

## **Analytical Social CRM: Concept and Tool Support**

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### **Abstract**

*The Social Web offers new opportunities, such as direct market access, interactive customer contact or a better understanding of market demands, in the field of customer relationship management (CRM). Consequently, firms develop new strategies, processes and technologies to utilise the Social Web for their needs. From the perspective of CRM, the Social Web creates an opportunity to directly include customer knowledge and shape a field called Social CRM (SCRM). Even though methods and tools for data extraction and media monitoring are already available, the analytical requirements of SCRM and necessary functionalities are open for research. This research explores the role of analytical SCRM and examines available tools with the required functional and technological components. The findings show that existing tools still have a limited functional scope which makes a 'best-of-breed' approach necessary. Finally, a concept for an integrated analytical SCRM system is proposed that comprises necessary SCRM components.*

**Keywords:** Social CRM, Social Media, Analytical CRM

## **1 Introduction**

The idea behind the "Web 2.0" (O'Reilly, 2005) changed significantly the way how people and organizations interact through the Internet. It extends interactive communication to address a broader audience via Communities, Blogs, Microblogs or Wikis. This differs considerable from established forms of communication which limited interactive communication to two persons and large audiences could only be addressed via expensive and mono-directional channels such as e-mailing, television, news papers or websites. Today, the Web 2.0 contains a large body of information on products and service providers which may be accessed electronically without additional costs. This new style of communication has induced a broad digital ecosystem in a very short time. Numerous service providers now offer innovative tools and platforms, such as Twitter, Skype, Facebook, Wordpress or LinkedIn, as infrastructure for the Web 2.0.

Their offerings are identified as “Social Media” which constitute the Social Web, the Web of People.

An important consequence of the increased customer-centric communication was that companies have less control over their market access and appearance (Berthon, Pitt, & Campbell, 2008). Traditional hotlines, front-offices and static websites are no longer satisfying especially the younger Internet affine consumers<sup>1</sup> (Moran & Gossieaux, 2010; Smith, 2007; Tripp & Grégoire, 2011). Companies are now faced with two worlds and the challenge to integrate them. On the one hand they have their traditional customer-facing processes and information systems (IS), such as Customer Relationship Management (CRM), with detailed data and knowledge about markets, customers and transactions. On the other hand, customers discuss offerings and provide help to each other in the Social Web. Research indicates, that both worlds are strongly connected and the “Share of Voices” in Social Media correlates with the “Share of Market” (Rappaport, 2010a).

Social CRM is an emerging concept that includes strategies, processes and technologies to link the Social Web with CRM processes. This is a complex task since the right conversation threads must be identified within millions of Social Web conversations and communication with the Social Web needs to be synchronised with other channels (Sarner, 2009). The need for automation calls for sophisticated capabilities in Social Web analysis and transformation of the Social Web content into CRM relevant knowledge and activities. This comprises four enabling areas:

*Availability of Social Tools and Services:* The data pools a firm may use for analytical Social CRM (SCRM) are either internal Social Media (e.g. discussion board), Social Media provided by the firm externally (e.g. customer community), external and free accessible Social Media (e.g. blog), and external, but access restricted Social Media (e.g. Facebook).

*Interfaces for Social Media:* Many Social Media provide RSS feeds that can be used to retrieve content and metadata. Customizable crawlers can be used to retrieve historic content or content from sources without feeds. Some Social Media offer as well standardised (e.g. Social API or Open API) or individual API's (web-services or portals) for bi-directional interaction.

*Data Analysis and Mining Methods:* Social Web content is usually represented as unstructured data which is not compatible with existing Business Intelligence (BI) or analytical CRM solutions. Semantic Mining methods often referred as Text Mining (TM) or Web Mining may be used to search a broader search space, add missing metadata and context, extract meanings or opinions, and to classify content.

*CRM Systems:* Leading CRM systems present at a single point all data connected with customer processes (e.g. information on market, actors, customers, products, activities and relationships between them) and the functionalities to manage them. Those systems can be used for interpretation and enrichment of Social Media content as well as to put new insights into actions, such as marketing campaigns.

These enablers offer the means to discover relevant content in the Social Web, access this content and transform it into relevant information for CRM. However, current technological solutions for SCRM still feature a limited functionality (Sarner et al., 2010) and little maturity regarding the integration of the Social Web and CRM information base.

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<sup>1</sup> This growing and economically important group of people born after 1980 that grow up with the Internet and Social Media are often named Y-Consumers (Cox et al., 2008). Through their high education and computer skills they are considered as the future top earners and consumers.

In view of the emerging SCRM field, this research investigates the requirements of SCRM and the role of analytical SCRM in integrated SCRM systems, analyses available solutions with their shortcomings and develops a blueprint of an analytical SCRM system. The research design follows the guidelines of Design Science (Hevner et al., 2004) which aims to create new artefacts in information systems research. It is part of a larger research project about SCRM Intelligence which involves two universities and three companies from CRM as well as text mining in Germany. The requirements of analytical SCRM were developed via literature reviews and expert interviews with project partners and the major findings were as well discussed and validated with them.

## **2 Concept and technology of SCRM**

### **2.1 CRM and CRM systems**

SCRM is built around existing CRM concepts and technologies. CRM can be defined as a “process that utilises technology as an enabler to capture, analyse and disseminate current and prospective customer data to identify customer needs more precisely and to develop insightful relationships” (Paulissen et al., 2007). This requires extensive knowledge about the customer and market needs as well as the appropriate positioning of a firm’s product and service portfolio in the customer life and buying cycle (Grönroos, 1996; Ives & Learmonth, 1984; Muther, 2002). The acquisition and usage of knowledge, such as customers past experiences or expectations of the market, is a key element of CRM concepts because it is the prerequisite for delivering satisfying offers in a cost-efficient way. The strategic goals of CRM are executed through CRM processes (Berger et al., 2009) and CRM systems (Chan, 2008).

In view of the diffusion of CRM systems in many businesses (Romano & Fjermestad, 2003; Wahlberg et al., 2009) CRM systems provide process support in the areas of marketing, sales and service with dedicated functionalities for information aggregation (e.g. customer history) and process specific presentation (e.g. interaction points and development in a campaign). Today, they support customer processes on an operational and analytical level, feature links to internal IS (e.g. ERP, EC-systems) and integrate multiple interaction channels (e.g. MCM). Recently, CRM system providers also made attempts to include Web 2.0 functionalities to involve customers into the product creation, production and even the sales process (Enrico, 2007; Greenfield, 2008; Roche, 2008; Winterberg, 2010).

### **2.2 Social Web, Web 2.0 Technologies and Social Media**

The term Social Web and its elements are still in discussion. Some authors conceive the complete World Wide Web as Social Web because it is based on interaction and information exchange between people. Others reduce it to services, such as Facebook or MySpace, where people meet, discuss and exchange information about their private life. Most authors take a stance in between and focus on web tools and platforms that foster interactive communication and collaborative work through Web 2.0 technology (Mangold & Faulds, 2009).

Tools, services and platforms for the Social Web are named as Web 2.0 Technology, Social Software or Social Media (Hennig-Thurau et al., 2010; Sarner, 2009; Winterberg, 2010). They describe “a variety of new sources of online information that are created, initiated, circulated and used by consumers intent on educating each other about products, brands, services, personalities, and issues” (Blackshaw & Nazzaro, 2006) and represent together the instances of the Social Web that allow people to interact and collaborate in the digital world (Cooke & Buckley, 2008). They encompass a wide range of online, word-of-mouth sources including blogs, discussion boards, chat rooms, consumer-to-consumer e-mail, ratings websites, forums, sites containing digital audio,

images, movies, or photographs and social networking websites (Mangold & Faulds, 2009). For example, consumers may share feedback about hotels via a blackboard on [tripadvisor.com](http://tripadvisor.com) or knowledge about cloud computing with others via a community at [ibm.com](http://ibm.com). Kaplan and Haenlein (2010) summarize the various forms by six types that vary on the two dimensions (a) social presence and (b) media richness and self-disclosure. Content and activities in the Social Web are generated, shared and interconnected through them (O'Reilly, 2005). If someone aims to access information within the Social Web he uses Social Media to retrieve or interact with it.

Social Media enable companies to talk to their customers, customers to talk to each other and customers to talk to companies (Mangold & Faulds, 2009). Lee (2010) identifies time (speed and durability), audience (plurality and diversity), cost (feasibility and effectiveness) and relations (friendliness and credibility) as key values of Social Media for businesses. Their content is theme related, expresses the view of an author and contains metadata such as publication date, links to other web sources or tags. It may include references on companies or even can be about them. But, the content, timing and frequency of the Social Media based conversations between consumers are outside of a companies direct control (Mangold & Faulds, 2009).

### **2.3 SCRM**

Information in the Social Web may help firms in improving their understanding of the market, to achieve a more direct market access and to realize real-time and customer-driven interactions. SCRM pursues three goals. First, it creates an instrument to efficiently discover opinions and comments from actors in the markets about products, the company as a whole and developments in the marketplace. Second, it establishes a contact channel for bi-directional interaction with actors in the Social Web. Third, SCRM provides the means to integrate content from the Social Web with customer-oriented processes and systems. All three issues enable SCRM strategies (Mangold & Faulds, 2009), such as viral marketing, services communities or social brand management, into action and significantly reduce their acquisitions costs and further intensify their customer relationships (Casteleyn, Mottart, & Rutten, 2009).

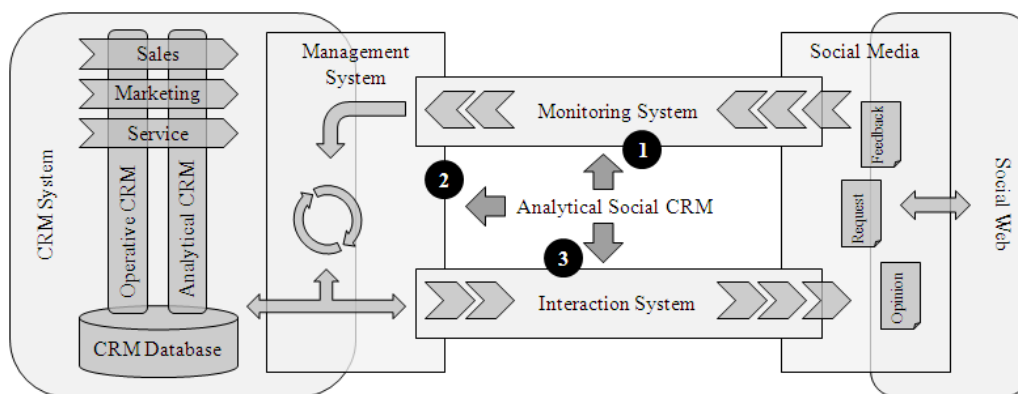
Even though SCRM is discussed under many different aspects and terms, such as CRM 2.0, eCRM or Internet Marketing, a need for technological support in form of SCRM systems is evident and a prerequisite for unleashing the potential of the Social Web in a firm (Winterberg, 2010). Sarner et al. (2010) define SCRM systems as applications that “encourage many-to-many participation among internal users, as well as customers, partners, affiliates, fans, constituents, donors, members and other external parties, to support sales, customer service and marketing processes”. Their primary task is to bridge the gap between Social Media and the customer-oriented service systems of a firm. Practitioners and researchers distinguish two major functional elements (Rappaport, 2010b; Sarner et al., 2010): (1) The monitoring system enables manual and automated searches through the Social Web. The system helps to extract data from identified sources through interfaces, to transform and enrich this data with mining mechanisms or data from other Social Media services and to store the data for later analysis and reporting. The system strongly relies on analytical functionalities, such as attribute extraction, sentiment analysis or trend examination. (2) The interaction system allows for the execution of processes through the Social Web, such as communication and interactions processes. The system aggregates relevant data and provides background information in interactions as well as the functionalities to manage them. The quality of performed interactions depends strongly on the degree to which existing knowledge can be utilised and whether the relevant discussions in the Social Web can be identified.

### 3 Analytical SCRM

#### 3.1 Analytical SCRM in SCRM systems

The previous analysis of existing literature yielded some insight in the task of SCRM and exposed, with the monitoring and interaction system, two major functional elements that are required to turn Social Web content into knowledge and activities. Discussions of these findings with the project partners made the need for an additional component apparent that connects the monitoring and interaction system with the existing CRM infrastructure. Such a *management system* should support manual, semi-automatic and automated collection and classification of Social Web sources, linking of Social Web content to CRM data and processes and the creation of new CRM objects. Furthermore, it should offer similar management functionalities for Social Media sources as for other channels. An infrastructure that integrates the monitoring, management and interaction system leads to a closed loop between the Social Web and CRM.

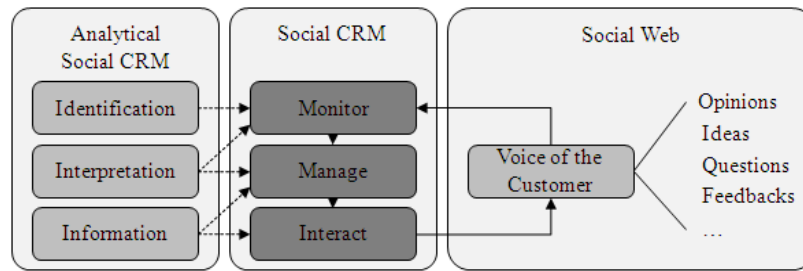
A key element for such an integrated SCRM system is the capability to monitor and to extract knowledge from the Social Web and to turn this into usable data and insights for CRM processes. This requirement is addressed through analytical SCRM as illustrated in Figure 1. It includes the need to generate information from heterogeneous Social Web data through knowledge aggregation, transformation and analysis as well as the need to utilise this knowledge in CRM processes. With data mining and TM techniques this content may be transformed into information and be connected with existing CRM data. CRM system users can directly work with this additional knowledge and start appropriate CRM processes and activities. They may also continually provide information for search terms, knowledge demands and support the improvement of techniques, such as sentiment analysis through process implemented annotation. The system would be open for user specific mining to discover new knowledge and for automated analysis to continuously expand the CRM knowledge base through pre-defined rules.



**Figure 1:** Framework of an integrated SCRM system

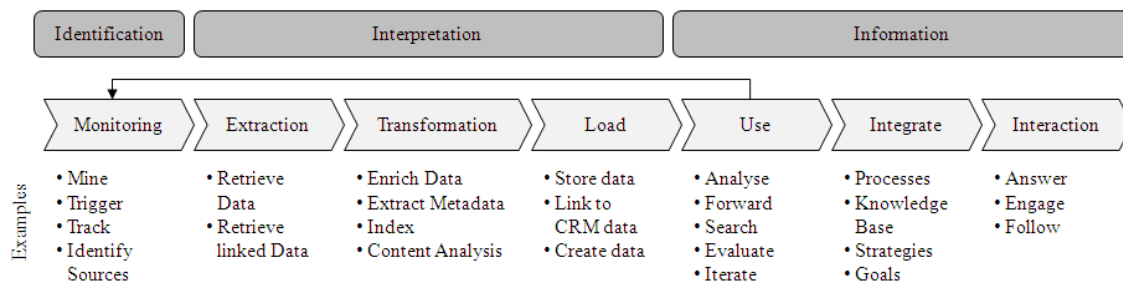
#### 3.2 Task of analytical SCRM

As one functional part of SCRM, analytical SCRM enables users to monitor the Social Web, retrieve knowledge from it, listen to events, discover actors, link knowledge from the Social Web with existing CRM data, make it usable for CRM processes, show the impact of CRM processes in the Social Web and to analyse SCRM data and activities in a holistic way. These requirements may be summarized into the tasks of identification, interpretation and information generation and be mapped to SCRM as illustrated in Figure 2.



**Figure 2:** SCRM tasks and their support through analytical SCRM

Features for *identification* include interfaces to Social Media for content extraction and to CRM systems for utilization of existing knowledge and integration of their users. They are used to identify the Social Web ecosystem of a firm and to access relevant content. Features for *interpretation* include mechanisms for data and text analysis, knowledge extraction and making the content of a conversation understandable for machines. They automate as much as possible, but also support user activities, such as verification, sense making or interpretation. A key element is the utilization of existing knowledge, sophisticated algorithms, and human capabilities for a self-sustaining and continuously improving a learning circle. Generated *information* may be used for analysis, reporting, monitoring and as well to generate new CRM data, objects and events that affect the future CRM activities of a firm.



**Figure 3:** Typical activities in an analytical SCRM Process

Analytical SCRM processes include specific activities in each of these three tasks (Rappaport, 2010b; Stern, 2010; Winterberg, 2010), that may be grouped into monitoring, extraction, transformation, load, use, integration and interaction as shown in Figure 3. They require techniques from BI, Data Mining and Social Media Management. The process goal is knowledge generation and identification of Social Web events for SCRM processes and related management activities, such as planning, execution and control.

**Table 1:** Potential links of Social Media Content to CRM Objects

CRM Object	Examples
CRM Master Data	Contact, Lead, Product, Proposal
Activities	Campaign, Service request, Sales Opportunity
Channels	Partner Community, Social Network, Own Blog, Microblogging Services
Market knowledge	Consumer Trends, New Services, Potential hybrid products

The content in Social Media may be relevant for each aspect of CRM, as long as managers bear in mind that this data has some shortcomings such as limited credibility or user objections against commercial use of this data. Therefore verification with data from other sources as well as sensitive use of data from the Social Web needs to be ensured. The content may relate to CRM objects, such as CRM Master Data, activities, channels and market knowledge (see Table 1). One of the two main challenges in SCRM is the discovering of relevant content out of the infinitive extent of the Social Web and its relations with those CRM Objects. The second challenge originates from

the different representation of data in the Social Web and CRM systems and their difficult integration.

Information in CRM systems represents the firms view and knowledge about their business ecosystem. It is enriched with external data from market research institutes or partners. For processing in CRM systems this data is structured and normalised. Additional textual reports, such as feedbacks from sales persons or market reports are stored in integrated document management systems and linked to relevant CRM objects. The nature of CRM data is more quantitative and optimised for quick insights and high usability. Unlike this information Social Web content represents the view and knowledge of the business ecosystems about the firm and includes as well information about competitors, the market itself, its actors, other markets and much more. Information is primarily exchanged between humans based on textual postings. Consequently, the data is unstructured and of more qualitative nature. As described earlier the task of SCRM is to connect the two worlds of CRM and Social Web. Information in the social content, such as about themes, linked topics or authors is at the core of SCRM. But uncovering this information for CRM requires functionalities to handle unstructured data in CRM systems and to integrate it with the existing data in these systems. Currently, firms often solve this problem by assigning employees that manually track discussions in the Social Web, retrieve knowledge where possible, engage where necessary and redirect Social Web users to traditional channels (Rappaport, 2010b).

## 4 Tool analysis and system blueprint

### 4.1 Tools for analytical SCRM

System vendors from various domains have identified the SCRM market as promising target. Most originate from related domains, such as Search Machines, TM, Community Management or CRM system development (Rappaport, 2010b) and adjusted their tools for specific tasks in SCRM. In the field of analytical SCRM five different types of tools with dedicated functionalities for (1) Social Media analysis and (2) transformation of Social Web content into structured data may be identified. First, *Search Machines* for Social Web content, such as GoogleAlerts or Social Mention, help in the real-time identification of new sources and content. Second, *Social Media Monitoring* tools allow to setup rules for continuously monitoring of indexed sources and to transform their content into information with the help of analysis, reporting and monitoring functionalities. Third, *Business Intelligence* vendors started to integrate Social Media into their analysis and reporting functionalities by adding TM based transformation algorithms and storage structures. Fourth, standard *CRM System* providers extended their tools for Social Web communication by providing management functionalities for social channels or access to data in social networks. Fifth, *Community* or technology providers for communities use their direct customer access for collecting data and offer this data or services that are based on them to external parties. They do not apply sophisticated technology in the field of interpretation but request customers to fill in relevant information through service usage.

### 4.2 Analysis design and results

The following analysis aims (1) to examine state-of-the-art components of analytical SCRM and (2) to blueprint an analytical SCRM system. In a first step, market reports and websites about SCRM, Social Analytics and Social Media Monitoring tools were analysed to identify available solutions in the field of analytical SCRM. This resulted in a list of more than 40 different solutions. Afterwards, solutions where no detailed whitepapers, demo versions or video presentations where available were excluded.

Finally, 14 solutions which were either reported as market leaders or representatives for innovative functionalities in the literature were selected for further analysis. They were examined for their features and components regarding the integration, interpretation and generation of information. However, an evaluation of the quality or a detailed comparison of features was outside the scope of this analysis. An overview of the findings is provided in Table 2 together with a brief description of each tool in Appendix A and B.

The analysis revealed that none of the existing tools supported all elements of an integrated SCRM system or all tasks of analytical SCRM. Compared to the framework in 3.1, monitoring is the most developed field and each tool offers at least basic monitoring capabilities. Management and interaction are far less developed and associated functionalities are primarily offered by CRM related tools. Regarding the tasks of analytical SCRM the functionalities of each tool still reflect the tools domain origin. Only few tools, such as Overtone or Radian 6, offer advanced features in all three fields.

Regarding *identification*, the tools are either built for selected Social Media and feature specific API's or provide content from Social Media via RSS. The latter usually allow a user to expand the list of sources by adding new RSS feeds, while the first can only be expanded by the tool provider. The tools usually copy the content from a source into a local database and then start the analysis and metadata generation. Professional tools are typically hosted by a provider that keeps extracted content permanently or a defined time in his database. Only the CRM related tools store data usually in a local database. Almost every tool allows a user to set up rules for permanent search and extraction. They also support more complex search phrases for data identification and extraction with Boolean operations or sometimes by specifying the type of desired data (e.g. companies, products).

**Table 2:** Analysis Overview

Type	Product	Identification	Interpretation	Information
Search Machine	Social Mention	+	o	+
Search Machine	BoardReader	o	o	o
Social Media Monitoring	Radian 6	+	+	++
Social Media Monitoring	Jive Software	+	+	++
Social Media Monitoring	Overtone OpenMic	++	+	++
Social Media Monitoring	Alterian SM2	+	+	+
CRM System	Oracle Social CRM	o	+	+
CRM System	Microsoft DSN Accelerator	o	o	+
CRM System	Salesforce	+	o	+
CRM System	Update CRM	+	o	+
CRM System	RightNow CX	+	+	+
Business Intelligence	SAS	+	++	++
Community	Lithium	o	+	++
Community	Facebook	+	+	+

Legend: o = basic features, + = more advanced features that show special functionalities, ++ = advanced features the are significantly above industry average

In the field of *interpretation*, nearly all tools apply statistical methods for key word, metadata and sentiment identification in the identified content. More advanced tools also apply TM functionalities to increase the quality and richness of extracted metadata in the field of entity recognition and sentiment analysis. Some tools use in addition machine learning methods and user feedback to improve sentiment analysis. Especially BI tools and tools with a TM background show advanced features here. But sentiment analysis still provides only basic insights, such as a positive or negative attitude in a posting with low accuracy. However, only few of the analysed tools provide details



about their semantic algorithms or allow users to adjust them to their own needs. Furthermore, it is difficult to integrate larger amounts of existing data, such as product names or domain specific key words, into the mining process. Almost every tool allows to search manually in the analysed data.

Regarding the generation of *information*, the tools may be distinguished into dashboard focused and process flow oriented data representation. Most of the monitoring and mining related tools offer report and analysis functionalities as well as a set of pre-defined dashboards and reports, such as trend-analysis, tag clouds, search comparison or category maps. As in BI solutions, the retrieved metadata may also be used to create personalized reports and dashboards. CRM related tools are more process oriented and allow users to categorize retrieved content, to add data and to assign process flows. They help users to extract process relevant metadata, expand the knowledge about the social ecosystem and provide as much as possible information for follow up activities. Advanced tools, such as Overtone, start to address both topics.

The analysis confirms that available tools with their components are specialised on some task of analytical SCRM in an integrated SCRM system only. Tools from providers with a CRM or community background lack analytical functionalities to monitor a large body of Social Media as well as to retrieve knowledge out of their content. Tools from providers with an analytical background lack the process specific generation of data as well as the automatic extraction of CRM relevant knowledge or generation of new CRM business objects.

### 4.3 Blueprint of an analytical SCRM system

Based on the requirements of SCRM and the tool analysis, the concept for an analytical SCRM system with components for identification, interpretation and generation of information in SCRM was developed. During the discussions with the project partners and tool providers, six key activities and basic services emerged that were included in the final blueprint as illustrated in Figure 4. These elements correlate with findings from other researchers and practitioners as illustrated in Table 3.

**Table 3:** Related work

Blueprint Element	Related work
Collect and harvest	(Rappaport, 2010b)
Process the harvested content	(Rappaport, 2010b; Stern, 2010)
Structure and mine the content	(Das & Chen, 2007; Kao & Poteet, 2007; Rappaport, 2010b; Stern, 2010; Weiss et al., 2005)
Connect into internal information logistic	(Rappaport, 2010b; Russom, 2007)
Enable integrated search	(Stern, 2010)
Distribute Social Web insights	(Hennig-Thurau et al., 2010; Rappaport, 2010b; Stern, 2010)

The first blueprint element is the support of *collecting and harvesting content* from the Social Web. Relevant sources and contents of the Social Web need to be identified continuously. Routers, such as Yahoo Pipes, and search machines, such as Social Mention or Google Alerts, may be used to direct or even partially automate this process and to reduce the overall effort significantly. The content may be collected through customizable Social Media interfaces such as RSS, API or Crawlers. These interfaces should not only allow to collect content, but also to post new content out of the SCRM system into the source. Harvesting into local databases is another important element, because content and conversation in Social Media change within minutes and might become inaccessible over time. Market leading monitoring tools copy the social content after initial cleaning into data warehouses and keep only links to the original source.

This enables them to examine trends later, enrich the data and to improve their machine learning algorithms. Both elements are orchestrated by a collector component that analyses CRM data and Social Web content for new sources automatically or semi-automatically. It is supported by a lookup component that can extract additional metadata, such as a user profile for a twitter posting or statistics about a website, from additional sources.

After the content of a source is available in the form of cleaned text and basic metadata, the CRM specific metadata may be extracted by *processing the text with analytical functions* through an Analyzer component (Rappaport, 2010b; Stern, 2010). This delivers information about the document, such as key words, authors, relevance and its general content, through the key word based examination of topics, themes or tags. Besides statistical functions, text-based algorithms, such as entity extraction and classification, can be applied to improve the quality of results.

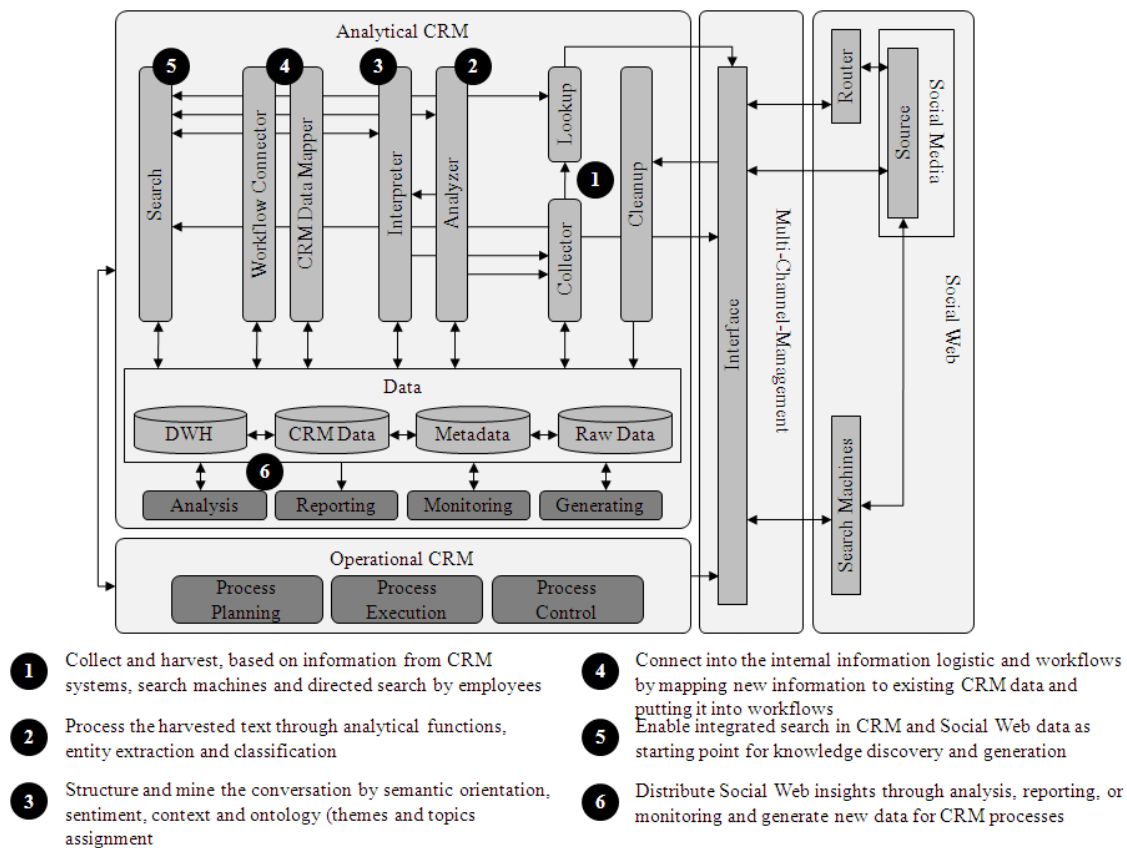
In addition to statistical methods, the content should be interpreted in the context of a firm by *structuring and mining with semantic methods* with an Interpreter component to unveil the content's meaning (Rappaport, 2010b; Stern, 2010). This includes the semantic orientation, context, ontology and sentiment. The integration with CRM systems offers new opportunities. CRM systems are traditionally used to structure, interlink and normalise data. The implicit semantic relations offer a good starting point for the configuration of TM algorithms. However, this requires a deep integration with CRM systems and data, management of multiplicity of entities in CRM data as well as semi-automated configuration of ontologies. Both components rely on machine learning and language processing functionalities that help to automatically process Social Media in real-time with a constant quality. This analytical SCRM system should also offer functionalities for manual adding, tagging and evaluation of metadata, because the work of system users or process experts can add valuable data for learning mechanisms, add related information and improve the overall quality.

While these elements reduce the available social content to relevant pieces that are described by a set of accurate metadata, another element is the *connection of this data with the internal information logistic of a firm as well as with its CRM workflows*. Using rules, semantic search and manual linking, the metadata of Social Web content and CRM data may be connected. This mapping between data, such as the connection of a Social Web posting with mentioned products, a certain person or an actual campaign, is the basis for further workflows that may create, update or delete CRM objects based on new insights from the Social Web. The workflow connection needs to be bi-directional, so that results or intermediate steps of analytical SCRM may trigger CRM processes as well as CRM processes to initiate new analytical SCRM processes or generate new data needs.

A search function connects all other components and enables users and algorithms to seek information in the CRM system and social content database based on interlinked metadata as well as semantic models. This component helps to unveil links between different types of social content as well as with CRM data from marketing, sales and services. Through *integrated search in CRM and Social Web data*, users may derive trends, investigate the origin of events or analyse the correlation between themes over time. This component needs to provide interfaces for the other components as well as for users and should support different types for presentation of the search results.

The *distribution of Social Web insights* is the final blueprint element. The retrieved information needs to be provided in relevant processes, kept accessible for further analysis, reporting or monitoring, and should be used to generate new inputs for CRM. This element encapsulates traditional functionalities from BI systems, such as ad-hoc analysis, OLAP, reporting, alerting and dashboard based real-time monitoring as well as mechanisms that generate new CRM objects, such as services requests from Twitter postings, new leads from Facebook fans or active bloggers as new marketing channels.

The underlying CRM infrastructure needs to handle social profiles, sources, interactions and events that are connected with existing CRM objects, such as a contact, person, opportunity, request, activity or campaign.



**Figure 4:** Blueprint of an analytical SCRM system with key activities and components

## 5 Conclusions

The emergence of the Social Web established a new information source and interaction channel for individuals. Businesses now start to recognise the Social Web as more than an inexpensive channel for word-of-mouth marketing or targeted advertising through communities. They now offer the opportunity to obtain new market insights, to cooperate with the market actors and to interact with their customers personally and not through complex distribution channels.

The literature review revealed that SCRM needs to monitor the Social Web, manage Social Web activities integrated with CRM processes and that they need to interact with Social Web actors in all customer process stages. SCRM systems provide the necessary technology and analytical SCRM is a key element in those systems. They enable firms to monitor large amounts of Social Web sources automatically and their employees to concentrate on the important conversations, actors and sources. TM is a core technology to free users from search and interpretation tasks as well as to route information between Social Web sources and SCRM processes. The system analysis revealed that available tools for analytical SCRM focus on specific tasks such as interpretation of Social Web content or process specific presentation of it. Based on the assumption that conversations in the Social Web relate with the business success of a firm, most existing systems primarily collect conversions about a firm and its product from as much sources as possible. They focus on the amount of relevant conversations and not on the meaning of them. Tools that support all elements of SCRM are currently missing.

The analysis revealed two elements for analytical CRM which are insufficiently addressed by current solutions. First, the accuracy in which Social Web content may be automatically classified and analysed is key for more complex SCRM strategies. However, the statistical methods in most available tools deliver only generic insights and manual effort is required to sort out and enrich this data. Semantic Mining-Methods are a promising approach for a faster and more accurate and deeper content analysis. Researchers may help with the development of TM algorithms that are easily configurable, but that deliver a high accuracy at the same time. The incorporation of existing structured data from CRM systems into ontologies as well as knowledge experts from CRM processes in the analytical process could be used to reduce the configuration overhead and to improve accuracy. Second, the automated linking between Social Web content and CRM objects as well as the triggering of appropriate activities is important for larger firms and their Social Web activities. Available tools lack a deep integration with CRM data and processes. Social Web workflows are restricted to a small set of well-know Social Media, such as Twitter or Facebook, and they require employees that identify the relevance of a conversation and start the right processes. Current solutions primarily retrieve data by keywords, index them and extract a pre-determined set of metadata that may be used in reports and dashboards. Only few SCRM tools allow to transform Social Web content into activities or to enrich existing knowledge. It seems necessary to integrate both approaches and sharpen the view on what is needed and possible to achieve, as well as to provide corresponding solutions.

The blueprinted system could supply the monitoring, management and interaction system in an integrated SCRM system with required information, events and insights. It shows key elements and introduces basic components for analytical SCRM. The main characteristics of the blueprint are (1) integration of Social Media content and CRM data through metadata and semantic analysis and (2) integration of automated semantic analysis with human capabilities through an integration of discovery and use phase. With this approach some of the disadvantages of semantic analysis, such as inaccuracy and configuration intensiveness may be overcome, and Social Media Monitoring and Interaction can be brought from some specialists in Social Marketing departments into the whole of an organization.

Currently, the realisation of the blueprinted system may only be achieved by integrating several of the available solutions in a “best-of-breed” fashion. The shortcomings of current solutions in the field of process or analytical functionalities make the realization of integrated processes with more than few Social Media challenging. The option of using one integrated system is currently not available and requires the system providers to enhance their solutions. The providers of monitoring related solutions may implement basic CRM functionalities with interfaces for CRM systems and CRM system providers in turn may enhance their solutions with more advanced mining mechanisms. An integrated system has the advantage, that not only analysis, reporting and monitoring but as well automatic generation of CRM objects and initiation of processes becomes possible. In sum, the emerging field of SCRM promises a fruitful area for further academic and practical research.

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## Appendix A

Type	Product	Identification	Interpretation	Information
Search Machine	Social Mention	Aggregates Social Web related information from other Search Engines and Social Media in real-time. User can use an API for search. New Sources are added by the provider.	Basic statistical mining and automated sentiment analysis through keywords. External data can not be included.	Basic analysis, reporting and advanced real-time monitoring features such as Buzz clouds, Sources, trends and Alerting. Calculation of Social Web related KPI such as reach or overall sentiment. Option to integrate search and search results into workflows via API.
Search Machine	BoardReader	Real-time Search Engine for forums and boards.	Key word search and basic statistical mining.	Displays search relevant content from boards and forums as well as the posting activity over the last months for each search. Provides information about the structure of a board. Search results can be exported via RSS.
Social Media Monitoring	Radian 6	Covers various sources such as Twitter, LinkedIn, Facebook and numerous Feeds from Blogs and Communities that are accessed via API and RSS. User can add own feeds.	Offers basic statistical mining and automated sentiment analysis. Data from external sources can be linked and users can tag results individually.	Offers analysis, reporting and monitoring features such as configurable dashboards or Tag Clouds. Additionally offers basic workflow management such as alerting or profile history and supports engagement through twitter. Offers interfaces for Salesforce.
Social Media Monitoring	Jive Software	User can add own RSS feeds to the large source base of RSS feeds from Blogs, Communities, media services or portals. Offers APIs for special sources such as Twitter or Facebook. Rule-based Search and Extraction	Interpretation through statistical mining and automated sentiment. Content from enterprise applications or reports can be included.	The system support analysis, reporting and monitoring features. It offers to tag Social Content and forward it into a Social collaboration component (Jive SBS) for interaction and engagement tracking. Limited interfaces for CRM-Systems.
Social Media Monitoring	Overtone OpenMic	Covers various Social Web sources and integrates direct conversation from a clients CRM system such as e-mail, surveys or SMS. Source list can be expanded by users. Support configurable API and RSS interfaces. Data is stored in the providers data Warehouse.	Advanced statistical and semantic text-mining with automated sentiment analysis. Mining includes content and data from CRM systems.	Standard Analysis, but extensive reporting and monitoring capabilities such as trend detections, automatic classification or tone. Tools provide rule-based generation of CRM data such as service request or new leads as well as process triggering and alerting.
Social Media Monitoring	Alterian SM2	Extracts primarily from RSS based sources and uses APIs for special Sources such as twitter. Users can add own RSS feeds. Rule based search with options to specify what the search is about (e.g. persons, companies). Search is performed on the providers data warehouse of pre-extracted Social Content.	Offers standard statistical and semantic mining functionalities with automated sentiment and emotion detection based on keywords. Scores content for relevance and popularity.	Standard Analysis and Monitoring Functionalities. Extensive Reporting with user specific and predefined reports and dashboards such as Buzz-Tracking, Trend Analysis, Tag Clouds or Emotions in Contents. Option to export data into other applications.
CRM System	Oracle Social CRM	Pre-defined APIs to special Social Media such as Twitter or LinkedIn and implemented Social Media. Search can be manually or rule-based initiated from CRM systems and CRM objects.	Basic statistical mining such as key word detection. Includes CRM data and correlates Social Web content to CRM data such as LinkedIn profiles to contact information.	Only process specific monitoring, analysis and reporting based on CRM data, but capabilities to provide Social Web content in CRM process flows such as Sales or Marketing. Focus on internal collaboration through provision of Social Web features and data in CRM process management.

Legend: 0 = basic features, + = more advanced features that show special functionalities, ++ = advanced features that are significantly above industry average

Appendix B

Type	Product	Identification	Interpretation	Information
CRM System	Microsoft Dynamics Social Networking Accelerator	Pre-defined API to twitter with automated extraction and filtering. o	Basic statistical mining, but automated linking and enrichment of Twitter conversations with CRM data such as user profile and history. o	Basic monitoring and reporting features. Extensive interaction features and workflow integration of Twitter conversations into CRM processes such as lead management or service management. +
CRM System	Salesforce	Interface for Twitter, Facebook and own Web 2.0 offerings such as Questions&Answers as well as integrated Social Media for internal communication. Integration with Jigsaw for data cleansing and updating. +	Basic statistical mining that is based on key words and internal CRM data. o	Basic analysis, reporting and monitoring features based on data in the CRM system. Features for lead, contact or case generation from Social Web content as well as functionalities for direct interaction through twitter. +
CRM System	Update CRM	Pre-defined API for Twitter and option to include RSS feeds. Users can add own RSS feeds. +	Basic statistical mining and automated sentiment based on key words. Social Content is automatically linked with CRM data. o	Basic analysis, reporting and monitoring features based on data in the CRM system as well as Social Web specific dashboards. Features for manual lead, contact or case generation from Social Web content as well as functionalities for direct interaction through twitter. +
CRM System	RightNow CX	Social Media can be integrated via RSS feeds and API. The provider offers interfaces to own Web 2.0 offerings and communities. Search and extraction via rules and ad-hoc. +	Basic statistical and semantic mining with automated sentiment analysis through key words. Data from CRM systems and external data can be included. +	Basic analysis, monitoring and reporting functionalities with a strong focus on community, channel and service management. Advanced features for interaction and tracking of conversations. Integration with CRM processes. +
Business Intelligence	SAS	Various sources can be integrated via existing RSS interfaces and APIs. Users can add own sources. Data is stored in a local data warehouse. +	Offers high-end statistical and semantic text-mining with automated sentiment analysis and option to include data from external systems through an ETL-component. ++	Extensive analysis, monitoring and reporting features through the SAS BI Suite. Users can create own analysis, reports and dashboards and include them in external applications. No CRM process specific functionalities, but option to integrate analysis results as new data into external systems. ++
Community	Lithium	Rich interfaces to own Web 2.0 offerings and communities and standard interface to special sources such as Facebook or Twitter. Option to include other sources. Preselected or rule based search and extraction. o	Uses statistical and semantic mining combined with machine learning to generate as much as possible information automatically. +	Standard analyse, report and monitoring capabilities especially for community management but extensive workflow management functionalities for Social Web specific processes such as idea breeding or community monitoring. Integration with Salesforce. ++
Community	Facebook	Content from own communities and links to relevant Social Web content through recommendations by users. No search or extraction functionalities but various options for users to add new data and to link content. +	Basic statistical mining based on community data and links. Data is aggregated into customer segments with numerous properties. Capturing of relevance and popularity through users recommendations. +	No explicit analysis, monitoring or reporting, but CRM process specific data presentation such as customer segments or links for advertisers. High accuracy of data and direct customer contact, no engagement functionalities. +

Legend: o = basic features, + = more advanced features that show special functionalities, ++ = advanced features that are significantly above industry average