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Social Media as CRM? How Two Scandinavian Airline Companies Used Facebook during the “Ash Crisis” in 2010

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Abstract. Some researchers predict a paradigm shift within Customer Relationship Management (CRM), moving from the traditional large in-house CRM systems to social software such as Facebook. In this article we investigate two issues. First: are there inherent problems in traditional CRM systems that Facebook may resolve? Second: if so, can social media replace CRM systems? We conducted a case study of two Scandinavian airliners' use of Facebook for customer communication during the ash crisis in April 2010. Our analytical approach was a Business Intelligence analysis using web- and text mining based on 28.000 postings on Facebook. We offer two findings. First, Facebook resolves some shortcomings of traditional CRM. The openness of Facebook allows for more dynamic interaction between company and customers. Facebook has a self-reinforcing mechanism for diffusion, meaning that short-term usefulness triggers more use, which again will increase the usefulness. Second, we do not believe that social media can replace traditional CRM systems, but it constitutes an interesting challenge. If not a full CRM, Facebook can serve as a “social CRM”. In contrast to traditional CRM, companies may not be the strongest part, since personal information is controlled by the customer. This is indeed an interesting arena for researchers.

Keywords: CRM systems, social media, business intelligence, ash crisis, case study.

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1 Introduction

The recent surge of interest in social media has led marketing researchers to predict a paradigm shift in Customer Relationships Management (CRM) systems, sometimes named CRM 2.0 or “social CRM”, which denotes the integration of traditional CRM systems with social software, such as Facebook (Greenberg 2010b; Woodcock et al. 2011). All the key players within CRM (SAP, Oracle, and Microsoft) have announced solutions that combine their CRM systems with Facebook in various ways. The more innovative practitioners, however, have more far-reaching perspectives on CRM 2.0, which redefines fundamentally what CRM systems may develop into (Thompson 2007). For example, Clara Shih wrote in CRM Magazine in 2009 that “Facebook is the future of CRM”:

Facebook, Twitter, and other social sites have become CRM for individuals. They’re how a growing number of people manage relationships across personal and professional realms. Social media is reminding us - and vendors - that CRM should be about customers, not technology. The future of CRM will be transparent, customer-centric, and customer-driven (Shih 2009, p.1).

While such claims may appear a bit presumptuous, they clearly illustrate that social media challenge the thinking and the solutions of the traditional CRM vendors. But is this for real? The CRM systems business is a multi-billion dollar market, with IT heavyweight companies and very sophisticated software, being used by the world’s corporations in most industries. Can simple social software, such as Facebook, really challenge these giants? Or put differently, are there inherent and unsolved problems in traditional CRM systems that social software may resolve in new ways?

In this article we address this issue. Our empirical evidence is related to an incident that happened in April 2010. A volcano in Iceland, the Eyjafjallajökull, erupted suddenly and violently, and an enormous ash cloud covered shifting parts of Europe for about ten days. Most of the North and Central European airspace was closed, and hundreds of thousands of passengers were grounded all over the world. Nobody had any idea of how long the crisis would last, and the feeling of panic spread among the airline companies. The need for quick communication and instant problem solving was overwhelming.

The first thing that happened in the headquarters of the airlines was that the telephone services broke down immediately, leaving people rather desperate for information. However, as an improvised response, two airline companies in Scandinavia established a large-scale customer communications and problem-solving operation through Facebook (interviews with airlines), which actually solved much of the problems.

We think that this experience has bearings on the CRM discussion, for two reasons. First, it showed that the airline customer services were put under a lot of stress by the situation. Secondly, it was a big surprise that Facebook, which is mainly perceived as a kind of leisure time software for small news and gossip between friends, suddenly appeared as a useful and available channel in a crisis.

In this paper we discuss the underlying challenges of CRM systems, and the possible role of social media. We investigate this through two research questions: First: are there inherent and

unsolved problems in traditional CRM systems that Facebook may resolve in new ways? Second: if so, can Facebook replace CRM systems? We proceed by reviewing the CRM research, and assess how social media, such as Facebook, can solve some of the key challenges. Then we present our method and our case; the airlines' actions during the ash crisis. We present and discuss our findings, and conclude in the last section.

2 Research review

First we briefly introduce the concept of CRM and the CRM systems. Then we discuss some key problems with CRM systems, and compare traditional CRM with Facebook.

2.1 CRM and CRM systems

CRM is defined by marketing research as an “integrated sales, marketing and service strategy” (Kalakota and Robinson 2001). Turban et al (2011) state that the goal of CRM “is to create one-to-one relationships with customers by developing an intimate understanding of their needs and wants” and that CRM is an extension of traditional marketing. Often, CRM researchers emphasize that CRM is much more than technology. For example, Buttle defines CRM broadly as a “core business strategy that integrates internal processes and functions, and external networks, aims to create and deliver value to targeted customers at a profit” (Buttle 2008) p.15.

These rather grand visions cannot hide the fact that in practice CRM is much about information technology. Since the early 1990s CRM systems were designed to support customer related processes, such as maintaining customer data, conducting customer segmentation, extracting customer preferences based on previous sales and communications, administering the sales force and handling direct marketing.

Companies have invested heavily in CRM systems for two decades. According to Gartner, the world market for CRM systems was over 12 billion dollars in 2011 (Gartner, 2012), with SAP as the largest vendor. Expectations of economic returns from investing in CRM systems are therefore high. The benefits of CRM systems have been advanced by the vendors, highlighting the potentials, and by Information Systems (IS) text books, focusing on the normative aspects, i.e. what companies ought to be doing (Turban et al. 2006). Some researchers have found that CRM systems do improve one-to-one marketing effectiveness (Mithas et al. 2006).

However, overall empirical evidence is much less convincing, in terms of successful cases and in economic statistics. Indeed, there is no evidence of improvements in stock returns or profitability for firms that have invested in CRM (Hendricks et al. 2007). Many researchers have pointed out that the often technical focus of CRM implementation is ineffective and that in order to be successful a number of social, human and marketing issues should be understood better (Bygstad 2003; Nairn 2002).

Even more worrying, doubts have been raised regarding the potential of CRM technology to generate self-reinforcing adoption. Ciborra and Failla found that “CRM seems to have no built in mechanisms by which it acquires its own momentum and the diffusion becomes a self-feeding

process” (Ciborra and Failla 2000). Such mechanisms have proven decisive in the diffusion of IT; for example the quick diffusion of e-mail in the 1990s was in large part due to a certain dynamics: the immediate usefulness of e-mail attracted more users, which made e-mail more useful, attracting even more users and so on. (See also Markus, 1987, on critical mass of user adoption). If a technology cannot generate this kind of dynamics, its diffusion will be an uphill struggle, with lukewarm and even resisting users. This has indeed been a characteristic of many CRM implementations (Bygstad 2003; Turban 2011).

2.2 CRM and Facebook

Bearing in mind this rather bleak picture it is no surprise that the business and software communities have been curious of the potential role of social media in improving customer communication, while retaining a low cost strategy. A recent CRM text book enthuses on the possibilities to integrate not only Facebook, but also the culture of social media into traditional CRM thinking, called “social CRM” (Greenberg 2010a). The newcomer Salesforce.com, which is regarded as the leading vendor in “social CRM” was the fastest growing CRM company in 2011 (CRM Magazine, 2012). Moreover, several traditional CRM vendors are actively trying to integrate Facebook (and other social media) with their products, at least in their strategy talks. It remains to be seen whether this integration is possible, and also whether it is acceptable for Facebook users.

However, this fascination for social media also provides an opportunity to assess the problems of CRM in a new context, because Facebook offers an interesting contrast to CRM systems in several respects. In particular, we will argue that Facebook includes some key features that mitigate some of the inherent problems in CRM systems. These problems relate to the way CRMs are conceptualized as traditional, closed in-house systems, designed to support complex business processes, operated and managed by staff. This makes them expensive to maintain, and, as observed by Ciborra and Failla (2000), lacking a self-feeding mechanism that allows them to grow without management push. Certainly, CRM and Facebook were made for completely different purposes, and we will only compare the attributes that relate to the problems described above. If we compare these attributes of CRM and Facebook, as illustrated in table 1, we notice that the differences are significant.

Access: Closed versus open

CRM systems are in-house applications, designed to support the key marketing functions of the organisation. They are strongly guarded with strict access regimes to protect the confidentiality of the data. Although a key aim of CRM is to share information across business functions, only selected company employees are allowed access and use. Customers have no access to this information, and are usually unaware of what information the company has stored.

In contrast, Facebook is an information infrastructure (Hanseth and Lyytinen 2010), which is open and evolving. Anyone with Internet access can become a user, and there is a strong culture of sharing information.

<i>Attribute</i>	<i>Traditional CRM systems</i>	<i>Facebook as CRM system</i>
Access	Closed	Open
Technology	Commercial software	Social software
Data structure	Complex and highly structured	Simple and semi-structured
Ownership of data	Company	Mixed ownership
Maintenance of personal data	Company	Customer
Self-reinforcing mechanisms	Lacking	Strong self-feeding mechanisms for growth

Table 1: Traditional CRM systems compared with Facebook as CRM system

Technology: Commercial versus social software

The largest CRM vendors are companies such as SAP and Oracle (Gartner 2012). The products are expensive and quite complex, requiring specialists for system configuration. Users need substantial training in order to use the software.

In contrast, Facebook is social software, linking millions of users. It takes only minutes to register as a new user, and the software is also available on (smart) mobile phones and tablet computers. Currently (2012), there are more than 1 billion Facebook users (one in seven of the world's population!), which is rather amazing for a product that was launched in 2004. In Norway, 51% of the population were registered Facebook users, while the number for Sweden and Denmark were 48% and 51% (Synlighet.no 2012).

Data structure: Complex and highly structured versus simple and semi-structured

Traditional information systems are highly structured. Examples are categories for type of customer and type of offer or complaint. Although traditional CRM systems also may contain unstructured data in form of notes made by call-centres or e-mails by the customer, these data are stored in a database and can only be retrieved by queries.

Web pages typically contain unstructured data, despite being coded in HTML (Blumberg and Atre 2003). Although being a web site, Facebook offers semi-structured data classified as date, user, question, answer, and commercial ads. Since it is so easy to use, Facebook appears quite simple. On the other hand, the social network of Facebook is a quite complex structure of several users and links between them.

Ownership of data: Company versus contributor

Data in traditional CRM systems are stored in-house, and owned by the company. However, traditional CRM systems do not necessarily provide adequate information, as was the case for an executive at a Fortune 500 telecommunications company. The manager complained that although they had up to 100 000 conversations with customers, he or she could only see the outcome, and not the content of the dialogues (Blumberg and Atre 2003).

At Facebook, the whole content and history may be studied by both parties. One important question, then, is who owns the data? According to Facebook's terms, the data belong to each contributor, specified as "You own all of the content and information you post on Facebook, and you can control how it is shared through your privacy and application settings". (Facebook 2011). In our case, this means that some data are owned by the two airlines, respectively, and some data are owned by the numerous users of Facebook.

Maintenance of personal data: Company versus mixed ownership

The implications of this mixed ownership are significant. While traditional CRM systems contain quite detailed information about each customer, the maintenance of this information has proved to be challenging (Bygstad 2003). Personal information is changing continuously, and it requires input from each customer ("I have a new e-mail address and a new telephone number") and action from the company (changing the customer information in the database). If this routine is not strictly followed, the system is quickly corrupted. Such problems are often underrated in CRM implementations (Reid and Catterall 2005).

In contrast, since the Facebook data belong to the customer, they are also maintained by each person. This solves a crucial problem with traditional CRM systems, since the Facebook user will usually maintain the basic contact information correctly, for practical reasons. However, the maintenance model of Facebook raises another challenge when it comes to more "transactional" data. The customer may choose to modify his/her text, and the company may modify its reply. Thus, the integrity of the entered information is weaker than in traditional in-house systems.

Self-reinforcing mechanisms

As Ciborra and Failla (2000) observed, CRM lacks a mechanism for self-feeding growth. A CRM system depends on internal routines for entering and maintaining data. The individual employee (for example in a call centre) often has no incentive to this (it is an extra effort), but the data may have value for another employee in another department, for example in Direct Marketing. If these maintenance routines are not meticulously followed the system will quickly get corrupt and useless. This lack of a self-feeding mechanism often makes CRM into an uphill struggle with a lot of management push.

In comparison Facebook has a strong self-feeding mechanism for growth; short-term usefulness and ease of use attracts users, which makes the network more useful and attracts more users, and so on. A new "friend" on Facebook extends the information richness of your network, and also increases the diffusion of your own information. Thus, the value of this network increases

with each new user, as described in network economics (Hanseth 2000). This, of course, does not imply that all social media are successful, which we also discuss in our limitations section.

2.3 Summing up the research review

As this review reveals, Facebook has many attractive features compared to traditional CRM, even though Facebook certainly lacks the rich functionality of CRM systems. In particular, Facebook addresses several of the inherent problems of CRM systems, notably on openness, maintenance of personal data and self-reinforcing mechanisms for diffusion. If not a full CRM, can Facebook serve as a lightweight CRM?

3 Method

The overall approach was a case study (Yin 1994), aiming to investigate a phenomenon in its context. We chose to investigate how two airline companies, SAS and Norwegian, interacted with their customers on Facebook during the ash crisis in April 2010. SAS (Scandinavian Airlines) is the largest airline company in Scandinavia, and offers intercontinental flights to USA, Middle East and Asia, as well as within Europe (SAS, 2010a). SAS was rated amongst the top three most punctual airline companies worldwide in 2009 (SAS, 2010b). CEO, John Dueholm, proudly stated: “Our staff does a tremendous job to ensure our customers arrive at their destination in time, especially considering the sometime severe weather conditions we are faced with in Scandinavia during the winter months” (SAS, 2010b).

Norwegian (Norwegian Air Shuttle ASA) is the second largest airline company in Scandinavia, and offers flights within Europe, North Africa and the Middle East. They market themselves as a low-cost airline, and on their website one can read: “With competitive prices and customer friendly solutions and service, the company has experienced significant growth in recent years” (Norwegian, 2011).

Our two companies were selected due to their leading positions in Scandinavia, as well as their goals of being punctual and customer friendly, respectively. Moreover, the companies’ use of Facebook offered an opportunity to study how the two handled a large volume of customer communication in a crisis situation, allowing us to conduct a comparative study.

Our data collection and analysis built extensively on Business Intelligence (BI) techniques, supplemented by interviews. The reason for using BI was that Facebook offered a large text material, which was suitable for BI analysis. This section first defines and describes BI. Then we describe in detail how the data from Facebook were captured by means of Ruby code, and how we analysed them using the most common BI end-user tool: Microsoft Excel. Finally, we discuss the validity of our research.

3.1 Definition of BI as process and tool

The primary aim of modern Business Intelligence is to support decision making on all levels of a company by providing a reliable database and tools for analysis (Davenport 2010). The process consists of gathering data, turning them into information upon which decisions should be made, and finally taking action (Turban et al. 2011). Hence, the process of BI is not new and has existed just as long as capitalism (Lönnqvist and Pirttimäki 2006). Today, the most common end-user tools are spread sheets, queries, dashboards and various forms of mining and analysis.

The BI literature envisions large benefits from using BI, the most common being faster and more accurate reporting and improved customer service. These benefits are obtained by making sophisticated queries to a database, one example being data mining. Data mining aims to uncover hidden patterns in large amounts of numerical data (Turban et al. 2011). Typical examples are which products are frequently purchased together, which can provide insights for campaigns and physical grouping of merchandise. Data mining has evolved into text- and web mining. According to Kosala & Blockeel, web mining was initially described in 1996 by O. Etzioni (Kosala and Blockeel 2000), and has the same purpose as data mining: discovering hidden patterns from data residing on web pages. Since web pages usually consist of text, one gets the challenge of analysing unstructured data. Overcoming this challenge can be worth the effort as web- and text mining enables sentiment analysis, a technique for detecting positive or negative opinions towards a product or service by using large quantity of textual data sources (Turban et al. 2011). As explained by Jeff Bezos, the CEO of Amazon:

If you upset your customers in the real world, they are likely to tell 6 friends each. On the internet, your unhappy customers can tell 6000 friends each (Digimind, 2008).

The next section illustrates how we performed web- and text mining.

3.2 BI techniques

We chose a single case, namely the ash crisis in the European airspace in April 2010. The Facebook materials offered an opportunity to investigate how data captured from social media can be used for research by means of BI techniques. The basic research steps of data collection and data analysis are conducted somewhat differently in a BI design than in traditional IS research. Data collection is done through a process called ETL (Extraction, Transformation, Load), and the data analysis can be conducted by techniques such as data- and text mining (Turban et al. 2011). The ETL steps of creating a reliable source for BI analysis are:

- Extraction: capturing data from one or several sources
- Transformation: modifying the data by for example filtering or summarising
- Load the data into a data warehouse or into a spreadsheet

An ETL tool can be purchased from a vendor, or coded from scratch (Moss and Atre 2003). In our case, we had it developed by our programmer. After the ETL process, data can be subject for further analysis.

3.3 Data collection

We employed both web content mining (Kosala and Blockeel 2000) as well as text mining (Turban et al. 2011). Our ETL process was conducted as follows.

First, in the extraction step, we identified two web pages on Facebook, namely Norwegian (Facebook 2010a) and SAS (Facebook 2010b). Our programmer used the programming language Ruby, using Facebook's Application Programmers Interface called the "Graph API of Facebook" (<http://developers.facebook.com/docs/api>). The script amounted to around 50 lines of code. The data extraction was conducted in June 2010.

Then, in the transformation step, we filtered out the commercials, pictures, and names, focusing on the one tab called "Wall" on Facebook (see figure 1). We wanted a main database containing the postings of customers and the replies of the companies, as well as date and time. Finally, in the loading step, the result was saved in Excel format.

Four Excel artefacts were produced: (a) all words containing "ash" per day, (b) the number of inquiries from passengers and replies from the airline companies, (c) the number of minutes from question from passengers to answer from employees, and finally (d) all unique words written by passengers and employees.

Artefact (a) would help us assure that our analysis was in fact about the ash situation, and not about general activity on Facebook, as both airline companies were active on Facebook before and after the ash crisis. The artefact (b) would reveal to how many of the stranded passengers made use of Facebook – how many questions were posted during the ash crisis period? Artefact (c): we were also curious about the response time from a passenger posted a question to an answer was given by Norwegian or SAS – given many questions; it could probably take hours, or even days? The last artefact (d) would serve as basis for our sentiment analysis – were the passengers angry, ventilating their frustration through the only media in operation?

All of our captured data were semi-structured, including meta data (Blumberg and Atre 2003). Meta data in our case were the time of creation, authors and identifying question and answer, facilitating the subsequent text mining.

3.4 Data analysis

The main technique in the data analysis was text mining. The most employed end-user tool of BI is Microsoft Excel (Watson 2009), and we used it for data- as well as text mining. While data mining is defined as searching for patterns within large amounts of structured data, text mining is: "...the semi-automated process of extracting patterns from large amounts of unstructured data" (Turban et al. 2011). At a high level the text mining process consists of establishing the data sources (decide which data to use), introducing structure (adapt the structure of files) and extracting knowledge (produce output data, based on for example classification, clustering or association). The following steps were conducted in the data analysis, shown in table 2.

The first three steps were relatively straight forward, producing frequency charts. Step #4 was more complex. From the total word count (artefact d) we wanted to measure the "emotional temperature" by conducting a sentiment analysis (figure 5). In order to do so, we first conducted an overall word frequency analysis of the occurrence of unique words. We counted all words

used on the web pages, by applying Excel's filter on each company, and removing all duplicates. From the webpage of Norwegian, we found 20.622 unique words, and SAS had slightly fewer; 18.600. The next step was performed manually by selecting all words with 5 or more instances, excluding prepositions and the like.

<i>Step and input</i>	<i>Description</i>	<i>Output</i>
1. Ensuring validity of data	Checking that the Facebook activity is directly related to the ash crisis	Number of instances of the word "ash" (Figure 1)
2. Analysing volume of Facebook traffic	Counting requests from passengers per day	Number of requests during the ash crisis (Figure 2)
3. Analysing response time	Measuring average response time, from request is posted to answer is provided	Response time in minutes (Figure 3)
4. Sentiment analysis	Identifying and accumulating positive and negative word per day	Sentiment graph (Figure 4)

Table 2: Steps in the data analysis

Starting on top of the list of word frequency list, the positive and negative words were manually identified. For example, words such as *thanks*, *good*, and *fantastic*, were classified as positive terms, and accordingly *resigned*, *chaos*, and *frustrating* were classified as negative. Some words with different meanings in Scandinavian and English (such as "true", which means "threatening" in Norwegian) were discarded since there were only a few occurrences.

For each identified (positive or negative) word, we searched systematically for other occurrences with a) the same stem, b) the same word in another language (English and Swedish, in addition to Norwegian) and c) misspellings. For example, the concept "frustrating" had 16 different forms, which were accumulated in the count. Then, for the six most frequent positive and negative terms (see table 3), we checked contexts; i.e. whether the use of the word was consistent with our classification. We did find some occurrences of expressions such as "no thanks" (2 occurrences) and "no good" (21 occurrences). We considered these as so few that this problem was ignored.

From the final list, we constructed two indexes, one consisting of the frequency of positive words per day, and the other one consisting of negative words per day. Extracting the information, we used the most common form of mining called categorisation (Turban et al. 2011). This implicated that we looked for certain behaviour of passengers and the airline company in their dialogue. Our result of the sentiment analysis for both companies during the ash period is shown in figure 5 below.

3.5 Validation

How valid were our data, meaning to what extent could we trust them? To ensure that we were in fact studying passengers' inquiries concerning ash crisis and not, for example, vacancies or booking for summer vacation, we extracted all instances of the Norwegian word for "ash" for our predefined period, as shown in figure 1 below.

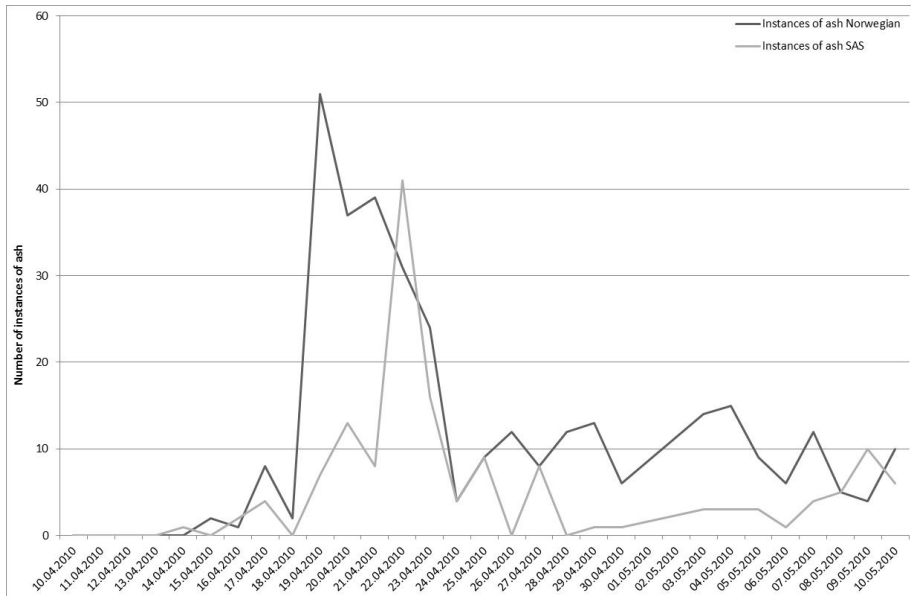


Figure 1: Number of instances of the word “ash” for the two airlines

The word “ash” appeared for the first time on April 13th, and during April 19th, the word “ash” was posted over fifty times on Norwegian’s Facebook page. We observed that the pattern was consistent with the ash crisis period, from the first warnings through the height of the crisis. The “ash” postings were only used as an indicator, and not used in the further analysis. We noted that the instances were few compared to the number of questions, as shown in figure 2 below. One explanation could be that the setting became established and most Facebook users interacting with Norwegian’s and SAS’s page were aware of the ash crisis.

4 Findings

The ash crisis started with the eruption of large volumes of ash from the volcano Eyafjallajökul on Iceland, in mid April 2010, which grounded most of the North European air traffic. It is significant to bear in mind that the airlines’ use of Facebook as a communication channel was improvised. As previously described, both Norwegian and SAS had been established on Facebook

in good time before the ash crisis. However, the medium had not been used for extraordinary situations before.

The CIO of Norwegian commented:

Last year we ran a campaign on “Win an airplane, for a free flight for you and your friends”, which resulted in a large number of followers on Facebook. When the ash crisis started, we discovered that many passengers started to ask questions on Facebook. We trained our customer support centre to reply in a way that made the dialogue constructive and problem solving, and set up a 24/7 service. The people who staffed the service became so enthusiastic that they did not want to go home in the evening.

At the peak of the crisis Norwegian had a team of 18 persons dedicated to respond to Facebook request (interview at Norwegian).

4.1 Number of requests in the ash period

Although both Norwegian and SAS had been using Facebook for customer communication earlier, the volumes increased strongly during the ash crisis. We limited our analysis to the period between April 10th and May 10th 2010. Our total material in the two Facebook entries consisted of 18.846 postings at Norwegian, and 10.180 at SAS. As figure 2 shows, during the busiest days in mid April up to 1500 requests per day were posted to Norwegian, and more than 500 to SAS. After the crisis, the numbers fell sharply.

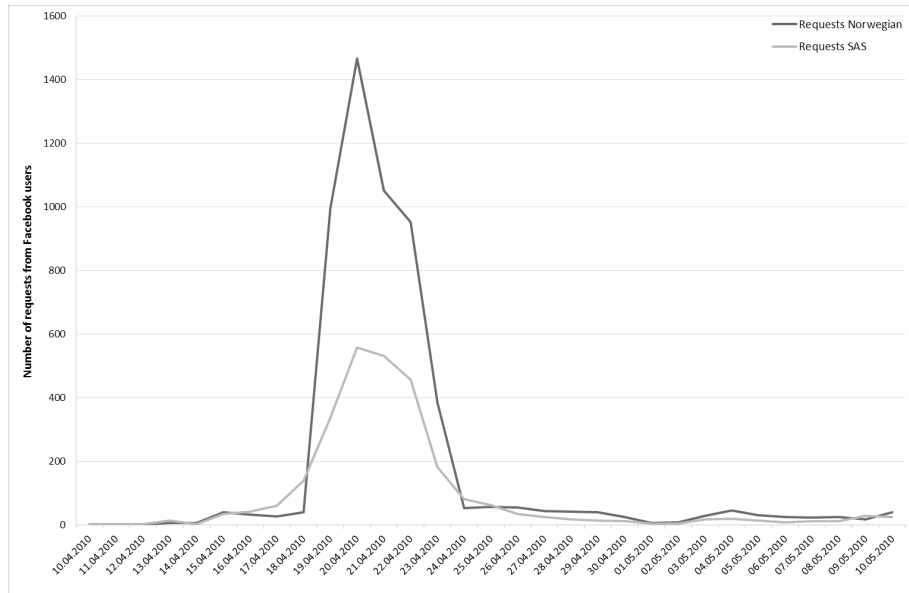


Figure 2: Number of requests for SAS and Norwegian during the ash crisis

Figure 2 indicates that Facebook was a useful channel for passengers during the ash crisis. As an IT service it scaled well, was easy to use, also from a mobile phone at a holiday destination or an airport. We note that there were significantly more postings on Norwegian than on SAS. Unfortunately, we do not have any data to explain this difference. However, one reason might be that Norwegian, as a low-cost airline, may attract younger customers who are more used to communicating through social media. Another possibility is that SAS might have been more available in their call centres. This difference, however, does not influence on the rest of our analysis.

4.2 Response time

We measured the response time from the two companies, i.e. the time in minutes from the posting of the request until an answer was posted on Facebook. As shown in figure 3, the response time was high before the start of ash crisis, but it quickly decreased to less than 60 minutes during the peak of the crisis. After the crises the response time rose, particularly for Norwegian.

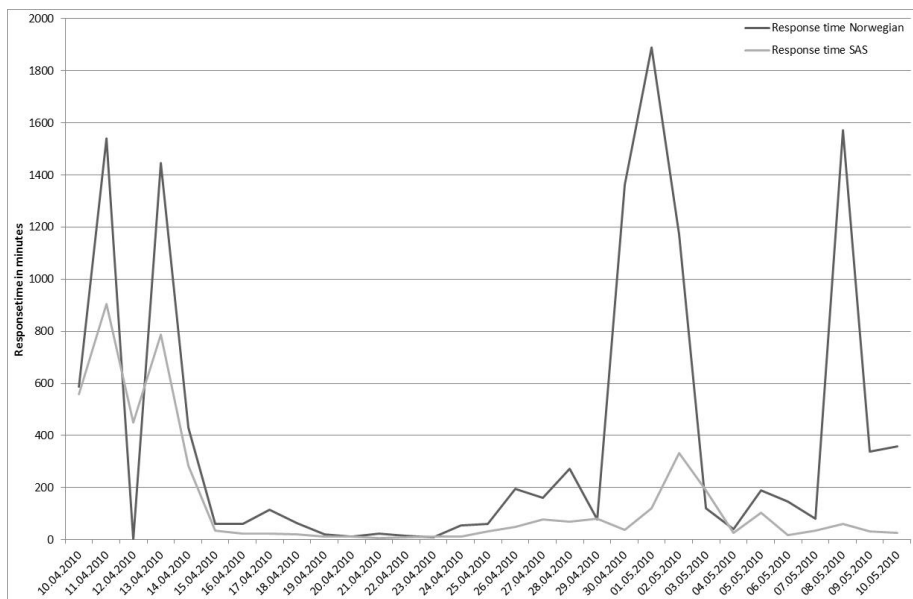


Figure 3: response time in minutes for SAS and Norwegian during the ash crisis

We think that the low response time is rather impressive, because “response” usually included some form of problem solving, for example a re-booking, or concrete advice on what the passengers should do. An illustrating example is the following exchange:

Passenger: We are 7 desperate ladies in Malaga who are booked on the flight to Oslo tonight. We just received a message about the airport being closed. Found out that there is a flight scheduled to leave Alicante at midnight. Everything is chaos down there.

Norwegian: Hello! Arrangements have been made for a bus from Malaga to Alicante. You need to contact the representative of Norwegian at the airport in Malaga. Hope it will work out.

Passenger (later): We are on the bus now!

As illustrated in figure 3, the response time from both airlines was significantly higher before and after the crisis. Closer analysis revealed that the postings before and after crisis, were more trivial, such as general requests whether pets are allowed on the flights. After the crisis, it appeared that the companies down-prioritised responding to Facebook requests. As the graph shows in figure 3, the response time increased up to 1800 minutes (about 30 hours) at Norwegian after the crisis, but the volume of requests was very low at the very end of April (refer figure 2).

4.3 Sentiment analysis

We also tried to measure the emotional temperature in the Facebook communication. We expected that a significant part of the communication would be somewhat heated, because many of the customers were finding themselves in a difficult and acute situation. As described in the method section, we conducted this investigation by a sentiment analysis, i.e. creating indexes of (emotionally loaded) positive and negative words. The result is shown in figure 4.

We were surprised by the result. As figure 4 indicates the emotional temperature in the Facebook postings was overwhelmingly positive, for both companies. The number of negative words was relatively low, and there was an almost complete absence of swearing and the like. Table 3 below shows the highest frequencies of emotionally loaded words. It shows that positive words clearly dominated the postings.

Again, we notice that the graphs for SAS and Norwegian show the same patterns. The differences between the two companies correspond roughly with the differences of the number of total postings in figure 2.

<i>Positive words</i>	<i>Frequency</i>	<i>Negative words</i>	<i>Frequency</i>
Thanks	1241	Resigned	56
Good	917	Frustrated	38
Fantastic	97	Chaos	27

Table 3: Frequencies of selected positive and negative word

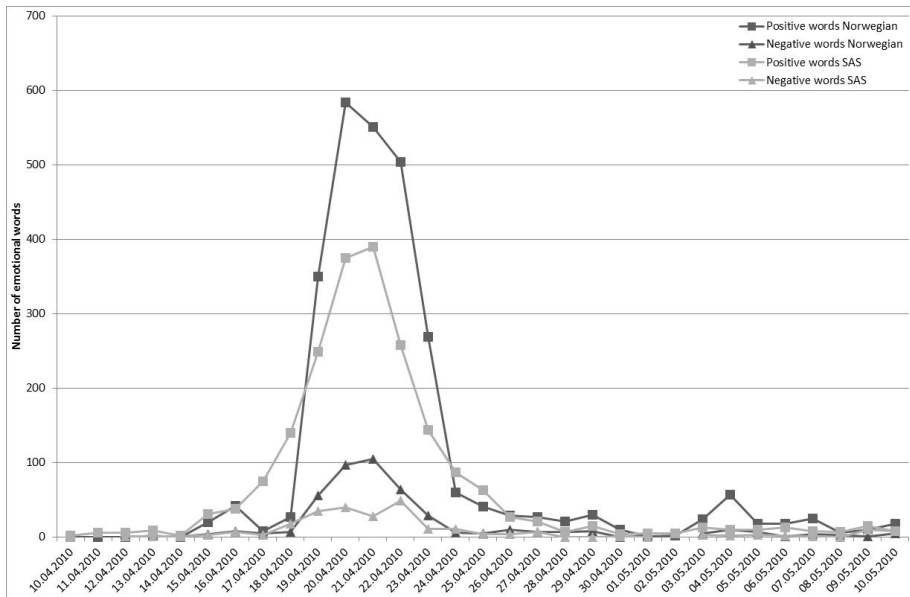


Figure 4: Sentiment graph for each airline company

4.4 Summing up findings

We argue that our data show that Facebook was successfully used for customer communication during the ash crisis, in several respects. Firstly, Facebook was a channel which many passengers found easy and convenient to use. Secondly, the airline companies succeeded in establishing an effective response service during the peak of the crisis. Thirdly, a detailed analysis of emotional loaded words showed that the atmosphere of the communication was quite civilised.

5 Discussion

In this section we return to our research questions. First: are there inherent and unsolved problems in traditional CRM systems that Facebook may resolve in new ways? Second: if so, can Facebook replace CRM systems? We also discuss limitations to our research.

5.1 RQ1: Are there inherent and unsolved problems in traditional CRM systems that Facebook may resolve in new ways?

In our review we showed that there are a number of inherent problems with CRM systems that have made implementation and use an uphill struggle. These include particularly openness, maintenance of customer data and the lack of self-reinforcing mechanisms of diffusion.

Regarding openness, the ash crisis investigation shows that airline passengers in acute need perceived Facebook to be a convenient channel. Facebook is easy to use, and is available on mobile devices, which may be the only operating channel in a crisis. Moreover, the medium is transparent for all users (Blumberg and Atre 2003), meaning that it is possible both to read questions from fellow passengers as well as the answers provided by each airline company. This transparency increases the effectiveness of the channel as comments may be revisited. (This transparency is of course also a concern, which we return to in the Limitations section.)

Regarding the maintenance of customer data, our evidence clearly shows the benefits of Facebook. Since every Facebook user maintains his and her own personal information, the issues of customer identification and system access were solved. The airline companies did not have to do any extra input in their systems, but could match the name and problem description with the ticket information. The feedback to the customer could be entered directly below the request on Facebook. It is visually very clear who is supplying the information on both sides.

It is a matter for lawyers whether this may be in conflict with legislation on personal information. The answer is not obvious, since it is the individual (not the company) that enters the personal information on identity and travel details. However, it does have some other ethical and practical aspects that we will return to.

Regarding the self-reinforcing mechanisms of diffusion (Ciborra and Failla, 2000), we believe that the improvised and extremely efficient use of Facebook during the ash crisis shows that Facebook supports a self-feeding process. The self-feeding process is driven by the openness and availability of the solution; each customer that enters information and receives help also increases the value of the site, because it increases the amount of relevant information in a difficult and complex situation. It also scales, in the sense that the users do not get a “busy signal”, as does a call-centre telephone. It requires of course an effective organising for response from the airlines.

Summing up, we argue that both current research and our empirical evidence show that Facebook indeed mitigates some of the inherent problems with traditional CRM systems. What does this imply in practice? Can Facebook replace CRM systems?

5.2 RQ2: Facebook as a social CRM?

In an article from 2007, Thompson claimed that social networks are “turning CRM upside down”. He pointed out that Facebook redefines the relationship between companies and customers, both parties being producers of information, and that the rich people information on Facebook represents an untapped source for dialogue with customers (Thompson 2007). Face-

book can obviously serve as a source of customer preferences and attitudes. But can Facebook really replace traditional CRM systems?

The CRM vendors certainly answer no, but aim at integrating Facebook with existing CRM systems. All major CRM vendors now have a form of Facebook strategy, working to make Facebook an add-on to their existing CRM systems (Greenberg 2010a). There are, however, mechanisms in Facebook to protect users from third party applications, such as external CRM systems. Hence, a Facebook user may choose to block such a third party CRM.

Our case shows that both Facebook users and companies are exploring the potential of social software. Questions yet to be answered are: how dangerous is it to tell the rest of the world that you are stranded on an airport? Is it an invitation to burglary in your home? Will the actual company, or other companies, misuse this information? We do not attempt to answer these questions here, but we believe that our case shows that Facebook proved to be quite efficient during the ash crisis. Our data may indicate that the benefits of sharing information were larger than the concerns, at least in this particular situation.

What are the benefits for the companies? They get immediate access to real-time data by real-life humans (Thompson 2007). Such data may be used in both analytical and operational activities. We observed that both SAS and Norwegian were efficient in solving problems in real-time. One question is whether this is cost efficient. Facebook is certainly a more inexpensive medium than call-centres. One reason is that requests are fully formulated in writing by customers, and can be processed efficiently and sequentially by staff. Another reason is transparency; other passengers can read the company replies and may not have to ask the same questions. Moreover, the identity of the customer (with its obvious limitations regarding authenticity) is provided by the Facebook user. On the other hand, Facebook communication is basically a one-to-one communication which is expensive for the company.

The process of Customer Relationship Management is not only the marketing and providing of services, but also the management of trust (Kalakota and Robinson 2001). Therefore, the atmosphere of the communication is also important. One interesting finding in our data is that customer sentiment was surprisingly positive as illustrated in figure 5. This indicates that the communication was trustful and friendly. The structure of Facebook enables follow-up questions and comments, and documents the dialogue between the customer and the company. One might question whether the positive atmosphere will endure if Facebook becomes a form of “standard” CRM channel, and not a bonus, as it may have been perceived to be in the ash crisis period? Perhaps the expectations of the passengers towards this medium were lower than when consulting a call-centre. As mentioned above, call-centres are infamous for long waiting time, and has traditionally been the only way of interacting with a company, apart from sending a letter, or actually appearing in person at a company’s location. The airline companies may investigate this further by mining other sources of sentiment such as Weblogs or other social media (Liu et al. 2007).

Summing up, we do not believe that Facebook will replace traditional CRM systems, because it lacks the rich functionality and security mechanisms of such systems. Facebook as of today also lacks internally generated data such as a passenger’s purchase history. However, data captured from Facebook can be merged with data from traditional CRM systems by means of the ETL process, and the lack of structured or categorised data in Facebook can be addressed by other BI techniques. Whether the Facebook users will accept this, remains to be seen.

5.3 Limitations and ethical issues

Our study was conducted on the ash crisis, which was a rather special situation. This made it particularly interesting to study the potential of Facebook as CRM, because we could analyse how both the customers and the companies responded in a time of pressures. This setting makes our study a small natural experiment. On the other hand, this is also a limitation, because it may not be applicable to more normal settings. Moreover, in a serious international crisis, there is no guarantee that Facebook will be available to all traffic; for example, their servers may be overloaded. We should, perhaps, also add that we do not make any predictions on the continuing success of Facebook as a social medium; whether Facebook will continue to grow is probably not related to this CRM discussion.

We also acknowledge that there may be limitations to our research design. Regarding our data analysis, we concede that the construction of the positive and negative word indexes could have been more systematic. For example, we could have checked whether there were systematic differences in sentiments between airline postings and customer postings. Also, the variations in the number of postings with corresponding response times between SAS and Norwegian might have been better explained. We conducted our study with two Scandinavian airlines. Whether our findings are valid for other airlines or service industries is a matter for future research.

Finally, we should comment briefly on the ethical aspects of companies using Facebook for commercial purposes. The past years have witnessed a heated debate on privacy on Facebook. As argued by Grimmelmann, the privacy issues of Facebook are not easily solved because the main reason why people are on Facebook is because they indeed want to share personal information. Tightening the security on Facebook would soon render it meaningless (Grimmelmann 2008).

Regarding the use of Facebook data for research purposes, we certainly believe that IS researcher should relate to the Facebook openness in an ethical way. In this study we adhered to the following two principles (Fule and Roddick, 2004); first that the research objective was ethical and part of a research programme; second that we only published accumulated data, i.e. results at group level.

6 Conclusion

In this paper we investigated (1) to what extent the most popular social media, Facebook, can be used to resolve some of the challenges of traditional CRM systems, and (2) whether Facebook can replace CRM systems. Our empirical evidence was a business intelligence analysis of around 28.000 postings in the SAS and Norwegian Facebook pages, during the ash crisis in 2010.

First, we find that the use of Facebook resolves some of the shortcomings of traditional CRM. The openness of Facebook allows for more dynamic interaction between company and customers. A recurring problem of CRM, namely the maintenance of personal data, is partly solved by the shared responsibilities of Facebook users. Moreover, Facebook has a self-reinforcing mechanism for diffusion, meaning that short-term usefulness triggers more use, which again will increase the usefulness of the solution. Our analysis shows that Facebook worked well as a social CRM in a crisis situation. What made it work? Facebook was a channel which

many passengers found easy and convenient to use during the ash crisis. Accordingly, the airline companies succeeded in establishing an effective response service during the peak of the crisis. In addition, a detailed sentiment analysis of emotional words shows that the atmosphere of the communication was quite civilised.

Second, we do not believe that Facebook can replace traditional CRM systems, but it constitutes an interesting challenge to them. We believe that in the coming years we will see that companies and customers will explore this potential of Facebook, in order to strike a balance between the networked power of social media and commerce. In contrast to traditional CRM, it is not obvious that the companies will be the strongest part in this exploration, since the customer controls his or her personal information. This is indeed an interesting arena for researchers, who should study the use of Facebook in different settings, for example we could investigate the role of Facebook in building and supervise the reputation of an organisation.

There are certainly also concerns. One issue is ethics and privacy; information on Facebook is accessible to anyone and can be misused, both by the company (using the information for other purposes) and the users (giving false or underspecified personal information). At a more technical level, there may be doubts whether information posted on Facebook will retain its integrity over time, since the owner of the data can change it at will. Moreover, for the companies, it is an open question whether Facebook will prove cost effective as a communication channel, particularly under normal operations.

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