Performance Management within Social Network Sites: The Business Intelligence Process Method

Abstract. The huge amount of data and complexity of decisions in the current information age, requires decision makers to utilize information analysis tools for supporting business decisions. The data within the social network's databases can be transformed from information to valuable knowledge with the aid of Business Intelligence. Business Intelligence is not widely used within companies who are dealing with user generated content. By conducting a qualitative research this paper provides more knowledge and a deeper understanding on Business Intelligence supporting the business model of companies exploiting a Social Network Site. Most of the Business Intelligence process models do not take the organizational aspects into account as continuous process improvement elements and therefore a new method is developed. The Business Intelligence process method (BIPM) and the related management information items were validated through a case study at the leading Dutch Social Network Site.

1 The information gap within Social Network Sites

Members on Social Network Sites are still increasing rapidly with over two-thirds (67 %) of the global online population have visited a Social Network Site and therefore the amount of user generated content increased as well [12]. The aim of Social Network Sites is sharing personal information, having fun and to keep in touch with friends. For this paper the definition from Boyd, D. & Ellison, N. [3] will be used in which Social Network Sites are defined as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others. A lot of user generated content is stored within the databases of Social Network Sites. Nevertheless they are not using all the information that can be extracted from the available data because a proper overview and in-depth insight are missing. The increased information overload makes it more and more difficult and time consuming to identify relevant information for decision purposes [14]. This is a missed opportunity for Social Network Sites dealing with user generated content and not effectively exploiting that abundance of contextual information. The huge amount of data and complexity of decisions in the current information age, requires decision makers to utilize information analysis tools for supporting business decisions [25]. The need for fast decision making on the one hand, and the longer time needed to acquire the right information on the other hand

causes a so-called "information gap". The data within the social network's databases can be transformed from information to valuable knowledge with the aid of Business Intelligence (BI) to gain competitive advantage [18]. However, BI is not widely used within companies who are dealing with user generated content and scientific literature on the combination of Social Network Sites and BI is only scarcely available [20]. This paper therefore uses the definition and confirms the view of Osterwalder and Pigneur [15] which place the business model between the strategy (strategic view) of a company and the process (operational view). Osterwalder and Pigneur [15] stated a business model is a "conceptual and architectural implementation (blueprint) of a business strategy (that) represents the foundation for the implementation of business processes and information systems".

By conducting a qualitative research with a literature study, interviews and a case study, this paper provides more knowledge and a deeper understanding on Business Intelligence supporting Social Network Site business models through the introduction of the BI Process Method (BIPM) which appropriately aligns these aspects. This work answers the following research question: **"In which way can Business Intelligence support the business model of companies that exploit Social Network Sites?"**

Research methodology and structure

When little is known about a topic, or phenomenon, qualitative methods can be used to create better understanding [21]. This is also the case within this research and hence a qualitative approach is used. For this research the qualitative approach of literature research and interviewing is used to support and validate theoretical findings and to expand the view of the domains. The other qualitative research method that is used in this thesis research is a case study. The purpose of the case study is to validate the result of our literature study and expert interviews: the Business Intelligence Process Method (BIPM).

This paper is constructed as follows. Chapter 2 comprises a literature review on social network sites, theories and business models for Social Network Sites, and Business Intelligence in general. Chapter 3 describes the proposed solution for Business Intelligence within Social Network Sites. It elaborates on the process model and its deliverables. Chapter 4 addresses a summary of the main outcomes, findings and arguments of the study. Finally chapter 5 gives the conclusion of this paper.

2 Social Network Sites, Business models and Business Intelligence

2.1 Social Network Sites

Human beings are very social in their natural behavior and this is one of the most important elements for our existence [10]. With the rise of the internet this phenomena of being social is extended from only offline connections and already existence to new online connections. A main driver for this growing phenomenon are Social Network Sites.

What makes Social Network Sites unique is not that they allow individuals to meet strangers, but rather that they enable users to articulate and make visible their social networks [3]. Social Network Sites are a means for self-presentation and for building and maintaining contact with friends and acquaintances (e.g. [3]). The users have a personal profile. Profiles are unique pages where a person can "type oneself into

being" [22]. Profiles usually include demographics and personal preferences completed with a profile picture and some other media related to the user which on their way is used for connecting with other users.

This paper explores Social Network Sites and their internal and external forces with a literature research, the results of which are shown in Table 1. The Web 2.0 characteristics as observed by various authors are compared for applicability in the field of Social Network Site-specific factors.

Table 1 Comparison of Social Network Site specific factors.

Högg et al. (2006)[6]	Anderson (2007)[1]	Brandtzaeg and Heim (2008)[4]	Isaias et al. (2009)[7]	This paper
Social environment	Open-ness	Harassment/bullying	User content addition features	Affordance
			User content development tools	
Interactive exchange of information	Architecture of participation		Availability of content to justify user's access	Collaboration
Content	Individual production and user generated content	Low quality content	User's input	Content
Network effect	Harnessing the power of the crowd	Lack of interesting people/friends attending	User's critical mass figures	Network effect
	Network effects, power laws and the Long Tail			
Based on principles of "free economy"		Over-commercialized	Revenue models	Revenue model
Trust building services	Trust, privacy, security	Low trust		Trustworthiness
		Dissatisfaction with moderators		
User acceptance	Rich user experience	Low usability	Ease of use of component	User experience
		Time-consuming/isolating		

2.2 Business models

Social Network Sites generate revenue by acquiring as many users as possible by offering free services and selling advertisement space to third parties and additional products or services to users or voluntary contributions. With the rise of user-

generated content and free access social networking platforms and other free access platforms that yield profit by online advertisement (e.g. [9]), the Web seems to come close to the accumulation strategies employed by capital on traditional mass media like TV or radio [23]. Beer and Burrows [2] stating that perhaps the key-defining feature of web 2.0 is that users are involved in processes of production and consumption as they generate and browse online content. The meaning of value and the process of value creation are rapidly shifting from a product- and firm-centric view to personalized consumer experiences [19]. Therefore it is of highly importance for companies who are dealing with this phenomena to know what their internal and external forces are for their business [18].

2.3 Business Intelligence

In literature a well-known agreement on the definition for Business Intelligence is still limited. (e.g. [11]). Pirttimäki and Hannula [17] define Business Intelligence "as an organized and systematic process by which organizations acquire, analyze and disseminate information from both external and internal sources significant for their business activities. However, the term can refer to processes, techniques or tools to support the making of faster and better decisions." According to this definition, Business Intelligence covers all information gathering and processing activities in an organization and therefore this paper also uses this definition of Pirttimäki and Hannula [17]. In line with Pirttimäki & Hannula [17] also this paper confirms that the theoretical process models seem to be quite similar to each other. However, at the same time, the process models at hand are organization-specific. Nevertheless most of the models do not take the organizational aspects into account as continuous process improvement elements. Therefore, we propose a new method specifically designed for use in organizations which employ Social Network Sites.

3 Business Intelligence within Social Network Sites

When implementing Business Intelligence, several areas or layers are important to take into account, as shown in Figure 1, in top-down order: Vision, Strategy, CSF, KPI, and Scorecards and Dashboards.

Figure 1 Business Intelligence layers

With these layers in mind there are two possible approaches when implementing Business Intelligence: a so-called bottom-up approach and a top-down approach. The bottom-up approach represents the data perspective in which the possibilities are considered to create measurements around the available data to reach the vision of the company. The top-down approach starts from the necessary information that is

required to reach the vision and strategy and then transforms this into actions to acquire the necessary data. To capture Business Intelligence in an integrative way a new method is developed and in specific for Social Network Sites from a top-down approach because with this approach a better alignment between the business model and the strategy can be assured. This method is based on a combination of all the relevant Business Intelligence processes and the Plan-Do-Check-Act (PDCA) cycle of Deming [5].

The main organizational aspect is a company's strategy [18] and its success factors. In this research the "value disciplines" of Treacy and Wiersema [24] are chosen to operationalize this situational factor. Treacy and Wiersema [24] identify three "value-disciplines" that can serve as the basis for strategy: operational excellence, customer intimacy, and product leadership. Because different strategies have different requirements for success it should be tailored to strategic orientation. The perspectives of Kaplan and Norton [8] are used to make a distinction between these orientation requirements. These perspectives are used to arrange the points of attention or building blocks from the business model. The financial and customer perspectives are external and have an outside-in approach. The internal business process perspective deals with the primary (results) and supporting processes (people and resources). The learning and growth perspective revolves around culture (encourage people to improve) and structure (quality systems and process improvements). These last two perspectives are added because they are present in every organization but not dealt with in this research because the external factors have more influence on the existence of companies dealing with Web 2.0 factors ([19], [23]). This paper models the situationality, deliverables and the Business Intelligence Process Method (BIPM) using the meta-modeling technique of Weerd & Brinkkemper [26] to reveal the relations between activities and concepts. The Process Deliverable Diagram is shown in **Error! Reference source not found.** and describes the process view on the left-hand side of the diagram which is based on a UML activity diagram [13]. On the right-hand side of the diagram the deliverable view is shown which is based on an UML class diagram [13].

[**Plan**] In the Plan phase the *business model is defined* wherein the strategic objectives are determined in which the mission is extracted. Also the target market is described in which the scope and market segments are defined. Then the value proposition is specified and the resources are defined. Next the key activities and the cost and revenue model are specified and at last also the value chain is defined. From this first step in which the business model is defined the next step *extract information needs* will be executed. The step *extract information needs* will answer questions regarding the information need or problem at hand or from the business model. The last step in the Plan phase consists of the step *determine strategy* with two sub activities. The first sub activity deals with the determination of the value discipline. According to Treacy and Wiersema [24] any company must choose to excel in one value discipline and this value discipline must be determined here. The second sub activity deals with the strategy. In this activity the targets are specified for the strategic objectives which are

used in a later stage to determine if the strategic objectives are reached.
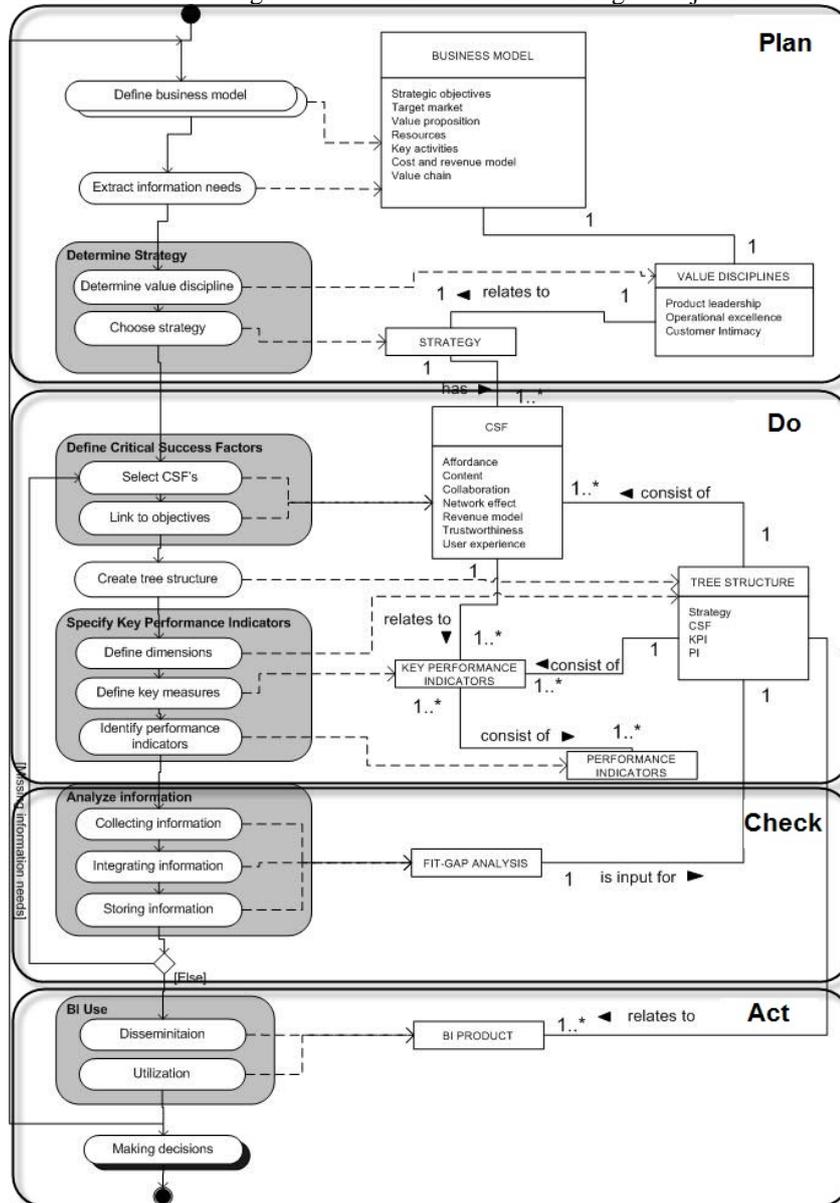

Figure 2 Process Deliverable Diagram of BI Process Method

[**Do**] In the Do phase, which is the second phase, first the *critical success factors are defined*. In this research this phase is worked out with specific SNS situationalities. The sub activities consist out of selecting the critical success factors and linking them to the objectives. A critical success factor is a characteristic of an organization or its

environment which is essential for a company's viability or success. This can be positive or negative but in the main point it is essential to give these critical success factors extra attention when managing on a strategic level. Therefore, and this is the second sub activity, the critical success factors should be aligned with the objectives on the strategic level. The second step in this Do phase consist of creating a so-called *tree structure*. This so-called tree structure is a newly developed deliverable in Business Intelligence processes to create overview and insight in the alignment between the upper vision (i.e. dimensions and critical success factors) and the bottom performance indicators (e.g. measures and data). Therefore the last step of this Do phase consists of *specifying the key performance indicators* which consists of three sub activities. The first sub activity defines the dimensions for the tree structure and linking them to the critical success factors and the key performance indicators. The dimensions for this research are obtained from Kaplan & Norton's [8] Balance Scorecard which consists of the external financial and customer perspectives and the internal business process and learning and growth perspectives which are internally focused. The following and second sub activity is being composed of selecting the key measures or so-called key performance indicators for each dimension or critical success factor. Key Performance Indicators (hereafter, KPI) are financial and non-financial metrics used to quantify objectives to reflect strategic performance of an organization. The third sub activity is about identifying the performance indicators. Performance indicators are a measurable degree to which the objective is being achieved and are components of the KPIs.

[Check] In the Check phase the information is analyzed. This phase contains three sub activities which collect, integrate and store the information. When going through these steps an overview is made of the necessary KPIs and the ones that lack. This is done in a fit-gap analysis which selects for each KPI the following information:

- **Performance indicator** – clear description of each performance indicator.
- **Owner** – Who is going to manage and measure the information.
- **Source** – Where is the information coming from or where can the information be found.
- **Availability** – Is the necessary information available.

When information needs are not answered after the fit-gap analysis the process rewinds to the Do phase.

[Act] In the Act phase the Business Intelligence output is actually used. In this stage of Business Intelligence usage, there are two sub steps which consist of dissemination of the gathered information and utilization of the information which is stored in specific Business Intelligence tools and products. The ultimate step in the Business Intelligence process is *making the decisions*. In this final step the managers can use the gathered information as additional knowledge within the decision-making process.

4. Validation and results

Next to the Business Intelligence Process Method (BIPM), shown in Figure 2, also parts of this process in which organization specific elements are developed. A major element are the critical success factors specifically tailored to Social Network Sites. This section validates the Social Network Sites specific critical success factors as well as the Business Intelligence Process Method (BIPM).

4.1 Interviews

The first validation phase was designed to validate the Social Network Sites specific critical success factors. This is done with several interviews with domain experts as they generally provide the best data available [21]. Table 2 shows the respondents which were interviewed.

Table 2 Respondents overview

Expert	Description
1	Is consultant at a international IT company and specialized in crowd sourcing among others on Social Network Sites.
2	Works as a management consultant and did research on monetizing websites and is now busy with everything that is called the "new" web.
3	Graduated on Web 2.0 and social computing business models and now works as a consultant focusing on social media strategy.
4	Graduated on the subject of Customer Relationship Management and Web 2.0 (SocialCRM) and works now as a Business Intelligence consultant and is specialized in Enterprise Micro Blogging.
5	Has a background in information retrieval in an academic setting. Now works for a company specialized in search technology in new media in which he is specialized in sentiment analysis on social media platforms.

The main purpose for conducting the interviews was to validate the Social Network Sites specific Critical Success Factors. The experts agreed with the factors that were proposed from this research and none of them suggested to add additional factors. Therefore, at this moment we consider the list of factors to be complete. However, this does not guarantee for future research as Social Network Sites are continuously evolving.

Table 3 Importance of each factor per expert.

Factor	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5
Affordance					
Collaboration					
Content					
Network effect					
Revenue model					
Trustworthiness					
User experience					

Unimportant factor ———————————— Important factor

4.2 Single case study

The next validation is done with a single in-depth case study at the largest Dutch Social Network Site. Adhering to the principle of triangulation, three types of data collection sources were applied in this study. The first is documentation which is an important source to verify and complete evidence from other sources. The data is presented in different documentation forms such as e-mail, websites and Excel documents. Secondly unstructured interviews were held and two semi structured

interviews will serve as a data collection method. This interviews were held with two respondents of a Dutch Social Network Site. The first respondent is Business Intelligence project manager and business analyst. The second respondent is CFO (Chief Financial Officer) and nearly involved with the implementation of Business Intelligence. After discussing all phases in our Business Intelligence Process Method, the respondents indicated that every step was clear to them. The respondents gave no reason to alter or add steps in the method and considered it to be complete. When relating the method to their own approach the respondents discovered useful additional steps. The most valuable improvement which definitely creates a clear insight and overview between the different management layers and their specific needs is the tree structure, as shown in Figure 3.
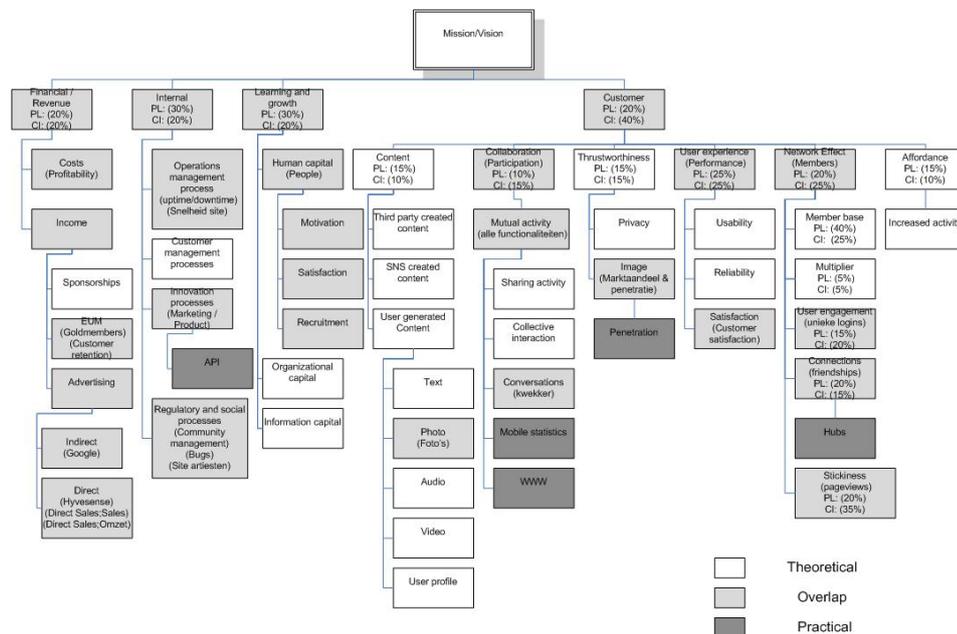

Figure 3: The validated tree structure at the leading Dutch Social Network Site.

The main improvement is the well-arranged connections that are made visible at first glance within the tree structure. In order to validate the tree structure in detail, also a validation was made, analyzing the overlap between the practical knowledge of the Dutch Social Network Site and the theoretical findings derived from the first part of our research. This validation was performed using several unstructured interviews, two structured interviews and a number of supporting documents from the Dutch Social Network Site The overlap is shown in light grey. The dark grey fields are specific additions derived from the validation at the Dutch Social Network Site. The white fields are possible improvement points for the Dutch Social Network Site. Next to this overlap also proposed weights are added to serve as a starting point that can be related to specific targets. These weight measures need to be improved constantly in order to accurately gauge them.

5 Conclusions

This paper opened with the observation that Social Network Sites have been growing extraordinarily during the last years and also the user generated content which is stored within the databases of Social Network Sites. Nevertheless they are not using all the information that can be extracted from the available data because a proper overview and in-depth insight are missing. The proposed Business Intelligence Process Method (BIPM) gives insight in the way a Social Network Site can walk through "an organized and systematic process by which organizations acquires, analyzes and disseminates information from both external and internal sources significant for their business activities" [17]. According to this definition, the proposed Business Intelligence method covers all information gathering and processing activities in an organization that exploits a Social Network Site.

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