS the means were calculated and put in the report (raw SPSS output is depicted in the appendix). After getting the numbers and percentages, these were related to the earlier operationalization of the CSR communication characteristics (different levels ranging from low to medium, to high). After calculating all the corresponding levels of the CSR communication characteristics we merely had to use Table 1 to assess the used CSR communication strategy (Etter et al., 2011).

In addition to the statistical analysis of the CSR communication characteristics that match with the CSR communication strategy (interaction and responsiveness) and intensity of CSR communication in social media, we also included sentiment analysis. For this sentiment analysis we used LIWC2015. This Linguistic Inquiry and Word Count (LIWC) program works by 'reading' a given text and counting the percentage of words that reflect different emotions, thinking styles, etcetera (Pennebaker et al., 2015b). In using this software for sentiment analysis we focused on the 'tone' variable in LIWC 2015 (Cohn et al., 2004). This variable puts the two dimensions of both positive emotion and negative emotion into a single summary variable. The score on this variable represents the emotional tone, below 50 suggests negative emotion (sentiment) and above 50 suggests positive emotion (sentiment), the farther from the 50 the stronger this emotion (sentiment), "a high number is associated with a more positive, upbeat style; A low number reveals greater anxiety, sadness, or hostility" (Pennebaker et al., 2015b, p. 22). We used the scores on this variable to code each individual tweet into containing positive,

neutral or negative sentiment. After this coding, we analyzed the percentages of tweets containing positive sentiment.

3.6 Research ethics

This research was constructed to comply with the academic research ethics. Firstly, the data that was gathered was not further distributed or shared with other parties and was treated with good care. However, it has to be noted that this is public data, which everyone connecting with the Twitter API can retrieve. Another measure according to academic research ethics is transparency of the research. In all cases, the actions in this research were disclosed to the supervising party from the Radboud University. In addition to this, the steps and raw output are depicted in this thesis, and the raw data sets are included on a CD together with this thesis, so that future studies can replicate this research for validation. These are just some of the measures we took to make sure this study lives up to the high standard of research ethics.

Results of this study could possibly benefit both the companies from the sample, as other companies, in their decisions regarding CSR communication characteristics and strategy in social media. This study portrays the situation of corporate CSR communication on Twitter. It thus can show other (smaller) companies how some of the large multinationals from the IT industry are doing it, providing an example and/or a point of reference for improving CSR communication in social media.

4. Results

4.1 Sample

A total of 11,396 tweets were retrieved. These tweets came from four different Twitter accounts dedicated to CSR/sustainability, matching to the four different IT companies from our sample. The sampling procedure that led to these four different IT companies and their Twitter accounts dedicated to CSR/sustainability has been previously described in chapter three. For each company/Twitter account, the exact number of tweets retrieved was different, just like the period of time in between which these tweets were sent by the companies. The ‘youngest’ Twitter account from our sample was the account from HP, which was created on the 29th of September, 2015. From this account, we were able to retrieve all (at the time of data gathering) their 1,744 tweets. The other accounts (Dell, Intel, and Microsoft) dated further back, to 2008-2010. Since the Twitter API limited us to retrieve circa 3,200 tweets per account we were not able to retrieve all the tweets from these ‘older’ accounts. As a result, our final data contained 11,396 tweets, 1,744 from HP, 3,218 from Intel, 3,225 from Microsoft and 3,209 from Dell.

Table 4. Data gathered represented over the years for each company

	Dell	HP	Intel	Microsoft
2017	555 tweets (up until November)	823 tweets (up until November)	503 tweets (up until November)	401 tweets (up until November)
2016	900 tweets	776 tweets	352 tweets	282 tweets
2015	762 tweets	145 tweets (since October)	522 tweets	234 tweets
2014	716 tweets		730 tweets	991 tweets
2013	276 tweets (since September)		1111 tweets (since March)	432 tweets
2012				354 tweets
2011				531 tweets (since February)

4.2 Basic CSR communication characteristics & strategy complete data set

We started off by performing analysis on the complete data set, containing all the 11,396 tweets of the four different Twitter accounts/companies. The earliest tweet in this data set was from the 3rd of February, 2011, the most recent tweet in this data set was from the 26th of November,

2017. In Table 4 is shown over what period of time the data gathered is representative for each individual company and how many tweets there were gathered over each year.

Looking at the CSR communication intensity for the complete data set we used a weighted total (weight based on the number of days over what period of time the data was gathered for each company). We did so because for each company it differed in between what period of time the gathered tweets were sent. The weighted CSR communication intensity gave a total of 277.2 tweets sent each month, by these four companies together. With further analysis, we looked into some of the other CSR communication characteristics of all these tweets. SPSS was used to retrieve the descriptives of CSR communication interaction and responsiveness for the complete data set. The results showed that from the 11,396 tweets, 61.2% used interaction. From these tweets which used interaction, merely 14.3% was a response. Regarding the CSR communication strategy used looking at Table 1, combined with the operationalization in chapter three, this brought us to an average use of the personalized information strategy. All the results and their operationalized levels are summarized in Table 5 (the raw SPSS output can be found in the appendix).

Table 5. CSR communication intensity, interaction, responsiveness and strategy of complete data set

Tweets/month	Degree of interaction	Degree of responsiveness	Communication strategy
277.2 tweets (High level)	61.2% (High level)	14.3% (Low level)	Personalized information strategy

When turning back to the constructed hypotheses, and comparing these with the discussed results for the complete data set, we see that hypothesis 1 is supported. Hypothesis 1 states: “*High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter*”, translating to these four companies sending at least 124 tweets/month (the normal operationalization of more than 30 tweets/month, times 4, gives at least 124 tweets/month for the complete data set). The results showed a high level of CSR communication intensity, of 277.2 tweets/month, thus hypothesis 1 is supported on the highest level (complete data set). Hypothesis 2 states: “*High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter*”, translating to more than 30% of the tweets containing interaction. The results showed a high level of interaction, 61.2% of the tweets contained interaction, thus

also hypothesis 2 is supported on the highest level (complete data set). Hypothesis 3 relates to what proportion of these tweets, which contained interaction, was a response. This hypothesis states: *“Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter”*, translating to between 20% and 80% of the tweets containing interaction being a response. The results showed a low level of responsiveness, 14.3% of the tweets, which contained interaction, was a response, which means hypothesis 3 is rejected on the highest level (complete data set).

Finally, hypothesis 5 is about the used CSR communication strategy in social media. The first part of this hypothesis states: *“The strategies encompassing a two-way communication approach are used more than the strategies encompassing a one-way communication approach for corporate CSR communication on Twitter”*. The second part of this hypothesis states: *“The engagement strategy is used more than any other CSR communication strategy for corporate CSR communication on Twitter”*. Translating the given results regarding CSR communication interaction and responsiveness to an overall strategy according to Table 1, we arrived at the use of the personalized information strategy, a strategy which encompasses a one-way communication approach (Etter et al., 2011). This means that both hypothesis 5a and hypothesis 5b are rejected on the highest level (complete data set). We continued analysis to look into the support/rejection of these different hypotheses on both the subgroup levels as well as for on the level of each individual company.

4.3 Basic CSR communication characteristics & strategy subgroups (PC versus software/hardware)

After performing analysis on the complete data set, we now compared the two subgroups we have distinguished in our sample. We made a distinction between the companies with as core business manufacturing and selling PCs versus the companies with as core business manufacturing and selling software/hardware for PCs. In making these distinctive subgroups we classified Dell and HP to be in the first subgroup and classified Intel and Microsoft to be in the second subgroup (as discussed in chapter 3).

Moving on to performing analysis on these two subgroups we started again by looking at the CSR communication intensity. We again used weighted totals for CSR communication intensity (weight based on the number of days over what period of time the data was gathered for each company). The weighted CSR communication intensity gave a total of 131.2 tweets sent each month by subgroup 1 (PCs), and a total of 89.2 tweets sent each month by subgroup 2 (software/hardware). With further analysis, we continued to look into other CSR

communication characteristics. SPSS was used to retrieve the descriptives of CSR communication interaction and responsiveness by these subgroups. The results showed that from subgroup 1 (PCs), 73.9% of the tweets contained interaction. From these tweets which contained interaction, 11.1% was a response. When looking at the results from subgroup 2 (software/hardware), we see that 51.5% of their tweets contained interaction. From these tweets which used interaction, 17.8% was a response. All the results and their operationalized levels are summarized in Table 6 and 7 (the raw SPSS output can be found in the appendix).

Table 6. CSR communication intensity, interaction and responsiveness of subgroups

	Tweets/month	Degree of interaction	Degree of responsiveness
Subgroup 1: PC	131.2 tweets	73.9%	11.1%
Subgroup 2: Software/hardware	89.2 tweets	51.5%	17.8%

When turning back to the constructed hypotheses, and comparing these with the discussed results for the subgroups, we again see that hypothesis 1 is supported. Hypothesis 1 states: “*High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter*”, translating to these two subgroups sending at least 62 tweets/month per subgroup (the normal operationalization of more than 30 tweets/month, times 2, gives at least 62 tweets/month per subgroup). The results showed high levels of CSR communication intensity for both subgroups, thus hypothesis 1 is supported for both subgroups. However, the results showed a considerable difference in the average number of tweets the subgroups sent each month, a difference between 89.2 tweets per month for the software/hardware subgroup, and 131.2 tweets per month for the PC subgroup. Hypothesis 2 states: “*High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter*”, translating to more than 30% of the tweets containing interaction. The results showed high levels of interaction for both subgroups, thus also hypothesis 2 is supported for both subgroups. However, again, the results showed a considerable difference in the average percentages of tweets which contained interaction, a difference between 51.5% for the software/hardware subgroup, and 73.9% for the PC subgroup. Hypothesis 3 relates to what proportion of these tweets, which contained interaction, was a response. This hypothesis states: “*Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter*”, translating to between 20% and 80% of the tweets containing interaction being a response. The results

showed low levels of responsiveness for both subgroups, which means hypothesis 3 is rejected for both subgroups.

Table 7. CSR communication intensity, interaction, responsiveness and strategy of subgroups

	Level of CSR communication intensity	Level of CSR communication interaction	Level of CSR communication responsiveness	Communication strategy
Subgroup 1: PC	High	High	Low	Personalized information strategy
Subgroup 2: Software/ hardware	High	High	Low	Personalized information strategy

Finally, hypothesis 5 is about the used CSR communication strategy in social media. The first part of this hypothesis states: “*The strategies encompassing a two-way communication approach are used more than the strategies encompassing a one-way communication approach for corporate CSR communication on Twitter*”. The second part of this hypothesis states: “*The engagement strategy is used more than any other CSR communication strategy for corporate CSR communication on Twitter*”. Translating the given results regarding CSR communication interaction and responsiveness to an overall strategy according to Table 1, we arrived at the use of the personalized information strategy, a strategy which encompasses a one-way communication approach (Etter et al., 2011), by both subgroups. This means that both hypothesis 5a and hypothesis 5b are rejected for both subgroups. We illustrated the aforementioned results in two scatterplots, Figure 1 depicts the scores for each subgroup on the communication intensity and the used CSR communication strategy, while Figure 2 depicts the scores for each subgroup on the variables interaction and responsiveness. We continued analysis to look into the support/rejection of these different hypotheses on individual company level.

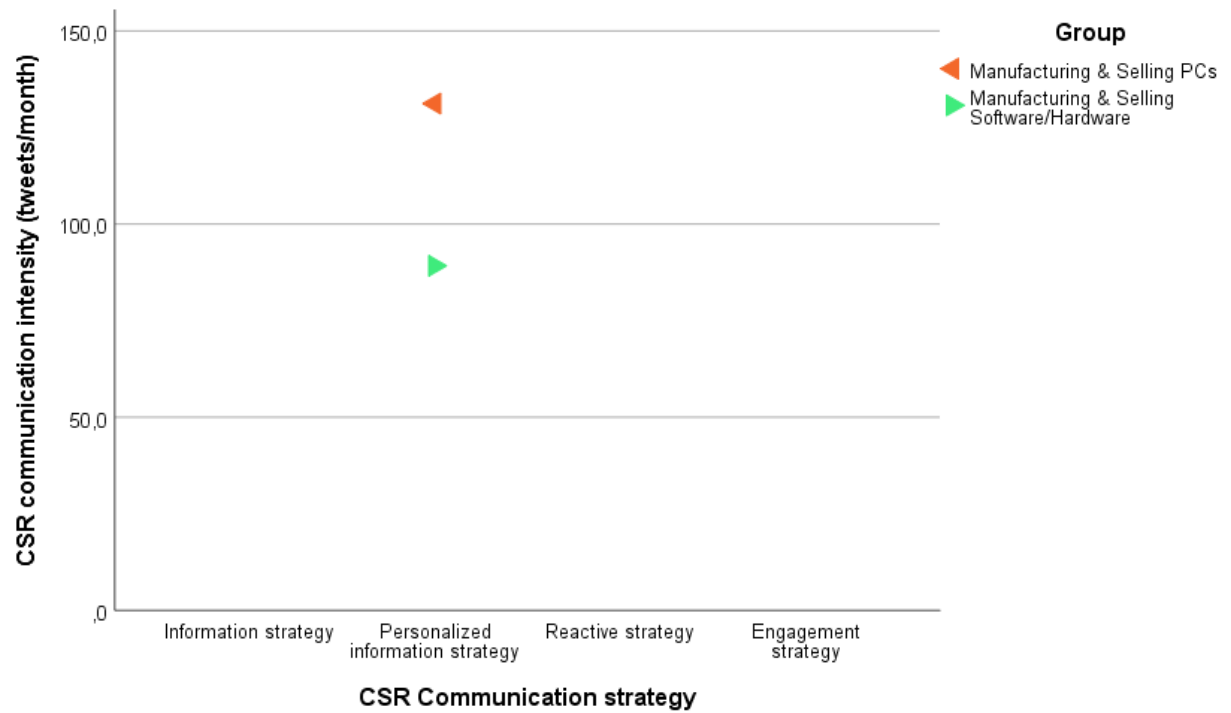


Figure 1. CSR communication intensity and strategy used by each subgroup

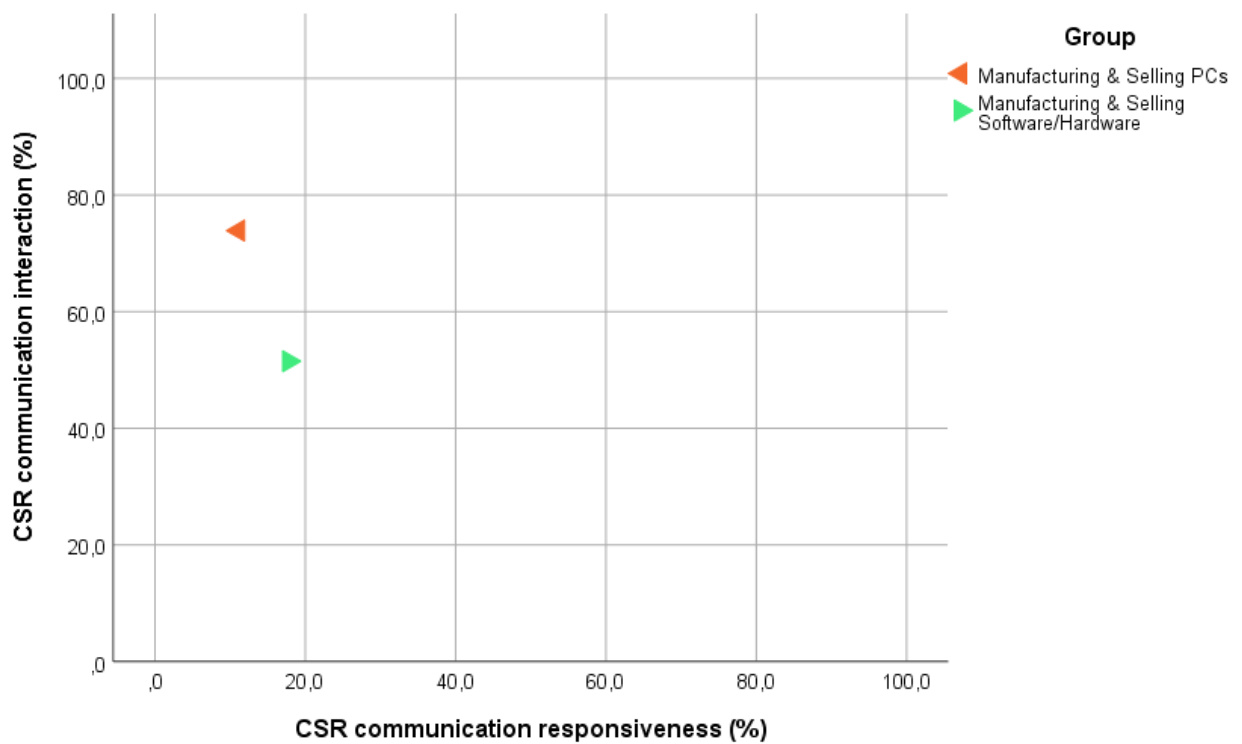


Figure 2. CSR communication interaction and responsiveness by each subgroup

4.4 Basic CSR communication characteristics & strategy each individual company

4.4.1 Dell

Next, we performed analyses on the data sets separated for each company, looking into the corporate CSR communication in social media on the individual level of each company. Starting off with the analysis for Dell. The intensity of the CSR communication by Dell was calculated as follows: First was calculated for how many days the data was retrieved, this was 1530 days. Since on average a month has 30.44 days, we calculated $1,530/30.44=50.26$ months. The data set contained 3,209 tweets, so on average, the intensity of Dell tweeting was $3,209/50.26=63.84$ tweets/month. Translating this result to the operationalized levels gave us a high level of CSR communication intensity for Dell. Meaning hypothesis 1: *“High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter”*, is supported for Dell.

Next up we analyzed the interaction and responsiveness in Dell’s CSR communication on Twitter. The results showed us that 75.1% of the tweets from Dell contained interaction, translating to a high level of interaction. Hypothesis 2: *“High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter”*, thus is supported for Dell. The results also showed us that 15.7% of the tweets from Dell, which contained interaction, was a response, translating to a low level of responsiveness. The related hypothesis, hypothesis 3: *“Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter”*, thus is rejected for Dell. The results of this analysis are summarized in Table 8 and Table 9 (the raw SPSS output can be found in the appendix).

4.4.2 HP

Continuing with the analysis performed on the data set from HP. The intensity of the corporate CSR communication by HP was calculated according to the same steps again: First was calculated for how many days the data was retrieved, in this case 767 days. Since on average a month has 30.44 days, we calculated $767/30.44=25.20$ months. The data set contained 1,744 tweets, so on average, the intensity of HP tweeting was $1,744/25.2=69.21$ tweets/month. Translating this result to the operationalized levels gave us a high level of CSR communication intensity for HP. Meaning hypothesis 1: *“High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter”*, is supported for HP.

Next up we analyzed the interaction and responsiveness in HP's CSR communication on Twitter. The results showed us that 71.3% of the tweets from HP contained interaction, translating to a high level of interaction. Hypothesis 2: "*High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter*", thus is supported for HP. The results also showed us that 2.1% of the tweets from HP, which contained interaction, was a response, translating to a low level of responsiveness. The related hypothesis, hypothesis 3: "*Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter*", thus is rejected for HP. The results of this analysis are summarized in Table 8 and Table 9 (the raw SPSS output can be found in the appendix).

4.4.3 Intel

Next up is Intel. The intensity of the corporate CSR communication by Intel was again calculated according to the previous steps: First was calculated for how many days the data was retrieved, in this case 1,714 days. Since on average a month has 30.44 days, we calculated $1,714/30.44=56.31$ months. The data set contained 3,218 tweets, so on average, the intensity of Intel tweeting was $3,218/56.31=57.15$ tweets/month. Translating this result to the operationalized levels gave us a high level of CSR communication intensity for Intel. Thus meaning hypothesis 1: "*High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter*", is supported for Intel.

Next up we analyzed the interaction and responsiveness in Intel's CSR communication on Twitter. The results showed us that 43.2% of the tweets from Intel contained interaction, translating to a high level of interaction. Hypothesis 2: "*High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter*", thus is supported for Intel. The results also showed us that 11.9% of the tweets from Intel, which contained interaction, was a response, translating to a low level of responsiveness. The related hypothesis, hypothesis 3: "*Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter*", thus is rejected for Intel. The results of this analysis are summarized in Table 8 and Table 9 (the raw SPSS output can be found in the appendix).

4.4.4 Microsoft

Finally, the data set from Microsoft was analyzed. The intensity of the corporate CSR communication by Microsoft was calculated according to the previously taken steps: First was calculated for how many days the data was retrieved, in this case 2,488 days. Since on average a month has 30.44 days, we calculated $2,488/30.44=81.73$ months. The data set contained 3,225 tweets, so on average, the intensity of Microsoft tweeting was $3,225/81.73=39.46$ tweets/month. Translating this result to the operationalized levels gave us a high level of CSR communication intensity for Microsoft. Thus meaning hypothesis 1: “*High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter*”, is also supported for Microsoft.

Next up we analyzed the interaction and responsiveness in Microsoft’s CSR communication on Twitter. The results showed us that 59.8% of the tweets from Microsoft contained interaction, translating to a high level of interaction. Hypothesis 2: “*High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter*”, thus is supported for Microsoft. The results also showed us that 14.3% of the tweets from Microsoft, which contained interaction, was a response, translating to a low level of responsiveness. The related hypothesis, hypothesis 3: “*Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter*”, thus is rejected for Microsoft. The results of this analysis are summarized in Table 8 and Table 9 (the raw SPSS output can be found in the appendix).

Table 8. CSR communication intensity, interaction and responsiveness of each company

	Tweets/month	Degree of interaction	Degree of responsiveness
Dell	63.8 tweets	75.1%	15.7%
HP	69.2 tweets	71.3%	2.1%
Intel	56.3 tweets	43.2%	11.9%
Microsoft	36.5 tweets	59.8%	14.3%

Looking at the analyses and the results we discussed and depicted in Table 8, these numbers translated to certain levels we have operationalized in chapter three. By translating the numerical results from Table 8 to these different levels, and relating them to one of the four CSR communication strategies from the framework of Etter et al. (2011) we made Table 9. We also illustrated the results in two scatterplots, Figure 3 depicts the scores for each company on

the communication intensity and the used CSR communication strategy, while Figure 4 depicts the scores for each company on the variables interaction and responsiveness.

Table 9. CSR communication intensity, interaction, responsiveness and strategy of each company

	Level of CSR communication intensity	Level of CSR communication interaction	Level of CSR communication responsiveness	Communication strategy
Dell	High	High	Low	Personalized information strategy
HP	High	High	Low	Personalized information strategy
Intel	High	High	Low	Personalized information strategy
Microsoft	High	High	Low	Personalized information strategy

We already discussed the support or rejection from the hypotheses 1, 2 and 3 for each company, relating to their CSR communication characteristics, in its turn relating to the overall used CSR communication strategy. Our fifth hypothesis is related to this used CSR communication strategy. The first part of this hypothesis states: “*The strategies encompassing a two-way communication approach are used more than the strategies encompassing a one-way communication approach for corporate CSR communication on Twitter*”. The second part of this hypothesis states: “*The engagement strategy is used more than any other CSR communication strategy for corporate CSR communication on Twitter*”. However, looking at Table 9 and/or Figure 3 we see that every company used the personalized information strategy, a strategy which encompasses a one-way communication approach (Etter et al., 2011). This means that both hypothesis 5a and hypothesis 5b are rejected for every company.

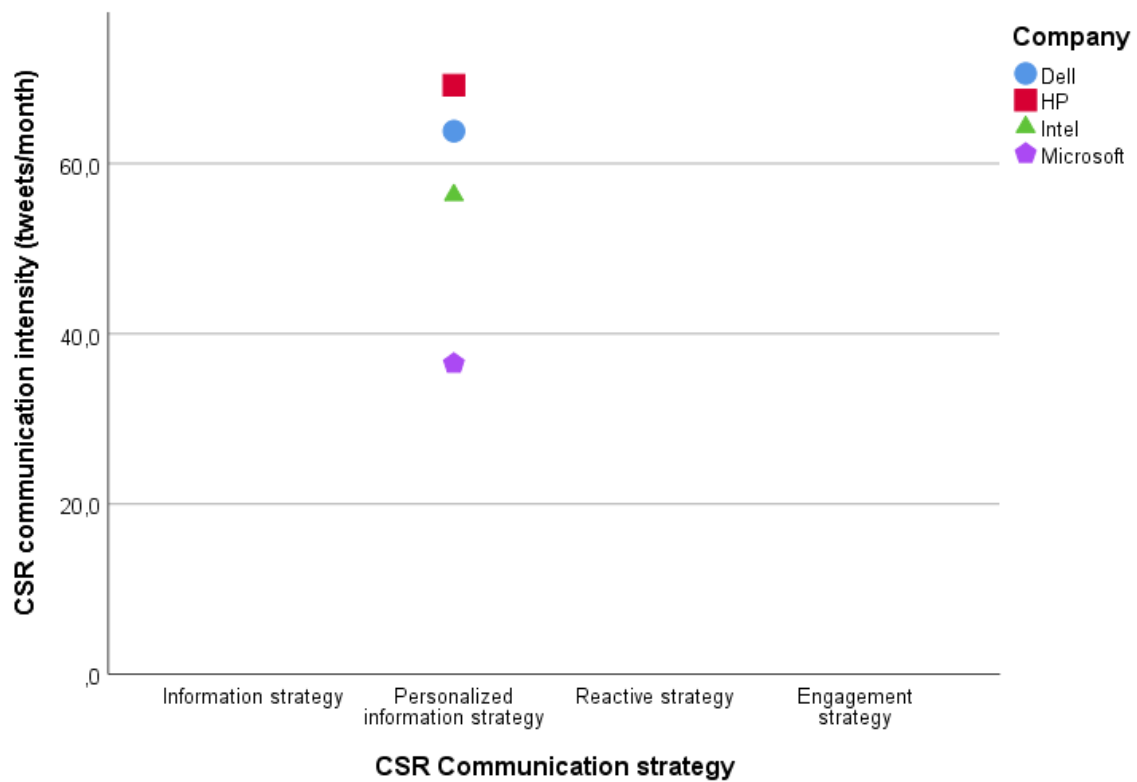


Figure 3. CSR communication intensity and strategy used by each company

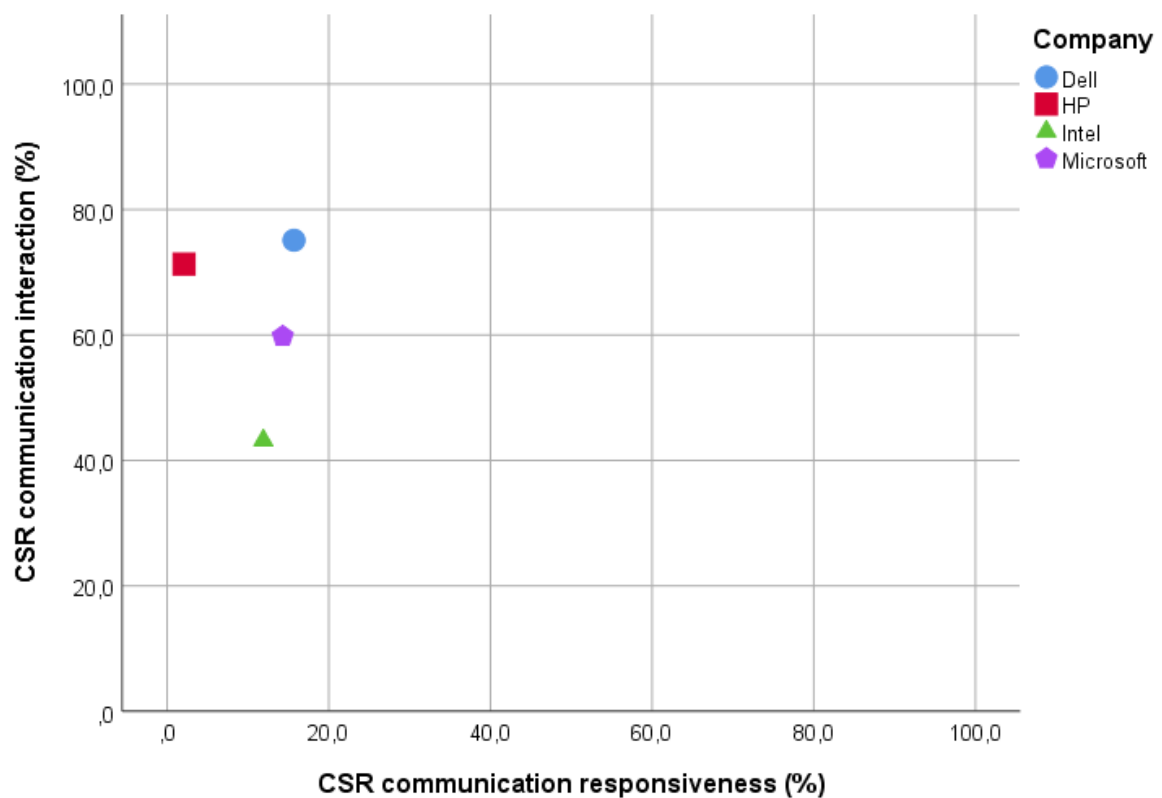


Figure 4. CSR communication interaction and responsiveness by each company

4.5 Further exploring CSR communication characteristics: Sentiment analysis

To analyze the sentiment used in corporate CSR communication in social media we used LIWC2015 for further text analysis. As described in chapter three, we focused on the ‘tone’ variable in LIWC2015 for the sentiment analysis. The result for this variable is a score ranging from 0 to 100. In a general sense, below 50 means negative, the closer to 0 the stronger, above 50 means positive, the closer to 100 the stronger. Pennebaker et al. (2015b) provided a basic benchmark when developing the psychometric properties of LIWC2015. In creating this benchmark they ran the LIWC2015 analysis for several different sorts of texts, for instance, blogs, expressive writing, novels, and tweets, and provided the mean scores for these texts and the mean score over all the different samples taken together. Their analysis gave a mean score on the ‘tone’ variable of 54.22 (Pennebaker et al., 2015b), suggesting a relatively weak positive sentiment. However, the mean score for Twitter was already substantially higher, with a score of 72.24 (Pennebaker et al., 2015b), suggesting that the sentiment in Twitter is positive and stronger than the average sentiment over all the different sorts of text samples included in the benchmark.

When we ran the LIWC2015 text analysis, the results expressed a mean score of 63.12 on the ‘tone’ variable, translating to a weakly-moderate positive sentiment. Compared to the Twitter mean score from Pennebaker et al. (2015b) we can see our score is lower. After analyzing this mean score we also wanted to separate the two subgroups (PC versus software/hardware), and each individual company for scores on ‘tone’ for their corporate CSR communication in social media. In Table 10 we depicted all the results. We used the score on the ‘tone’ variable to code each individual tweet for positive or negative sentiment (the results did not show any tweet with neutral sentiment). Using this coding we analyzed how much percent of the tweets has positive sentiment, again at the highest level (complete data set), for the two different subgroups (PC versus software/hardware), and for each individual company. The results from these different analyses were added to Table 10 (the raw SPSS output can be found in the appendix).

As demonstrated in Table 10, was the average percentage of tweets with positive sentiment 52.5% for the complete data set. However, this does not yet prove that the use of positive sentiment significantly differed with the use of more negative sentiment or a perfect 50/50 ratio of positive and negative sentiment. To test hypothesis 4 at the highest level (complete data set) we thus performed a binomial test to check whether the proportion tweets that used positive sentiment significantly differed from a perfect 50/50 ratio of use of positive and negative sentiment. We tested it this way because our hypothesis states that: “*Positive*

sentiment is used more than negative sentiment in corporate CSR communication on Twitter”, and we already discussed that the results did not show tweets with neutral sentiment. To be able to confirm or reject the hypothesis we thus needed to know if the shown proportion of tweets with positive sentiment significantly differed from a 50/50 ratio of use of positive and negative sentiment. Results showed $p < 0.001$ ($N=11,396$), we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment. These results mean that hypothesis 4 is supported at the highest level (complete data set). The results are summarized in Table 11 (the raw SPSS output can be found in the appendix).

Table 10. Results for sentiment analysis including LIWC2015 benchmark

	Tone	Percentage tweets positive sentiment	Positive emotion	Negative emotion
Microsoft	65.34	55.2%	6.57%	0.41%
Dell	64.57	54.4%	7.12%	0.53%
HP	63.98	53.2%	5.97%	0.30%
Intel	59.00	47.4%	5.41%	0.66%
Subgroup 1: PC	64.36	54.0%	6.71%	0.45%
Subgroup 2: Software/hardware	62.17	51.3%	5.99%	0.54%
Complete data set	63.12	52.5%	6.30%	0.50%
Twitter mean LIWC2015	72.24		5.48%	2.14%
Mean LIWC2015	54.22		3.67%	1.84%

Continuing with the comparison between the two subgroups (PC versus software/hardware). The results showed that for the PC subgroup 54% of the tweets contained positive sentiment, for the software/hardware subgroup 51.3% of the tweets contained positive sentiment. However, again, this does not yet prove that the use of positive sentiment significantly differed with the use of more negative sentiment or a perfect 50/50 ratio of positive and negative sentiment. To test hypothesis 4 for both subgroups we thus performed two binomial tests to check whether the proportion tweets that used positive sentiment significantly differed from a perfect 50/50 ratio of use of positive and negative sentiment. Results showed

$p < 0.001$ ($N=4,953$) for the first subgroup (PC), we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment for the first subgroup. After repeating the same process for the second subgroup (software/hardware), the results showed $p < 0.05$ ($N=6,443$), we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment for the second subgroup. These results mean that hypothesis 4 is supported for both the subgroups (PC versus software/hardware). The results are summarized in Table 11 (the raw SPSS output can be found in the appendix).

When looking at the percentages of tweets with positive sentiment for each individual company (in Table 10), we saw that the percentages of tweets with positive sentiment were higher than 50% for Microsoft, Dell and HP. However, for Intel, only 47.4% of their tweets contained positive sentiment. To test the support or rejection of hypothesis 4 for each of these individual companies we again performed binomial tests to check whether the proportion tweets that used positive sentiment significantly differed from a perfect 50/50 ratio of use of positive and negative sentiment. Starting off with Microsoft, results showed $p < 0.001$ ($N=11,396$), we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment. These results mean that hypothesis 4 is supported for Microsoft. Repeating the process for Dell, results showed $p < 0.001$, we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment. These results mean that hypothesis 4 is supported for Dell. Repeating the process for HP, results showed $p < 0.01$, we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment. These results mean that hypothesis 4 is supported for HP. Finally, repeating the test for Intel, for whom the results already showed that less than 50% of their tweets contained

positive sentiment, namely 47.4%. The results showed $p < 0.01$, we thus rejected the null hypothesis that the proportion that used positive sentiment is equal to the hypothesized proportion (50/50 ratio of use of negative and positive sentiment) and concluded that the proportion using positive sentiment significantly differed from a perfect 50/50 ratio of use of negative and positive sentiment. However, as already discussed, Intel showed greater use of negative sentiment in their corporate CSR communication than positive sentiment. This means hypothesis 4 is rejected for Intel. The results are summarized in Table 11 (the raw SPSS output can be found in the appendix).

Table 11. Results binomial tests of proportion tweets with positive sentiment

	N	Observed proportion positive sentiment	Test proportion positive sentiment	<i>p</i>
Microsoft	3,225	55.2% ***	50%	.000
Dell	3,209	54.4% ***	50%	.000
HP	1,744	53.2% **	50%	.009
Intel	3,218	47.4% **	50%	.003
Subgroup 1: PC	4,953	54.0% ***	50%	.000
Subgroup 2: Software/ hardware	6,443	51.3% *	50%	.041
Complete data set	11,396	52.5% ***	50%	.000

*** $p < .001$, ** $p < .01$, * $p < .05$

4.6 Additional analysis: Use of positive and negative emotion words

In addition to the score on different summary variables like the ‘tone’ variable, LIWC2015 includes a wide variety of other variables in their text analysis. Two of those variables were interesting for additional analysis of our tweets, those are the percentages of positive emotion words used in the text and percentages of negative emotion words used in the text. However, these are less ‘complete’ variables than the ‘tone’ variable, and thus we used the score on the ‘tone’ variable for the measurement and coding of sentiment, for testing the hypothesis. However, as an additional analysis, possibly giving more insight into corporate CSR communication in social media, we also extracted the percentages of positive emotion words and negative emotion words used in corporate CSR communication in social media. Again turning back to the benchmark given by Pennebaker et al. (2015b), the mean score over all different text samples was 3.67% for positive emotion words and 1.84% for negative emotion

words. When turning to the specific Twitter sample from their benchmark we see higher percentages of both variables, 5.48% of positive emotion words and 2.14% of negative emotion words.

Repeating the process for the results on the ‘tone’ variable, we first looked at the results for the complete data set, with all the companies taken together. The mean scores showed 6.30% for positive emotion words, and 0.50% for negative emotion words. Compared to the LIWC2015 benchmark, we see that the corporate CSR communication on Twitter is higher on positive emotion words, and lower on negative emotion words. After this analysis, we also wanted to separate the two subgroups (PC versus software/hardware), and each individual company, for scores on both variables (percentage positive emotion words and percentage negative emotion words). In Table 10 we depicted all the results (the raw SPSS output can be found in the appendix).

As you can notice, the companies in Table 10 are ordered by their score on the ‘tone’ variable, starting at the top with the highest scoring company (Microsoft), working our way down to the lowest scoring company (Intel). This ordering also matches with the ordering on the percentage of tweets with positive sentiment. However, this ordering does not match for this additional analysis into the percentages of positive emotion words used, and percentages of negative emotion words used. Since the ‘tone’ variable is more complete, this might not be that important after all. However, it could mean that Microsoft compared to Dell, for instance, used less but stronger positive emotion words, and/or Dell compared to Microsoft, for instance, used more but weaker negative emotion words. It might thus be interesting to dive deeper into this matter with future research. For example, exploring what positive emotion words are best for corporate CSR communication in social media, and what negative emotion words to avoid, this way delivering even more specific theoretical and practical knowledge on corporate CSR communication in social media.

4.7 Additional analysis: Chi-square tests

In addition to the previous analyses of the communication characteristics, already showing certain differences in the tables with the results, we also performed six chi-square tests to see if the two different subgroups (PC versus software/hardware) and the individual companies significantly differed in using interaction, responsiveness and positive sentiment in their CSR communication in social media. First off, we started by testing the three assumptions for Pearson’s Chi-square test. The first assumption is about the independence (Field, 2013), which can be explained as in that each subject contributes data to only one cell. In our case, the subjects

were the different companies/subgroups, and the cells were whether the tweets had positive or negative sentiment, if the tweets contained interaction (true or false), or if these tweets, which contained interaction, was a response (true or false). Our sample is thus in line with the independence assumption, the subjects did not contribute to more than one cell in each of the chi-square tests. The second assumption states that no more than 20% of the contingency cells can have expected values of < 5 (Field, 2013). The SPSS output (appendix 18-23) showed us that in all our tests 0% of the contingency cells had expected values of < 5 . This means our sample is also in accordance with the second assumption. The third assumption states that no cells should have an expected value of < 1 (Van Kranenburg, Cloudt, & Hagedoorn, 2001). The SPSS output (appendix 18-23) showed us that in all our tests 0% of the contingency cells had expected values of < 1 . Finally, this means our sample is also in accordance with the third and last assumption.

After testing and confirming we are in line with the assumptions, we ran all the chi-square tests in SPSS. Results showed us that in all cases Pearson's chi-square is significant ($p < 0.01$), thus rejecting the null hypothesis (which assumes that there is no association between the two variables) and supporting the hypothesis that these variables are associated. These results thus support that both the two subgroups (PC versus software/hardware), as well as each individual company, significantly differed in using interaction, responsiveness and positive sentiment in their CSR communication in social media. In Figure 5 and Figure 6 the differences on the different variables are illustrated in bar charts, Figure 5 depicts the bar charts for the different subgroups, Figure 6 depicts the bar charts for the different companies.

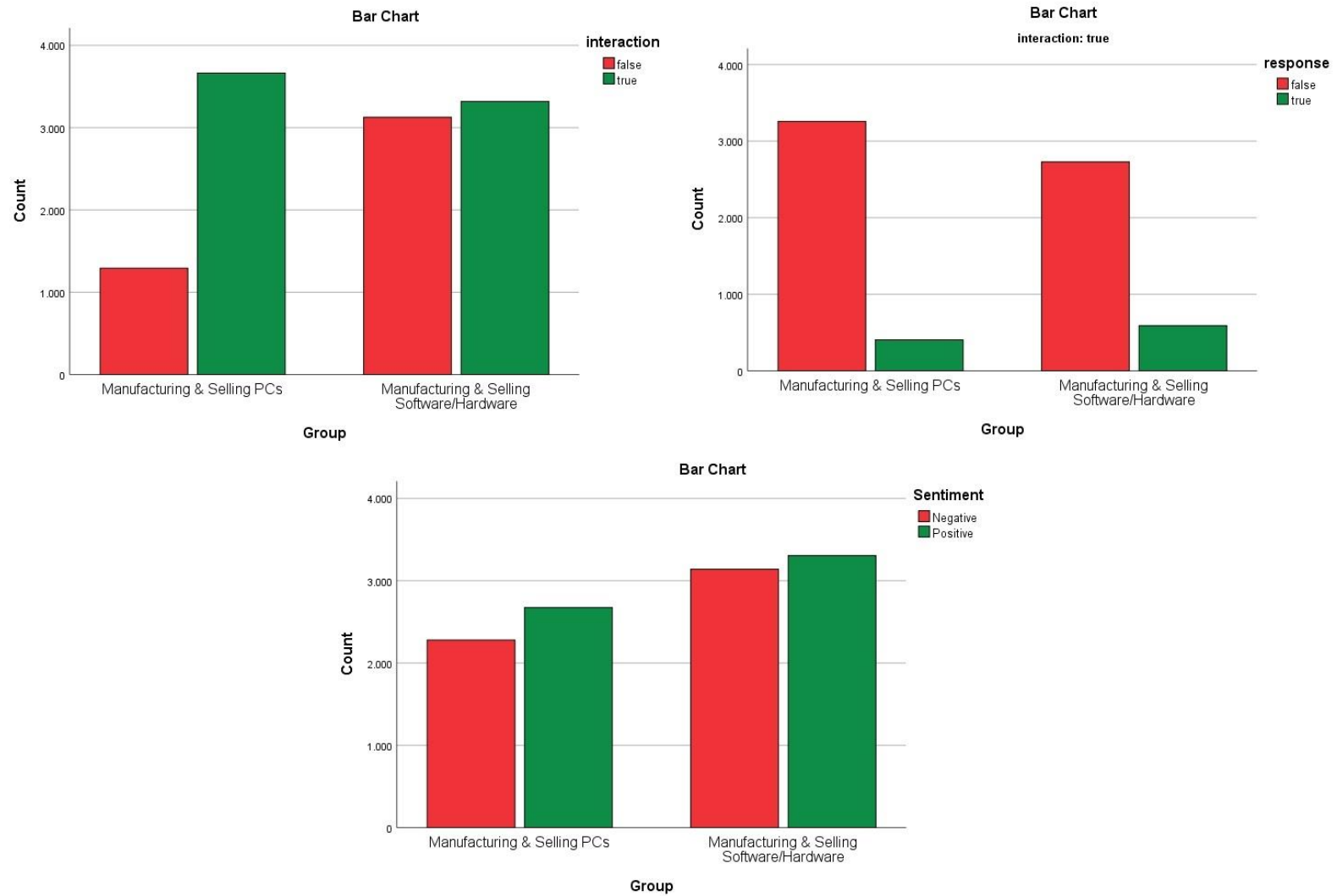


Figure 5. Bar charts CSR communication interaction, responsiveness and sentiment on subgroup level

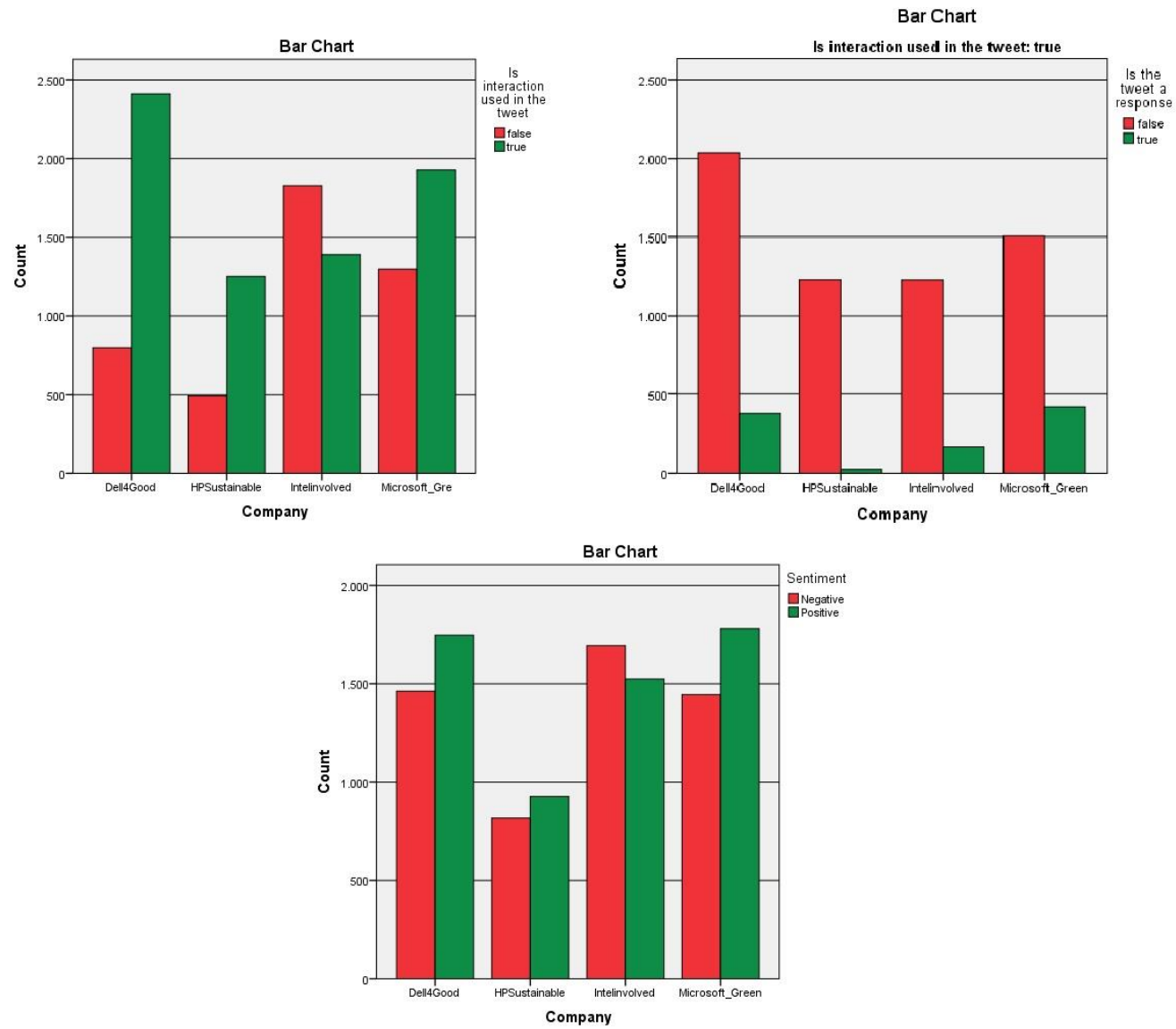


Figure 6. Bar charts CSR communication interaction, responsiveness and sentiment on company level

5. Conclusions

5.1 Conclusions

The research question of this study was: *“How do companies use social media for CSR communication?”*. The research sub-questions constructed were: *“What do we define as CSR?”*, *“What are the characteristics of corporate CSR communication in social media?”* and *“What communication strategy is used for corporate CSR communication in social media?”*. To explore this topic we constructed and conducted this study based on a number of hypotheses. These hypotheses looked into different CSR communication characteristics, and the more overall CSR communication strategy used. The hypotheses were constructed and based on earlier studies looking into (corporate) CSR communication in social media (Capriotti, 2011; Colleoni, 2013; Etter, 2013; Etter et al., 2011). We tested these constructed hypotheses and the results of our analyses supported several hypotheses, however, also rejected some of the hypotheses.

The first research sub-question, *“What do we define as CSR?”*, was answered in the literature review. We defined CSR in this study as *“the continuous commitment by businesses to make proactive efforts to improve the quality of life of the community and society at large (both ecological and social)”* (Cho, Furey, & Mohr, 2017; World Business Council for Sustainable Development, 1999).

In answering the second research sub-question, *“What are the characteristics of corporate CSR communication in social media?”*, we tested hypotheses 1 till 4. The first hypothesis states that: *“High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter”*. This hypothesis was supported by the results on all the different levels, being on the highest level (the complete data set), in the comparison between the two subgroups with different core businesses (PC versus software/hardware), as well as for each individual company. The second hypothesis states that: *“High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter”*. This hypothesis was also supported by the results on all the different levels (complete data set, subgroups, and individual companies). The third hypothesis states that: *“Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter”*. This hypothesis was rejected by the results on all the different levels (complete data set, subgroups, and individual companies). The results actually showed low levels of responsiveness. The fourth and last hypothesis about the CSR communication characteristics on Twitter was about sentiment used and states that:

“Positive sentiment is used more than negative sentiment in corporate CSR communication on Twitter”. This hypothesis was supported by the results on the highest level (complete data set), for both subgroups (PC versus software/hardware), as for three of the four companies. Only for the corporate CSR communication on Twitter by Intel this hypothesis was rejected by the results. The results for Intel actually showed a larger percentage of tweets with negative sentiment than tweets with positive sentiment.

Finally, in answering the third research sub-question, *“What communication strategy is used for corporate CSR communication in social media?”*, the last hypothesis from this study, which consists of two parts, was tested. The first part of this hypothesis states: *“The strategies encompassing a two-way communication approach are used more than the strategies encompassing a one-way communication approach for corporate CSR communication on Twitter”*. The second part of this hypothesis states: *“The engagement strategy is used more than any other CSR communication strategy for corporate CSR communication on Twitter”*. The CSR communication strategy was determined by the CSR communication characteristics interaction and responsiveness. As discussed and demonstrated by the hypothesis, we expected that the strategies encompassing a two-way communication approach (reactive strategy and engagement strategy) were used more than the strategies encompassing a one-way communication approach (information strategy and personalized information strategy). More specifically, we expected that the engagement strategy would be the dominant CSR communication strategy on Twitter, which is characterized by a medium to high level of interaction and a medium level of responsiveness. However, the results rejected both the parts of this hypothesis on all the different levels (complete data set, subgroups, and individual companies). The results actually demonstrated us that the personalized information strategy, a strategy which encompasses a one-way communication approach (Etter et al., 2011), was the dominant CSR communication strategy for corporate CSR communication on Twitter. In Table 12 is given a summary of all the hypotheses from this study, and whether they are supported or rejected by the results, on all the different levels, being on the highest level (the complete data set), for the two subgroups with different core businesses (PC versus software/hardware), as well as for each individual company.

Table 12. Summary of all tested hypotheses

	Complete data set	Subgroup 1: PC	Subgroup 2: Software/hardware	Dell	HP	Intel	Microsoft
H1: High level of communication intensity is used more than low or medium level of communication intensity in corporate CSR communication on Twitter	Supported	Supported	Supported	Supported	Supported	Supported	Supported
H2: High level of interaction is used more than low or medium level of interaction in corporate CSR communication on Twitter	Supported	Supported	Supported	Supported	Supported	Supported	Supported
H3: Medium level of responsiveness is used more than low or high level of responsiveness in corporate CSR communication on Twitter	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected
H4: Positive sentiment is used more than negative sentiment in corporate CSR communication on Twitter	Supported	Supported	Supported	Supported	Supported	Rejected	Supported
H5a: The strategies encompassing a two-way communication approach are used more than the strategies encompassing a one-way communication approach for corporate CSR communication on Twitter	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected
H5b: The engagement strategy is used more than any other CSR communication strategy for corporate CSR communication on Twitter	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected

A first additional analysis further looked into the used text in the corporate CSR communication on Twitter, by exploring the percentages of positive emotion words and negative emotion words. Compared to the LIWC2015 (Twitter) benchmark, the corporate CSR communication on Twitter showed a higher percentage of positive emotion words, and a lower percentage of negative emotion words.

Finally, as a second additional analysis, six chi-square tests were performed to explore if the differences between the two subgroups and between the four different companies were significant when it came to the use of positive sentiment, interaction, and responsiveness. All the chi-square tests came back significant, proving that both the subgroups, as well as each individual company significantly differed on these variables (CSR communication interaction, responsiveness, and sentiment).

5.2 Discussion

Since there is no recent research that is (exactly) alike, we are not able to really compare our study and the results as precisely as would have been ideal. However, we did find studies that looked into (corporate) CSR communication on Twitter which date back some years now. For instance, the study from Etter et al. (2011) which we used as a foundation for this study. When we compare our results with the results from this study of Etter et al. (2011), we see that the intensity of corporate CSR communication has increased. We did, however, also expect this up front, because of the increase in active Twitter users worldwide per month (Statista, 2017a) and the fact that our sample merely consists of Twitter accounts that are dedicated to CSR/sustainability (Etter, 2013). It might, however, not be solely based on these facts, and thus suggests that companies communicate more often about CSR on Twitter at this point in time.

When looking at the CSR communication characteristics interaction and responsiveness, we see that the interaction has also increased (compared to Etter et al., 2011), however, the responsiveness has decreased considerably (compared to Etter et al., 2011). The reasons behind this decrease of responsiveness might be really interesting to find out through further research. It could possibly be that responsiveness falls behind because of the general increase in communication intensity. However, this is merely a speculation, further (qualitative) research should dive into this topic. These CSR communication characteristics do make it so that the dominant CSR communication strategy in our study is the personalized information strategy (one-way communication approach), when the engagement strategy (two-way communication approach) was the dominant CSR communication strategy in the study from Etter et al. (2011). This is interesting because we expected and hypothesized that the strategies

encompassing a two-way communication approach would be used more than the strategies encompassing a one-way communication approach, and even more specific for the engagement strategy to be the most used CSR communication strategy. However, because of the lack of responsiveness, which should be further researched, this is not the case.

Also interesting is the fact that the study from Etter et al. (2011) already looked into corporate CSR communication by Microsoft on Twitter, via their '@Microsoft_Green' account on Twitter, just like this study did. Noted has to be that the study from Etter et al. (2011) only used data over 1.5 years for this account, dating from the creation of the account, 9th of January 2009, to August 8th of 2010, thus, their results may be less 'solid' and reliable. However, when we take this into account, we see that for this old data set Microsoft's corporate CSR communication on Twitter actually used the ideal strategy, the engagement strategy (Etter et al., 2011), when they now merely used the personalized information strategy according to our results. It might thus prove to be interesting to monitor corporate CSR communication by large multinationals, and see in which way it develops. In the case of Microsoft, it seems to have developed in the wrong direction, at least according to the theory and framework from Etter et al. (2011). It might also be of great interest to explore the reasons why these companies develop the way they do. Further qualitative research on this matter might reveal interesting factors in this context.

When looking back at the comparison between the two subgroups, we expected certain differences based on the core business. The first subgroup (Dell and HP) has as core business to manufacture and sell PCs, therefore can be expected to often be in direct contact with the consumer. This can be expected because they have to influence the consumer, for instance, to choose and buy their PCs out of all the different options. The second subgroup (Intel and Microsoft) has as core business to manufacture and sell the software/hardware for these PCs, therefore can be expected that these companies focus more on contact with (potential) companies that buy and use their software/hardware to build PCs. On the basis of this focus on contact with consumers or with other companies, we expected the first subgroup to communicate more 'intense' about CSR (sending more tweets/month). We expected this because Twitter is a popular medium to broadcast messages, in this case about CSR, to stakeholders and the more general public. In being so, we expected subgroup 1 to 'push harder' when it comes to corporate CSR communication on Twitter. Subgroup 2 might of course still want to show their CSR agenda and efforts to stakeholders and the more general public, however, their focus might be more on (direct) communication with (potential) companies buying and using their software/hardware. The results support this expectation, and despite

showing high levels of CSR communication intensity for both subgroups, also showed a considerable difference between the average number of tweets sent per month. Subgroup 1 (PC) on average sent 47% more tweets per month than subgroup 2 (software/hardware). In line with this expectation, because of subgroup 1 ‘pushing harder’ when it comes to corporate CSR communication on Twitter, we expected subgroup 1 to show more interaction in the CSR communication on Twitter than subgroup 2. The results support this expectation, and despite showing high levels of CSR communication interaction for both subgroups, also showed a considerable difference between the average percentages of tweets which contained interaction. Subgroup 1 (PC) on average used interaction in 43% more tweets compared to subgroup 2 (software/hardware). We did not have clear expectations on possible differences in CSR communication responsiveness between the two subgroups.

When focusing on the use of sentiment in (CSR) communication on Twitter, we turn to the studies of Hansen et al. (2011) and Colleoni (2013). These studies already tested the use of sentiment on Twitter. The study from Hansen et al. compared news tweets with non-news tweets, and Colleoni (2013) extended the research of the use of sentiment into the specific context of (corporate) CSR communication on Twitter. In essence, classical theory suggests that negative sentiment is better for spreading news (Hansen et al., 2011). However, Hansen et al. (2011) showed that people tend to associate themselves more with positive content, which translated to their results showing that positive sentiment was better for non-news tweets. Colleoni later (2013) tested the use of sentiment for CSR communication on Twitter, and the results showed that positive sentiment was used the most when it came to CSR communication on Twitter, both for companies as for the public. Our results support these previous results for (corporate) CSR communication on Twitter, and showed more positive sentiment used than negative sentiment. However, on the individual company level, this was not the case for Intel. The results showed that Intel had more tweets with negative sentiment than tweets with positive sentiment. However, disregarding our results, it could be interesting for future research to look further into the distinction between news tweets and non-news tweet, related to corporate CSR communication on Twitter. Research on this matter could prove to be interesting and helpful for companies to decide when to use what sentiment when communicating about different matters in the more overall subject of CSR.

5.3 Practical implications

The results from this study suggest that large multinationals, from the IT industry, do not leverage social media to the maximum potential it could bring when it comes to corporate CSR

communication, according to the theory and framework from Etter et al. (2011). The potential in using social media for corporate CSR communication is huge. As discussed in the literature review, it is a medium which brings interactivity into the communication between a company and its customers. When relating this to the ongoing CSR conversation, companies can use social media to co-create the CSR agenda and efforts, receiving feedback from their stakeholders. This increases the chances to develop successful CSR, increasing corporate legitimacy, which in its turn positively correlates with firm performance. Other literature already showed this positive relationship between involvement in CSR and firm performance, also often referred to as the concept of ‘doing well by doing good’ (Bhattacharya & Sen, 2004; Madueño et al., 2016; Wu, 2006).

Our study thus concludes that large multinationals do not leverage social media the right way for corporate CSR communication at this point in time. This means it leaves large multinationals with a gap to fill with improvement on this matter. When looking at the CSR communication characteristics on Twitter from large multinationals, they are actually performing well on this matter of communication intensity, the use of sentiment (except for Intel), and interaction. However, they have to improve their responsiveness. Our study shows that large multinationals still lack in this area, and therefore leave great opportunities. One would think that it would show an improvement in service if a company openly replies to the questions from their customers, and the more general public in social media. And if companies are able to improve their responsiveness, and move to medium levels of responsiveness, they also fit into the ideal CSR communication strategy for social media according to the framework from Etter et al. (2011), which is the engagement strategy. When using the engagement strategy, companies disseminate information towards other (Twitter) members personally and also show interest in responding to Twitter members publicly. In doing so, companies can establish an interpersonal dialectic relationship, creating symmetric two-way communication, which is ideal. In the end, both the companies as the consumers can benefit from these changes in corporate CSR communication in social media.

5.4 Limitations and further research

There are several limitations to this study. One of the core limitations of this study is the fact that differences in CSR communication between the companies were left unexplored. Our study did highlight some differences between the companies when it comes to CSR communication characteristics, however, these differences and the possible reasons behind them were not further explored. Further (qualitative) research should dive into this matter and explore the

various reasons there might be to the differences in CSR communication in social media. The same holds for the comparison between the two subgroups we made in our sample. We made a distinction between the companies with as core business manufacturing and selling PCs versus the companies with as core business manufacturing and selling software/hardware for PCs. In making these distinctive subgroups we classified Dell and HP to be in the first subgroup and classified Intel and Microsoft to be in the second subgroup. Our results showed considerable differences between the two subgroups when it came to CSR communication intensity and interaction. Again, the possible reasons behind these differences were left unexplored. Future (qualitative) research could thus also explore differences (and the possible reasons behind it) in CSR communication in social media between different groups, for instance, based on the core business. Making and comparing groups based on other factors might be also interesting (e.g. firm size or firm age).

There also are several limitations due to the application of text-mining to study corporate CSR communication on Twitter. A primary limitation because of this method might, for instance, be the fact that various languages have diverse linguistic structures, possibly also making for different ‘tweeting cultures’. In this study we focused on the English language, and therefore also the English ‘tweeting culture’. However, this means that our results might not be applicable for other languages and ‘tweeting cultures’ such as, for instance, Chinese and Spanish. Since Chinese and Spanish are number two and number three in the most used languages on the internet (Internet World Stats, 2017c), it is also interesting to research (corporate) CSR communication in social media for these languages and ‘tweeting cultures’. Future research should therefore look into Spanish/Chinese (corporate) CSR communication in social media, possibly revealing important differences (for companies) to take into account when creating and executing a CSR communication strategy for social media. A second limitation because of the application of text-mining might be the large volume of data. Twitter data keeps piling up, and therefore it is a very dynamic subject. This implies that the results of this research may need updating in a narrow time window. Further research should thus ideally develop a way of structurally monitoring corporate CSR communication on Twitter, to spot (abrupt) developments in the context. Despite this large volume of Twitter data, not even all tweets are indexed or made available by Twitter. This might thus be another limitation, and must be held into account when interpreting our results. Finally, while the application of text-mining has benefits in terms of transparency and implementability by practitioners and other academics, future research should develop this work further and investigate more nuanced approaches of studying CSR communication in social media. For example, social network

analysis can supplement the text-mining, to gain a deeper understanding of the corporate-consumer social network relationships.

Another limitation might be the use of LIWC2015 for sentiment analysis. Learning how words reveal thoughts, feelings, personality, and motivations, “Based on years of scientific research, LIWC2015 is more accurate, easier to use, and provides a broader range of social and psychological insights” (LIWC, 2015). However, there might be possible concerns about the accuracy of such a tool for short texts like tweets, especially since certain tweets only contained a few words after the data cleaning. Future research should encompass other methods of sentiment analysis, to test if the results still hold. Future research could also try to extend the study of the use of sentiment in CSR communication to other social media, for example, Facebook. The reason for this is that different social media might hold different implications for the use of sentiment in CSR communication. However, this point might be applicable to this complete study. The previous studies we found all focused on (corporate) CSR communication on Twitter, but future research should also set out to explore (corporate) CSR communication in other social media such as Facebook, to highlight possible important differences.

Last, it should be noted that the used methods merely ‘scratch the surface’ of the complex concept of corporate CSR communication in social media, and its strategies. Our sample, for instance, only consisted of large multinationals from the IT industry, it might be the case that corporate CSR communication by large multinationals from other industries is completely different. Further research, implementing other deeper (qualitative) research methods, in other industries, is required to get a more complete understanding of the concept of corporate CSR communication in social media, and the different strategies there are to it. In doing so, further research might discover new important dimensions to corporate CSR communication in social media, and possibly even create entire new theories and frameworks regarding corporate CSR communication in social media. One of the interesting topics here might be the attitude from the public (e.g. followers/friends on social media) towards the CSR communication by a company. The CSR communication characteristics and strategy might be negative or positive, or even considered ideal according to a specific theory or framework, but in the end it all comes down to how the audience evaluates the company and its CSR communication. Further research should thus include the role of attitude in the context of corporate CSR communication (in social media).

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Appendix: SPSS output

Appendix 1: CSR communication interaction & responsiveness of complete data set

Is interaction used in the tweet

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid false	4416	38,8	38,8	38,8
true	6980	61,2	61,2	100,0
Total	11396	100,0	100,0	

Is the tweet a response^a

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid false	5985	85,7	85,7	85,7
true	995	14,3	14,3	100,0
Total	6980	100,0	100,0	

a. Is interaction used in the tweet = true

Appendix 2: CSR communication interaction & responsiveness of PC subgroup

interaction^a

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	false	1291	26,1	26,1	26,1
	true	3662	73,9	73,9	100,0
	Total	4953	100,0	100,0	

a. Group = Manufacturing & Selling PCs

Group * response Crosstabulation^a

			response		
			false	true	Total
Group	Manufacturing & Selling PCs	Count	3257	405	3662
		% within Group	88,9%	11,1%	100,0%
	Manufacturing & Selling Software/Hardware	Count	2728	590	3318
		% within Group	82,2%	17,8%	100,0%
Total		Count	5985	995	6980
		% within Group	85,7%	14,3%	100,0%

a. interaction = true

Appendix 3: CSR communication interaction & responsiveness of software/hardware subgroup

interaction^a

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	false	3125	48,5	48,5	48,5
	true	3318	51,5	51,5	100,0
	Total	6443	100,0	100,0	

a. Group = Manufacturing & Selling Software/Hardware

Group * response Crosstabulation^a

			response		
			false	true	Total
Group	Manufacturing & Selling PCs	Count	3257	405	3662
		% within Group	88,9%	11,1%	100,0%
	Manufacturing & Selling Software/Hardware	Count	2728	590	3318
		% within Group	82,2%	17,8%	100,0%
Total		Count	5985	995	6980
		% within Group	85,7%	14,3%	100,0%

a. interaction = true

Appendix 4: CSR communication interaction & responsiveness of the individual companies

Is interaction used in the tweet

Handler from the tweet			Frequency	Percent	Valid Percent	Cumulative Percent
Dell4Good	Valid	false	798	24,9	24,9	24,9
		true	2411	75,1	75,1	100,0
		Total	3209	100,0	100,0	
HPSustainable	Valid	false	493	28,3	28,3	28,3
		true	1251	71,7	71,7	100,0
		Total	1744	100,0	100,0	
Intelinvolved	Valid	false	1828	56,8	56,8	56,8
		true	1390	43,2	43,2	100,0
		Total	3218	100,0	100,0	
Microsoft_Gre	Valid	false	1297	40,2	40,2	40,2
		true	1928	59,8	59,8	100,0
		Total	3225	100,0	100,0	

Handler from the tweet * Is the tweet a response Crosstabulation^a

			Is the tweet a response		Total
			false	true	
Handler from the tweet	Dell4Good	Count	2032	379	2411
		% within Handler from the tweet	84,3%	15,7%	100,0%
	HPSustainable	Count	1225	26	1251
		% within Handler from the tweet	97,9%	2,1%	100,0%
	Intelinvolved	Count	1224	166	1390
		% within Handler from the tweet	88,1%	11,9%	100,0%
	Microsoft_Gre	Count	1504	424	1928
		% within Handler from the tweet	78,0%	22,0%	100,0%
Total	Count	5985	995	6980	
	% within Handler from the tweet	85,7%	14,3%	100,0%	

a. Is interaction used in the tweet = true

Appendix 5: Score tone variable and percentage of positive sentiment tweets of complete data set

Statistics

Tone

N	Valid	11396
	Missing	0
Mean		63,12218322
Median		96,76000000
Std. Deviation		37,68601174
Range		99,00000000
Minimum		,0000000000
Maximum		99,00000000

Sentiment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	5418	47,5	47,5	47,5
	Positive	5978	52,5	52,5	100,0
	Total	11396	100,0	100,0	

Appendix 6: Score tone variable and percentage of positive sentiment tweets of subgroups

Statistics

Tone

Manufacturing & Selling PCs	N	Valid	4953
		Missing	0
	Mean		64,3602644861700
Manufacturing & Selling Software/Hardware	N	Valid	6443
		Missing	0
	Mean		62,1704190594444

Sentiment_PositiveNegative

Group			Frequency	Percent	Valid Percent	Cumulative Percent
Manufacturing & Selling PCs	Valid	Negative	2279	46,0	46,01	46,0
		Positive	2674	54,0	53,99	100,0
		Total	4953	100,0	100,00	
Manufacturing & Selling Software/Hardware	Valid	Negative	3139	48,7	48,72	48,7
		Positive	3304	51,3	51,28	100,0
		Total	6443	100,0	100,00	

Appendix 7: Score tone variable and percentage of positive sentiment tweets of the individual companies

Descriptive Statistics

twitter_handle		N	Minimum	Maximum	Mean	Std. Deviation
Dell4Good	Tone	3209	1,000000000	99,00000000	64,56771892	37,64726900
	Valid N (listwise)	3209				
HPSustainable	Tone	1744	1,000000000	99,00000000	63,97854358	37,27089948
	Valid N (listwise)	1744				
Intelinvolved	Tone	3218	1,000000000	99,00000000	58,99658173	37,96584653
	Valid N (listwise)	3218				
Microsoft_Green	Tone	3225	,000000000	99,00000000	65,33736744	37,36020828
	Valid N (listwise)	3225				

twitter_handle * Sentiment Crosstabulation

			Sentiment		Total
			Negative	Positive	
twitter_handle	Dell4Good	Count	1462	1747	3209
		% within twitter_handle	45,6%	54,4%	100,0%
	HPSustainable	Count	817	927	1744
		% within twitter_handle	46,8%	53,2%	100,0%
	Intelinvolved	Count	1694	1524	3218
		% within twitter_handle	52,6%	47,4%	100,0%
	Microsoft_Green	Count	1445	1780	3225
		% within twitter_handle	44,8%	55,2%	100,0%
	Total	Count	5418	5978	11396
		% within twitter_handle	47,5%	52,5%	100,0%

Appendix 8: Percentage of positive emotion words and percentage of negative emotion words of complete data set

Statistics

posemo

N	Valid	11396
	Missing	0
Mean		6,303028256
Median		5,560000000
Std. Deviation		8,788584919
Range		100,0000000
Minimum		,000000000
Maximum		100,0000000

Statistics

negemo

N	Valid	11396
	Missing	0
Mean		,4963311688
Median		,0000000000
Std. Deviation		2,101833548
Range		50,00000000
Minimum		,0000000000
Maximum		50,00000000

Appendix 9: Percentage of positive emotion words and percentage of negative emotion words of subgroups

Statistics

Group		posemo		negemo
Manufacturing & Selling PCs	N	Valid	4953	4953
		Missing	0	0
	Mean		6,71139915202908	,446587926509186
Manufacturing & Selling Software/Hardware	N	Valid	6443	6443
		Missing	0	0
	Mean		5,98909669408661	,534570852087537

Appendix 10: Percentage of positive emotion words and percentage of negative emotion words of the individual companies

Descriptive Statistics

twitter_handle		N	Minimum	Maximum	Mean	Std. Deviation
Dell4Good	posemo	3209	,0000000000	100,0000000	7,116989716	9,533828472
	Valid N (listwise)	3209				
HPSustainable	posemo	1744	,0000000000	100,0000000	5,965103211	7,520156787
	Valid N (listwise)	1744				
Intelinvolved	posemo	3218	,0000000000	100,0000000	5,411280298	7,376571911
	Valid N (listwise)	3218				
Microsoft_Green	posemo	3225	,0000000000	100,0000000	6,565658915	9,803054776
	Valid N (listwise)	3225				

Descriptive Statistics

twitter_handle		N	Minimum	Maximum	Mean	Std. Deviation
Dell4Good	negemo	3209	,0000000000	33,33000000	,5286880648	2,208315670
	Valid N (listwise)	3209				
HPSustainable	negemo	1744	,0000000000	20,00000000	,2955217890	1,549985532
	Valid N (listwise)	1744				
Intelinvolved	negemo	3218	,0000000000	50,00000000	,6585394655	2,481606125
	Valid N (listwise)	3218				
Microsoft_Green	negemo	3225	,0000000000	20,00000000	,4108713178	1,805917971
	Valid N (listwise)	3225				

Appendix 11: Binomial test proportion positive sentiment of complete data set

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Positive	5978	,525	,500	,000
	Group 2	Negative	5418	,475		
	Total		11396	1,000		

Appendix 12: Binomial test proportion positive sentiment of Microsoft

Binomial Test^a

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Positive	1780	,552	,500	,000
	Group 2	Negative	1445	,448		
	Total		3225	1,000		

a. twitter_handle = Microsoft_Green

Appendix 13: Binomial test proportion positive sentiment of Dell

Binomial Test^a

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Positive	1747	,544	,500	,000
	Group 2	Negative	1462	,456		
	Total		3209	1,000		

a. twitter_handle = Dell4Good

Appendix 14: Binomial test proportion positive sentiment of HP

Binomial Test^a

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Positive	927	,532	,500	,009
	Group 2	Negative	817	,468		
	Total		1744	1,000		

a. twitter_handle = HPSustainable

Appendix 15: Binomial test proportion positive sentiment of Intel

Binomial Test^a

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Positive	1524	,474	,500	,003
	Group 2	Negative	1694	,526		
	Total		3218	1,000		

a. twitter_handle = Intelinvolved

Appendix 16: Binomial test proportion positive sentiment of PC subgroup

Binomial Test^a

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Positive	2674	,54	,50	,000
	Group 2	Negative	2279	,46		
	Total		4953	1,00		

a. Group = Manufacturing & Selling PCs

Appendix 17: Binomial test proportion positive sentiment software/hardware subgroup

Binomial Test^a

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
Sentiment_PositiveNegative	Group 1	Negative	3139	,49	,50	,041
	Group 2	Positive	3304	,51		
	Total		6443	1,00		

a. Group = Manufacturing & Selling Software/Hardware

Appendix 18: Chi-square test Company * Interaction

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Handler from the tweet * Is interaction used in the tweet	11396	100,0%	0	0,0%	11396	100,0%

Handler from the tweet ^ Is interaction used in the tweet Crosstabulation

			Is interaction used in the tweet		Total
			false	true	
Handler from the tweet	Dell4Good	Count	798	2411	3209
		Expected Count	1243,5	1965,5	3209,0
		% within Handler from the tweet	24,9%	75,1%	100,0%
		Standardized Residual	-12,6	10,0	
	HPSustainable	Count	493	1251	1744
		Expected Count	675,8	1068,2	1744,0
		% within Handler from the tweet	28,3%	71,7%	100,0%
		Standardized Residual	-7,0	5,6	
	Intelinvolved	Count	1828	1390	3218
		Expected Count	1247,0	1971,0	3218,0
		% within Handler from the tweet	56,8%	43,2%	100,0%
		Standardized Residual	16,5	-13,1	
	Microsoft_Gre	Count	1297	1928	3225
		Expected Count	1249,7	1975,3	3225,0
		% within Handler from the tweet	40,2%	59,8%	100,0%
		Standardized Residual	1,3	-1,1	
Total	Count	4416	6980	11396	
	Expected Count	4416,0	6980,0	11396,0	
	% within Handler from the tweet	38,8%	61,2%	100,0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	786,223 ^a	3	,000
Likelihood Ratio	791,834	3	,000
N of Valid Cases	11396		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 675,81.

Appendix 19: Chi-square test Company * Responsiveness

Case Processing Summary^a

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Handler from the tweet * Is the tweet a response	6980	100,0%	0	0,0%	6980	100,0%

a. Is interaction used in the tweet = true

Handler from the tweet * Is the tweet a response Crosstabulation^a

			Is the tweet a response		Total
			false	true	
Handler from the tweet	Dell4Good	Count	2032	379	2411
		Expected Count	2067,3	343,7	2411,0
		% within Handler from the tweet	84,3%	15,7%	100,0%
		Standardized Residual	-,8	1,9	
	HPSustainable	Count	1225	26	1251
		Expected Count	1072,7	178,3	1251,0
		% within Handler from the tweet	97,9%	2,1%	100,0%
		Standardized Residual	4,7	-11,4	
	Intelinvolved	Count	1224	166	1390
		Expected Count	1191,9	198,1	1390,0
		% within Handler from the tweet	88,1%	11,9%	100,0%
		Standardized Residual	,9	-2,3	
	Microsoft_Gre	Count	1504	424	1928
		Expected Count	1653,2	274,8	1928,0
		% within Handler from the tweet	78,0%	22,0%	100,0%
		Standardized Residual	-3,7	9,0	
Total	Count	5985	995	6980	
	Expected Count	5985,0	995,0	6980,0	
	% within Handler from the tweet	85,7%	14,3%	100,0%	

a. Is interaction used in the tweet = true

Chi-Square Tests^a

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	256,481 ^b	3	,000
Likelihood Ratio	318,918	3	,000
N of Valid Cases	6980		

a. Is interaction used in the tweet = true

b. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 178,33.

Appendix 20: Chi-square test Company * Percentage positive sentiment

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
twitter_handle * Sentiment	11396	100,0%	0	0,0%	11396	100,0%

twitter_handle * Sentiment Crosstabulation

			Sentiment		Total
			Negative	Positive	
twitter_handle	Dell4Good	Count	1462	1747	3209
		Expected Count	1525,7	1683,3	3209,0
		% within twitter_handle	45,6%	54,4%	100,0%
		Standardized Residual	-1,6	1,6	
	HPSustainable	Count	817	927	1744
		Expected Count	829,1	914,9	1744,0
		% within twitter_handle	46,8%	53,2%	100,0%
		Standardized Residual	-,4	,4	
	IntelInvolved	Count	1694	1524	3218
		Expected Count	1529,9	1688,1	3218,0
		% within twitter_handle	52,6%	47,4%	100,0%
		Standardized Residual	4,2	-4,0	
	Microsoft_Green	Count	1445	1780	3225
		Expected Count	1533,3	1691,7	3225,0
		% within twitter_handle	44,8%	55,2%	100,0%
		Standardized Residual	-2,3	2,1	
	Total	Count	5418	5978	11396
		Expected Count	5418,0	5978,0	11396,0
		% within twitter_handle	47,5%	52,5%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	48,628 ^a	3	,000
Likelihood Ratio	48,604	3	,000
N of Valid Cases	11396		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 829,15.

Appendix 21: Chi-square test Subgroup * Interaction

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * interaction	11396	100,0%	0	0,0%	11396	100,0%

Group * interaction Crosstabulation

			interaction		Total
			false	true	
Group	Manufacturing & Selling PCs	Count	1291	3662	4953
		Expected Count	1919,3	3033,7	4953,0
		% within Group	26,1%	73,9%	100,0%
		Standardized Residual	-14,3	11,4	
	Manufacturing & Selling Software/Hardware	Count	3125	3318	6443
		Expected Count	2496,7	3946,3	6443,0
		% within Group	48,5%	51,5%	100,0%
		Standardized Residual	12,6	-10,0	
Total	Count		4416	6980	11396
	Expected Count		4416,0	6980,0	11396,0
	% within Group		38,8%	61,2%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	593,968 ^a	1	,000		
Continuity Correction ^b	593,023	1	,000		
Likelihood Ratio	606,825	1	,000		
Fisher's Exact Test				,000	,000
N of Valid Cases	11396				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 1919,31.

b. Computed only for a 2x2 table

Appendix 22: Chi-square test Subgroup * Responsiveness

Case Processing Summary^a

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * response	6980	100,0%	0	0,0%	6980	100,0%

a. interaction = true

Group * response Crosstabulation^a

			response		Total
			false	true	
Group	Manufacturing & Selling PCs	Count	3257	405	3662
		Expected Count	3140,0	522,0	3662,0
		% within Group	88,9%	11,1%	100,0%
		Standardized Residual	2,1	-5,1	
	Manufacturing & Selling Software/Hardware	Count	2728	590	3318
		Expected Count	2845,0	473,0	3318,0
		% within Group	82,2%	17,8%	100,0%
		Standardized Residual	-2,2	5,4	
Total	Count		5985	995	6980
	Expected Count		5985,0	995,0	6980,0
	% within Group		85,7%	14,3%	100,0%
	Standardized Residual				

a. interaction = true

Chi-Square Tests^a

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	64,357 ^b	1	,000		
Continuity Correction ^c	63,808	1	,000		
Likelihood Ratio	64,456	1	,000		
Fisher's Exact Test				,000	,000
N of Valid Cases	6980				

a. interaction = true

b. 0 cells (,0%) have expected count less than 5. The minimum expected count is 472,98.

c. Computed only for a 2x2 table

Appendix 23: Chi-square test Subgroup * Percentage positive sentiment

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Sentiment	11396	100,0%	0	0,0%	11396	100,0%

Group * Sentiment Crosstabulation

			Sentiment		Total
			Negative	Positive	
Group	Manufacturing & Selling PCs	Count	2279	2674	4953
		Expected Count	2354,8	2598,2	4953,0
		% within Group	46,0%	54,0%	100,0%
		Standardized Residual	-1,6	1,5	
	Manufacturing & Selling Software/Hardware	Count	3139	3304	6443
		Expected Count	3063,2	3379,8	6443,0
		% within Group	48,7%	51,3%	100,0%
		Standardized Residual	1,4	-1,3	
Total	Count		5418	5978	11396
	Expected Count		5418,0	5978,0	11396,0
	% within Group		47,5%	52,5%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8,228 ^a	1	,004		
Continuity Correction ^b	8,120	1	,004		
Likelihood Ratio	8,231	1	,004		
Fisher's Exact Test				,004	,002
N of Valid Cases	11396				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 2354,80.

b. Computed only for a 2x2 table