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Social media and performance measurement systems: towards a new model?

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Abstract

Purpose – The purpose of this paper is to analyse how social media (SM) influence performance measurement systems (PMS), examining changes in measurement methods, performance indicators and their application.

Design/methodology/approach – The framework of the research was constructed to cover the technical component of PMS (measurement methods and indicators) and the use of the information obtained from SM. Empirically, the study is based on a set of case studies in eight companies.

Findings – The study findings offer a theoretical and empirical framework to evaluate PMS in the era of SM. It provides a classification of SM metrics, key performance indicators correlated to their use within different departments belonging to eight companies, highlighting the benefits and threats of SM information for PMS.

Research limitations/implications – The limitation of this study is the diversity of industries included into the multiple-case study. The authors choose cases with the aim of providing a broader view on the impact of SM on PMS. However, the results show the dependency of use and type of measurement on certain industries, requiring future research focused on specific sectors or PMS aspects.

Practical implications – The paper provides a map of SM information measurement methods and use, which allows companies to position themselves and examine PMS evolution.

Originality/value – The results of the paper propose a holistic model, employing SM as a new variable in PMS.

Keywords Performance measurement systems, Social media

Paper type Research paper

1. Introduction

Social media (SM) is defined as group of internet-based applications, "including collaborative projects, micro-blogs/blogs, content communities, social networking sites, and virtual worlds", that are based on Web 2.0 and allow an exchange of user-generated information (Kaplan, 2012, p. 129). Over recent years, there has been an explosion in SM use, with the number of users growing annually by a significant 20 per cent and now reaching more than one billion (McKinsey, 2013). Apart from individual use, this mounting interest has been seized upon by many companies all over the world and across different sectors (Harvard Business Review, 2012). SM applications generate a large corpus of data that companies can exploit to measure and manage their performance, delineating the need for a new performance measurement system (PMS) model. PMS is intended as a process for quantifying action efficiency and effectiveness, by "understanding of the factors, both internal and external to the organisation, that facilitate and inhibit the introduction of new measures" and optimise their use to support organisations in their decision making and achieving desired performance (Kennerley and Neely, 2002, p. 217). While practitioners and the consultancy industry have been very active in providing contributions on the role of SM data in measuring performance ("Open data", McKinsey, 2013), academic research is still in its infancy in this area.

Prior literature on the topic of PMS, without using the PMS label, provides an important contribution to the use of SM information in supporting decision-making processes. The majority of these studies have a specific focus, such as market predictions (Mislove et al., 2010), positioning on the stock exchange (Ghiassi et al., 2013), analysis of competitors and recognition of the behaviour of other players (Dutta, 2010; Haefliger et al., 2011). Only the work of Kaplan and Haenlein (2010) offers a broader perspective, examining in more general terms the potential contribution of SM information in decision-making processes. This research presents an interesting early view of the link between SM information and the decision-making cycle, but only offers general advice on the adoption of SM. The aim of this paper is to contribute to this area by analysing how SM information impacts on PMS, addressing two aspects: first, PMS technical features, in terms of indicators and measurement processes; second, the use of indicators within business processes.

Our research was carried out using a multiple-case study (Stake, 1995). Eight cases were analysed taking information from several sources, which included documents, web analyses, internal reports and face-to-face interviews with key players involved in processing and using SM data. The results highlight a variety of approaches in both designing the PMS and using data, revealing an "evolution" of PMS in the SM era. The eight cases have also proved that there is no holistic approach even at company level, ultimately specific departments (e.g. marketing; research and development (R&D), human resources) are developing their use of SM.

To illustrate these results, the paper is organised as follows: Section 2 provides a broad prospective on existing literature about PMS and SM; Section 3 proposes a framework to integrate SM with PMS; Section 4 explains the methodological approach for empirical investigation; Section 5 presents the results of the case studies and, in Section 6, the research results are discussed and the overall conclusions presented.

2. Literature review: PMS and SM
The aim of the literature analysis is to provide a broad overview of the existing contributions on SM and PMS and identify the issues and gaps in this field. There are only a limited number of academic articles specifically addressing PMS in the age of SM (Denning, 2011; Boyd and Gessner, 2013) and, while they mention PMS, the articles focus on sub-areas rather than on PMS as a system. Denning (2011) concentrated on marketing and client relationship management, proposing that SM information should be implemented within PMS to measure the company's ability to perform and deliver both value and customer satisfaction. Boyd and Gessner (2013), on the other hand, studied how SM information derived from an "internal Facebook" group could be adopted to measure employee performance, and therefore achieve a fair evaluation and ensure their well-being.

Similarly to these research works, other studies tackle the contribution of SM information in measuring and managing performance more indirectly. For the purposes of our research, it was essential to carry out a more extensive review of these studies. Guided by the definition of PMS provided earlier (Kennerley and Neely, 2002), we analysed the current state-of-the-art by focusing on three areas: performance indicators; measurement process; the use of SM indicators.

Regarding indicators, a first stream of papers explore the metrics for measuring the effectiveness of SM sources in responding to client requests, spreading viral information, etc. (Burton and Soboleva, 2011; Coulter and Roggeveen, 2012; Logan et al., 2012; Bonson and Ratkai, 2013; Rohm et al., 2013). These studies usually focus on

owned SM sources (i.e. sources owned by companies, their websites, collaborative platforms, blogs by employees speaking in their company's name, accounts on Facebook, Twitter, etc.) and paid SM sources (i.e. sources acquired externally by payment, advertisements on websites, posts in blogs, reviews in on-line magazines and fora, etc.) (Hanna *et al.*, 2011). Some studies propose simple metrics linked to SM participation, such as the number of "likes" and "followers" (Witek and Grettano, 2012). More refined indicators are proposed to monitor the structure of SM networks, measuring the degree of centrality, stakeholder closeness and betweenness (Daly and Haahr, 2009; Hanneman and Riddle, 2011; Kadushin, 2012). Finally, some traditional indicators, such as return on investment, have been re-adapted to calculate the return for companies on their SM investment (Bell, 2012; Romero, 2011; Malthouse *et al.*, 2013).

A second stream of research has developed and experimented with indicators on SM network dynamics (user, information flows). In this case, the indicators are based not only on owned and paid sources, but also on earned sources (i.e. sources belonging to third parties, where data are generated by people talking directly about the company, product or service). Researchers here have developed metrics about the level and speed of diffusion of information across social networks (Kazama *et al.*, 2012; Bakshy *et al.*, 2012; Malthouse *et al.*, 2013); users' influence on company brands, products and services through SM sources, for example Twitter, Facebook, blogs, fora, etc. (Bakshy *et al.*, 2011; Phang *et al.*, 2013; Flanagin and Metzger, 2013; Campo-Avila *et al.*, 2013).

The studies presented so far propose metrics based upon structured and punctuated information (quantitative measurement of social networks properties and flows), yet many other scholars have studied the potential of extracting value from the analysis of content provided and exchanged by SM users. In this case, text-derived indicators are built starting from the computational treatment of qualitative information, i.e. opinions, sentiment and subjectivity in text that occurred as a direct response to the surge of interest for a specific objective or for the company in general (Pang and Lee, 2008). Specifically, several researchers have concentrated their studies on the analysis of indicators concerning sentiment (positive, neutral or negative) expressed by the end users (Kalampokis *et al.*, 2013; Schoen *et al.*, 2013) or associations or on trend analysis for a specific product, service or objective (Ceron *et al.*, 2013). Other researchers, addressing initiatives carried out within the organisation, propose indicators based on the employees' text communication, with an attempt to trace their relationships and the circulation of information through internal SM systems (Joshi *et al.*, 2012; Raybourn, 2013; Deparis *et al.*, 2014).

Regarding the measurement procedures of SM indicators, there are fewer managerial contributions, as management researchers prefer to see the data collection process and analysis as a black box (Wang and Lin, 2011; Ceron *et al.*, 2013). Only a few marketing scholars have addressed the problem of measurement methodologies. For example, Bell (2012) has proposed a method for analysing unstructured SM data targeting specific company objectives. Other methodologies for implementing SM solutions were developed by Bajaj and Russell (2010), who proposed an information aggregation model combining text mining and semantic analysis for more reliable and tailored results. Notwithstanding, further to these studies, significant research has been carried out by information technologies scholars, who analysed SM information and its particular requirements in terms of collection and analysis (Vercellis, 2009; Nikolopoulos *et al.*, 2013; Shelton and Skalski, 2014; Balahur, 2014). A thorough analysis of these papers is beyond the scope of our work, although some issues relevant to PMS measurement procedures are highlighted here. The first issue is

related to the initial step of the measurement procedure – set-up – that is, the identification and choice of SM areas for further analysis. SM areas are represented by a specific country or countries using the same language and geographically close, which use different SM platforms that substitute or complement each other. For example, in China, several internationally diffused platforms are forbidden and replaced by local equivalents (Li, 2014). In different geographical areas, different languages are used, as this has a direct impact on the capability of analysing content and sentiment, as for many expressions there is no direct translation in English (Unnamalai, 2012; Khan *et al.*, 2014). The second important issue is the need to "clean" the data collected from SM in order to use the information in further analyses and guarantee its reliability (Vercellis, 2009). When indicators rely on unstructured information, specific procedures are needed that depend upon the nature of the content: text (Shelton and Skalski, 2014), images (Nikolopoulos *et al.*, 2013), exploring sentiment (Balahur, 2014) or user identity (Motoyama and Varghese, 2009).

The third area addressed in this literature review is the use of SM indicators in decision-making processes. Some studies analyse the use of SM information in planning, for predicting market situations, by providing real-time data or the behaviour of other players, by expanding the scope of analysis (Mislove *et al.*, 2010). Jackson (2011) and Bruhn *et al.* (2012) have investigated the interference of SM information, looking at how this information can influence a company's brand and share values, with the power of improving or worsening a company's position. Other researchers have explored the potential of SM information in measuring and analysing company performance. Jin *et al.* (2012) proved, through an experiment-based study, that there is a correlation between SM usage (measured as the number of conversations and expressed sentiments for a company or sector) and creation of value within a company. Bradbury (2011), in his article "Data mining with LinkedIn", highlighted the power of LinkedIn and other professional SM platforms to construct indicators about companies' competitive intelligence and their employees' profiles and competencies, with emphasis on the most successful, i.e. a self-developing ranking system. Booth and Matic (2011) went further, linking performance analysis with action revision. They investigated how to map and make use of influencers in SM to shape the perception of corporate brands, measured as a numerical rating of the influencers in a SM conversation about a particular company, product or service, obtained by an index valuation algorithm. An important use of SM measures in HRM is to monitor performance and satisfaction of personnel. Based on case studies, Bennett *et al.* (2010) looked at the importance of social networking, which can be measured as the number of projects being carried out within virtual teams, showing how it improves communication and relationships between employees and, therefore, the greater likelihood of achieving desired performance. Brzozowski (2009) has explored how these instruments are driving employees' perceptions of their workplace, simplifying communication and collaboration and leading to achieving the company's objectives.

The number of studies tackling SM and PMS has been steadily growing over the past decade. However, the researchers have been focused on the specific fragments of PMS, i.e. measurement metrics and procedures (Daly and Haahr, 2009; Hanneman and Riddle, 2011; Kadushin, 2012; Nikolopoulos *et al.*, 2013; Shelton and Skalski, 2014; Balahur, 2014), or specific performance monitoring (Bennett *et al.*, 2010; Brzozowski, 2009; Jin *et al.*, 2012). The literature review aimed to analyse these previous studies about SM and PMS that are not capable of providing a comprehensive reference for PMS in the age of SM. Several authors underlined that further research is required in

this field to explore SMI systematically (Schoen *et al.*, 2013) and shed light on "how informal learning data can be harvested from […] social media" within companies (Raybourn, 2013, p. 10).

3. Framework

The aim of this paper is to investigate the impact of SM on PMS in terms of measurement methods, performance indicators and use. Based on the prior research analysed in the previous chapter, this section provides an overall framework for PMS, considering SM as a new variable. The framework is distinguished into two parts (Franco-Santos *et al.*, 2012): components and use.

3.1 PMS and SM: components

The first area of the framework addresses the technical aspects of performance measurement, which comprises indicators, proposing a classification linked to the use of SM; and measurement methods, analysing the steps needed to obtain the indicators from SM.

On the basis of previous research, SM indicators are here distinguished according to two aspects: the nature of the content (Pang and Lee, 2008) and the source of information (Hanna *et al.*, 2011). The nature of the content refers to the type of information used to build the indicators, which are divided into punctuated and text-derived indicators (Pang and Lee, 2008). The source of information refers, instead, to the different types of SM applications, which are divided into paid, owned or earned (Hanna *et al.*, 2011). Table I illustrates the indicators classified according to the two aspects, giving examples.

The second component of PMS is a measurement method. Currently, there is no single methodology for constructing performance indicators from SM; this situation leads to various problems in applying and interpreting metrics across companies, and even within the same company (Doerflinger and Dearden, 2013). Based on our analysis of literature, we propose the following major steps for the measurement process represented in Table II. Previous research identified five important phases: first, setting-up phase, to define clear objectives for the analysis (e.g. sentiment on product launch) and choice of the SM area (e.g. geographical area, specific sources, language); second, data gathering phase, consisting of source analysis and choice of applicable techniques for analysis, data extraction and data cleaning; third, data analysis phase, which directly depends on the type of data: statistical and network theories are applied to structured and quantitative data, and content analysis to unstructured data; fourth, measurement phase, involving the development and calculation of indicators based on structured and unstructured information; fifth, composition, representation and

	Punctuated (examples)	Text-derived (examples)	
Paid sources	Number of articles	Rank in search engines/popularity	
	Views	Frequency of keywords terms	
Owned sources	Number of subscribers	Rank of features	
	Traffic generated (number of active actions)	Frequency of most used terms	**Table I.**
Earned sources	Number of users	Number of new ideas	Indicator
	Number of comments	Sentiment of discussions	classification

Phase	Description

Setting-up	Conceptual phase, which involves defining the parameters needed for the analysis
	   Objectives
	   Choice of the SM area (geographical, available sources, language)

Data gathering	Collecting and validating data:
	   Source analysis (paid, owned, earned)
	   Choice of techniques for the analysis
	   Data collection
	   Data cleaning

Data analysis	Structured data analysis and statistics, network analysis Unstructured data analysis of content and sentiment to obtain relevant and structured information
Indicators measurement	Indicators measurement and calculation
Monitoring and reporting	Composition of reports Visualisation of results Setting the periodicity

Table II.
Measurement method

frequency of reports; although this phase appears similar to traditional PMS, the availability of tools to visualise SM data may also have an impact on reporting.

This measurement path is not intended to be a practical guide, but a reference to be used in the empirical analysis of case studies, in order to explore how companies actually face the measurement issue.

3.2 SM information use
The second component of the framework concerns the use of SM indicators, in terms of PMS, to support the organisations' decision making. Specifically, we refer to three main decision-making phases where PMS can potentially provide support: planning, performance analysis and revision of action (Kennerley and Neely, 2002). Using these phases, it is possible to carry out the uses reviewed in the previous section, highlighting the differences and added value of SM indicators compared to traditional systems.

The first use of SM indicators is for planning. Traditionally, PMS supports decision makers in simulating the impact of different plans and checking their coherence with the company's objectives and strategies. Previous studies highlighted the potential role of SM indicators to enhance the PMS function in this phase and, particularly, within competitive positioning: constant benchmarking with competitors, including for specific products or services; identification of market or sector trends on SM; simulation of acceptance of products or services through SM channels, suggesting that customers compare different prototypes on SM platforms (Mislove *et al.*, 2010; Bradbury, 2011). It emerged that the main users of this information for planning activities are marketing, R&D and human resources (Leonardi and Barley, 2008; Kumar and Lease, 2011), as they have information about the market situation and customer expectation in real time.

The second type of use concerns performance and variance analysis. Traditionally, performance analysis in PMS is used to capture the trend of a company's results and to monitor the difference between planned and actual performance through variance analysis (forecasted over actual sales; planned over actual turnover of employees, etc.). Using SM information, it is possible to carry out variance analysis rapidly, with the status of the current situation being given through qualitative (content and sentiment)

and quantitative measures (no. of advertisements for a specific product that are "shared" correlated to the sales of that product), therefore not only addressing the company's expected performance over its actual performance, but also providing analysis concerning its competitors and forecasts (Bradbury, 2011; Jin *et al.*, 2012).

After completing the performance analysis phase, the next step in PMS is revision of action, which takes into consideration both internal and external perspectives. Based on the traditional measurements of client and employee satisfaction (surveys, no. of product returns, no. of complaints), companies take action to improve the quality of products, services, replies to complaints, etc. Revision of action, in PMS based on SM platforms, makes taking immediate action possible, not only for a single unsatisfied client, but for many clients experiencing the same problem, as SM information is open. SM indicators potentially trace problems through comments, reviews in blogs, advice and opinions in fora or Twitter for a specific product or service (Brander, 2011; Gummerus *et al.*, 2012), signalling the problem to the person responsible in the company and replying immediately. From an internal company perspective, internal SM systems make project development and co-creation easier, by addressing questions to the right person or receiving a desired answer from the whole community (internal notice boards).

Table III summarises these uses with examples of related indicators.

Phase	Examples of use	User	Examples of indicators
Planning	Benchmarking applied to competitors, products, services	Marketing and communication Human resources	Number of "Friends" on Facebook Number of "Followers" on Twitter Profile updated on LinkedIn
	Trend analysis Simulation on the market	Research and development	Clusters of ideas generated on SM Features selected according to on-line surveys and customer comments
Performance Analysis	Benchmarking applied to market and competitors	Marketing and communication Human resources Research and development	Monitoring the number of friends/followers over time with respect to competitors and the average
	Identification of changing patterns and new trends	Marketing and communication Human resources Internal communication	Monitoring the polarity of comments relating to the theme or object of interest, perception of the market
Revision of action	Actions on specific objects (i.e. internal or external actors)	Marketing and communication Human resources Research and development Internal communication	Number of responses on posts or announcements Sentiment of responses
	Corrective actions on model variables (internal purpose)	Internal communication	Number of responses by company to stakeholders' questions

Table III.
Impact of SM KPI on the control cycle

4. Methodology

This empirical study of the impact of SM on PMS is based upon a case study methodology, making it is possible to investigate the complexity of organisational processes in a real-life context (Yin, 2009, 2014). A case study method is consistent with recent claims made regarding this type of investigation in performance and measurement systems (Masquefa, 2008; Chenhall *et al.*, 2011; Ulgen and Forslund, 2015; Kumar *et al.*, 2015), and with studies on SM management (Worrell *et al.*, 2011; Haefliger *et al.*, 2011). In this research, an explorative case study of eight companies was adopted with a clear objective to investigate SM use for performance measurement (Barratt *et al.*, 2011). These case studies allow us to generalise and develop the theory (Eisenhardt, 1989) while, at the same time ensuring that they can be applied to qualitative data analysis. In order to gain a more balanced view of SM use, interviews were carried out with companies from several different firms operating in the technology, telecommunications, manufacturing and consultancy sectors.

The organisations were chosen following a preliminary analysis of their websites, in order to establish how they use social networks, giving preference to companies that use SM actively. Multiple inclusion criteria were used to select the companies: they must use at least three social networks in an active manner and own fan pages; they must have a significant number (over one thousand) of "likes", "tweets", "followers", "comments", "shares", etc.; they must have their own web-platform and blog. We created a list of possible case studies, consisting of 20 companies and got in touch with all 20. The eight agreed to participate in our research.

The main element of our study was face-to-face interviews (Goldman and McDonald, 1987; McCracken, 1988). These interviews were carried out using a semi-structured protocol, addressing four areas of analysis: the adoption of SM, organisational roles involved in the process, PMS components and PMS use (as defined in the framework section). In total, ten interviews were carried out with eight respondents. A second round of interviews with multiple respondents was performed with two companies, DATA and SOFTW, to clarify several details, insure richness of the findings and increase reliability (Barratt *et al.*, 2011). In terms of participants, the interviewees were selected according to their relative ownership of responsibility for the SM information flows within the organisation, and, therefore, involved a mix of people from marketing, information technology and management. Table IV summarises selected companies and interviewees.

Each interview lasted between 45 and 90 minutes, according to the respondents' available time. All the interviews were recorded and transcribed, and each transcript was analysed separately by each author before discussing the results jointly. The results of transcription analysis were compared with the theoretical framework and different patterns were identified for how SM are adopted within the PMS and control cycle activities. Additional information was collected through multiple sources, and included the analysis of documents from the websites of the companies; their annual reports and other official documents; SM reports (usually not available to the public) provided by companies and SM platforms' statistics. The procedures for information collection (both external from SM and internal provided by company), as well as the face-to-face interviews (semi-structured list of questions, interview transcription and steps of analysis) were replicated in all eight case studies to ensure reliability of the findings and conclusion section.

The results of the research provide a continuous comparison between the eight case studies (Glaser and Strauss, 1967) following the proposed framework. We have used

Company	Industry	Country	Description	Number of employees[a]	Department	Position of interviewees
MANU	Manufacturing	Italy	Multinational company with headquarters in Italy producing rubber products	2,000-10,000	Digital media	Director of digital media
BEV	Alcoholic drinks	Italy	Italian company working in the internal alcoholic drinks market	0-500	Marketing and advertising	Assistant brand manager
TELCO	Telecommunications	Italy	Multinational operator with headquarters in UK, operating globally	2,000-10,000	On-line consumer division	Manager of online division
ICT	Information technology and software	Italy	Multinational IT company with headquarters in USA, producing computers and programmes	500-2,000	Research and Development	Research Manager
CONS	Consultancy	Russia	International American consultancy company, operating globally	2,000-10,000	Marketing and business development	Marketing SM manager
SOFTW	Information technology, hardware and software	Russia	Multinational American company, mainly producing software	500-2,000	Digital lead, marketing organisation	Head of digital marketing
ITA	Information technology	Italy	Italian company providing IT based solutions on local market	0-500	Public relations and communications	Content and community manager
DATA	Data intelligence	Italy	Italian data intelligence company operating in consultancy and the development of IT solutions	0-500	Management	Head of the company

Note: [a]Range of number of employees in the companies' subsidiary where the interviews took place

Table IV.
Case study summary

the multiple sources of evidence and viewpoints (Meyer, 2001) to construct a taxonomy of SM use and to identify three main patterns in the discussion section. Triangulation of all the information (Yin, 2014) gathered during the interviews, cross-case analysis (Stake, 1995) and additional materials have been used to prepare the conclusion and discussion section of the paper.

5. Results
The results section is composed of two sections, components and use of the framework. The analysis provides an overview of the current impact of SM on PMS and the application of such tools within companies. These sections illustrate these findings, providing a cross-case perspective.

5.1 Components

The first results area relates to the components associated to the technical implementation of SM within PMS. Table V illustrates the indicators used by companies, highlighting the type (punctuated and text-derived), examples of metrics and the SM platform adopted.

Cases are listed in the table according to similar features. The first two companies, BEV and CONS, only adopted a punctuated type of indicator derived from the most common platforms, such as Facebook, Twitter, LinkedIn, etc. These companies explained that their choice of metrics was based upon its simplicity of adoption. BEV and CONS stated that this approach is used for their own fan pages, and also for advertisements published on other SM sources. They underlined that these indicators are easy to understand and use because of their correlation to the specific analysis objective. However, these indicators do not explain the causes of low or high popularity measured by the number of "likes" or "shares" and further analysis of content is required. Next are MANU and ITA, which use a broader variety of indicators from owned, paid and earned sources. During their interviews, MANU highlighted that it is important for them to know if a significant number of people are talking about their products on earned platforms. Both MANU and ITA are also interested in text-derived indicators, as these make it possible to understand what people are saying about specific products and what sentiment they feel about SM-based marketing campaigns, with the content providing both numeric results and possible causes. The other four cases use text-derived and punctuated information from the most common platforms in an equal measure, but they also add special platforms for particular topics of interest. SOFTW agreed that both numeric and content indicators are required to understand who, what and how frequently are people talking about the company or a specific product. Using these types of indicators, answers can be given to all four questions, covering all sources of SM information from owned to earned, and action can be taken if necessary.

The second part of the components analysis involves the measurement method for data collection and elaboration. Table VI provides a cross-case overview of SM data measurement methods, taking into account the five stages defined in the framework. Cases are listed according to their similarities within the data collection and analysis methods.

The first three companies, MANU, BEV and CONS, use a simplified measurement methodology and do not have a data analysis phase. This depends on the type of metrics mainly adopted by companies, where only quantitative analysis of structured data is required. In the case of BEV and CONS, interviewees highlighted that the analyses of sources are crucial and data collection are carried out using the analytic tools belonging to the SM platforms. In the case of MANU, the interviewee stressed that, when quantitative data shows significant changes, they apply the next step to analyse qualitative data and this is done manually. The reporting and monitoring phase is not well-defined in any of the three cases. Interviewees agreed that reports are issued when required (focus on SM, specific SM campaigns or to signal some significant changes to SM sources that can impact on the company). This type of reporting and monitoring can potentially lead to high risks in term of reputation, as comments and negative issues brought up by customers and SM users remain unanswered.

The remaining five cases put in place the complete measurement methodology, including data analysis, to calculate both punctuated and text-derived indicators. These companies started their analysis by identifying the SM area. In the SOFTW case, the interviewee drew attention to the fact that each specific market has its own "main"

Company	Type of indicator	Indicator examples	SM platform
BEV	Mainly uses of punctuated indicators from both owned and paid sources	# "Likes" # "Friends" # "Followers"	Facebook Youtube Twitter Instagram
CONS	Mainly uses of punctuated indicators from owned sources, less from paid source. Manual elaboration of text-derived indicators	# "Likes" # "Friends" # "Comments" Pays attention to who is commenting and how (positively/negatively)	Facebook Twitter LinkedIn *Less used* YouTube, Google+
MANU	Punctuated indicators from all types of sources, text-derived indicators for the significant events, specific objectives	# "Likes", # "Friends" # "Followers" # "Comments" Sentiment analysis and opinion mining based on popularity	Facebook Twitter YouTube, LinkedIn Blog Pinterest, Instagram
ITA	Punctuated indicators from all types of sources, text-derived indicators for a limited number of important issues	# "Likes", # "Friends" # "Followers" # "Comments"	Facebook Twitter YouTube, LinkedIn Blog, Foursquare
TELCO	Text-derived indicators and punctuated indicators to analyse traffic and SM places of concentration from all types of sources	Sentiment Opinion mining # "Likes", # "Friends" # "Followers" # "Comments"	Facebook, Twitter, LinkedIn Google+, Blogs, Fora, Platforms *Less used* YouTube, Instagram
ICT	Text-derived indicators and punctuated indicators to analyse traffic and SM places of concentration from all types of sources	Sentiment Opinion mining # "Likes" # "Friends" # "Comments"	Twitter, Yammer LinkedIn Blogs, Fora *Less used* Facebook, Google+
SOFTW	Text-derived and punctuated indicators to analyse general "talk about" company and particular events, to express sentiments and provide numeric significance based on types of sources	Sentiment Opinion mining # "Likes", # "Friends" # "Comments"	Facebook, Fora, Blogs Twitter, Internal SM LinkedIn, Odnoklassniki VKontakte
DATA	Text-derived and punctuated indicators to analyse particular events, express sentiments and provide numeric significance based on types of sources	Sentiment Opinion mining # "Likes" # "Friends" # "Comments"	Facebook, Twitter, YouTube Google+, Pinterest Foursquare, Instagram, Blogs Fora

Table V.
Indicators and metrics for cross-case analysis

Company	Setting-up	Data gathering	Data analysis	Indicator calculation and measurement	Reporting and monitoring
BEV	Specific SM campaign for product	Source analysis of most diffused SM Platform tools for data collection	SM platform tools Statistics Variation	Punctuated indicators based on quantitative analysis of structured data represented in numbers and their variation analysis connected to the objectives	Driven by marketing campaign, reporting and monitoring are infrequent
CONS	Specific objectives (brand, trend, communication of recent activities)	Source analysis of most diffused SM Platform tools and analytics platforms for data collection	SM platform tools Statistics Variation Manual analysis	Punctuated indicators based on quantitative analysis and manual identification of who is saying what about the company or a particular service	Driven by marketing campaign, or on request of managers
MANU	Specific objectives (products)	Source analysis of most diffused SM Platform tools and analytics platforms for data collection	SM platform tools Statistics Variation Manual analysis	Punctuated indicators based on quantitative analysis, and text-derived indicators based on manual qualitative analysis, if punctuated indicators alert significantly change	Monthly reporting, as a part of marketing report. SM monitoring driven by campaigns
ITA	Specific objectives SM area (language)	Source analysis of area Data collection and data cleaning are carried out by external agency	Statistics Variation Content (clustering, main themes) Sentiment	Punctuated and text-derived indicators calculated based on quantitative analysis of structured data and qualitative analysis of unstructured information	Monthly reporting Weekly monitoring More frequent during specific campaigns
DATA	Specific objectives SM area (language)	Source analysis of area Data collection based on internally developed tools and algorithms, specific programmes	Statistics Variation Network analysis Content Sentiment	Punctuated indicators based on quantitative analysis of structured data, text-derived indicators based on qualitative analysis of unstructured information using different methodologies, from network analysis to content, clustering and sentiment	Monthly reporting More frequent during campaigns Daily monitoring
ICT	Specific objectives SM area (language, areas)	Source analysis of area Internally developed data collection tools for quantitative and qualitative analysis	Statistics Variation Network analysis Content Sentiment	Punctuated indicators based on quantitative analysis of structured data, text-derived indicators based on qualitative analysis of unstructured information, recognition of network configuration, in-depth analysis of content and sentiment	Weekly reporting Daily monitoring

Table VI.
Cross-case analysis by measurement method

Company	Setting-up	Data gathering	Data analysis	Indicator calculation and measurement	Reporting and monitoring
TELCO	Specific objectives SM area (language, area inside and outside country)	Source analysis of area Platform tools for quantitative analysis, external agency for qualitative analysis	Statistics Variation Network analysis Content Sentiment	Punctuated indicators based on quantitative analysis of structured data Text-derived indicators based on qualitative analysis of unstructured information, network configuration, trend analysis, analysis of content, clustering and sentiment	Daily or Weekly reporting to all involved departments Daily monitoring Hourly monitoring if required
SOFTW	Specific objectives SM area (language, area inside or outside country)	Source analysis of area Data collection and data cleaning are done internally based on algorithms, specific programmes	Statistics Variation Network analysis Content Sentiment	Punctuated indicators based on quantitative analysis of structured data, text-derived indicators based on qualitative analysis of unstructured information, analysis of network, correlation between quantitative and qualitative analysis, based on content and sentiment, recognition of trends and predictions of future on-line situations	Daily or weekly reports to all involved departments Daily monitoring Hourly monitoring if required

Table VI.

SM platforms, i.e. in Russia, VKontakte and Facebook are equivalent and both should be included in the analysis. He also confirmed that, for a certain market, two languages can be used for text-derived metrics, with Russian being the main language in this case and English the secondary language. This is also valid for other cases where analyses are carried out in Italian and English. However, this decides the specific requirements for further data gathering and analysis. All companies confirmed that specific tools and even external agencies are required to carry out data collection, data cleaning and data analysis for text-derived indicators. DATA, ICT and TELCO put special attention on data being available within the company for further use and that frequent reporting is a must. The level of detail in these reports depends on the final recipient, and can vary from general quantitative information to the detailed sentiment analysis for a specific feature in a product. The ability of companies to provide different types of reports is closely connected to their technical knowledge. Therefore, the ICT, SOFTW and DATA cases are significantly more advanced than ITA and TELCO. The latter two cases use external partners to perform certain types of analysis. The monitoring systems implemented help to avoid some of the drawbacks of the first two cases (BEV and CONS) and lead to better results and performance.

5.2 SM use
The second area of results relates to the actual use of SM information in the decision-making process. The following table summarises the cross-case analysis based upon

the aspects highlighted in the framework: use and phase (planning, performance analysis and revision of action) which are aligned with examples of information user (Table VII).

The first CONS case shows the unstructured use of SM, employed mainly to observe and listen on SM platforms, in order to analyse information about the company and its services. The interviewee explained that they are screening SM platforms and, in most cases, do not carry out any further action, so, to provide an example, for the purpose of recruitment, the company only publishes open job vacancies. The person responsible for SM information is a marketing employee; SM data are reported to the head of the department on his/her request.

The following companies, MANU, BEV, ITA and DATA, use SM information for defined purposes and support only some phases in the control cycle. These companies represent an intermediate stage of SM adoption. SM information helps to provide answers to concrete and well-defined questions. MANU and BEV use this information for a specific product type. In these companies, the Marketing department is also the main owner of the data, although an important part of SM data analysis is carried out for R&D and human resources, with the final users of the information being heads of departments, managers and marketing specialists.

The last three case studies, TELCO, ICT and SOFTW, have some features in common with the previous cases, insomuch as the departments own the data and there are end users; it does, however, differ significantly, as SM data cover all control cycle phases. These companies have implemented an overall vision of SM and use SM instruments for both external and internal sources of information. This approach leads to further synergy from cross-departmental SM data use and provides management with a complete picture of SM activity and its influence over the company's performance.

Summarising, the results of the case studies show that the analysis of SM information, in dealing with a specific type and large volumes of data, requires special competencies and tools. For this reason, there is an obvious comparative advantage for companies with internal IT departments, while others prefer to carry out this type of analysis externally. In reality, the case studies show how a multinational company with an IT background implements internal solutions that focus on the needs of each department. There is, however, a discrepancy between the implementation of specific SM solutions and their integration within the entire performance system. In the consultancy and manufacturing cases, SM is used for communication and marketing purposes, but is rarely part of the R&D department. Even in the case of the ICT and telecommunications companies, this information is barely used by the controllers.

6. Discussion
This research explored the role of SM in measuring performance, and it proposes a preliminary framework that covers both the technical features of the PMS and its use. According to this framework, eight cases were studied, showing that SM have an actual impact on the PMS and, more in detail, how SM are incorporated to enhance performance measurement. The previous section pointed out both the variations and the similarities between the cases, allowing patterns of adoption and use to be outlined.

Regarding the "components" part and considering both the indicators used and the measurement methods adopted by the companies, three configurations emerge, here labelled simplified, focused and ample. The simplified components configuration involves cases BEV and CONS. The main feature of this configuration lies in its

Company	Example of use	Phase	Department	User Organisational role
CONS	Public awareness Recruitment monitoring	Performance analysis	Marketing and communication	Specialist in marketing
MANU	Sales forecasting Product awareness Product feedback monitoring Public awareness	Planning Performance analysis Revision of action	Marketing and communications Human resources	Specialists Managers Department head
BEV	Sales forecasting Product awareness Product feedback monitoring Public awareness	Planning Performance analysis Revision of action	Marketing and communication Human resources R&D	Specialists Managers Department head
ITA	Customer monitoring Sales forecasting Product awareness Product feedback monitoring Public awareness Benchmarking	Planning Performance Analysis Revision of action	Marketing and communication Human resources R&D	Specialists Managers Department head
DATA	Customer monitoring Sales forecasting Product awareness Product feedback monitoring Public awareness Benchmarking	Planning Performance analysis Revision of action	Marketing and communication Human resources R&D Internal communication	Specialists Managers Department head Country manager
TELCO	Product co-creation Product awareness Product feedback monitoring Customer monitoring Recruitment monitoring Public awareness Benchmarking	Planning Performance analysis Revision of action	Marketing and communication Human resources R&D Internal communication	Specialists Managers Department head
ICT	Product co-creation Product awareness Product feedback monitoring Customer monitoring Recruitment monitoring Benchmarking Social BPM	Planning Performance analysis Revision of action	Marketing and communication Human resources R&D Internal communication	Specialists Managers Department head
SOFTW	Product co-creation Product awareness Product feedback monitoring Customer monitoring Recruitment monitoring Public awareness Social BPM Benchmarking	Planning Performance analysis Revision of action	Marketing and communication Human resources R&D Internal communication	Specialists Managers Department head

Table VII.
Cross-case
analysis by use

straightforward approach to SM. Companies adopt simple punctuated metrics to measure specific marketing campaigns every now and again. Methods are derived from the SM platforms (e.g. TweetStats, Facebook insights, etc.), and do not include any particular features; only on the odd occasion is sentiment and content analysis carried out manually. The focused components configuration also involves two cases, MANU and ITA, which apply a larger number of indicators based on punctuated and text-derived metrics. However, methods to analyse text-derived indicators are still simple and do not permit big data sets to be processed. Analysis is concentrated on quantitative measures based on statistic models and the adoption of specific analytic platforms (e.g. Salesforce, Google analytics). The remaining four cases are included within the ample components configuration, and use both punctuated and elaborated text-derived indicators. The methods of analysis of SM information are complex and based on internal company IT systems or the expertise of external analysis provider.

Three main configurations can also be seen for the "use" aspect; these are labelled: random, object-oriented and refined. One company (CONS) belongs to the random use configuration, it observes SM sources and uses information for general performance analysis, without it being linked to any precise objectives. The object-oriented use configuration includes four companies (MANU, BEV, ITA and DATA). They use SM for one or more specific objectives (brand, products and services) and take SM information into account for planning, performance analysis or revision of action. Other companies (TELCO, ICT and SOFTW) generate a refined use configuration that employs SM information as part of an integrated process of control. Based on these configurations, we have developed a matrix (Figure 1) that graphically represents the positions of the eight cases, based on their "use" and "components".

Analysing this figure, it is possible to identify three major patterns, putting together technical adoption (components) and use: beginners – cases BEV and CONS; selective – cases MANU and ITA; and transversal – cases TELCO, ICT, SOFTW and DATA. The beginner use represented by cases BEV and CONS is the starting point of SM development, as a new resource providing useful managerial information for many organisations. The worldwide access and visibility of company's actions require
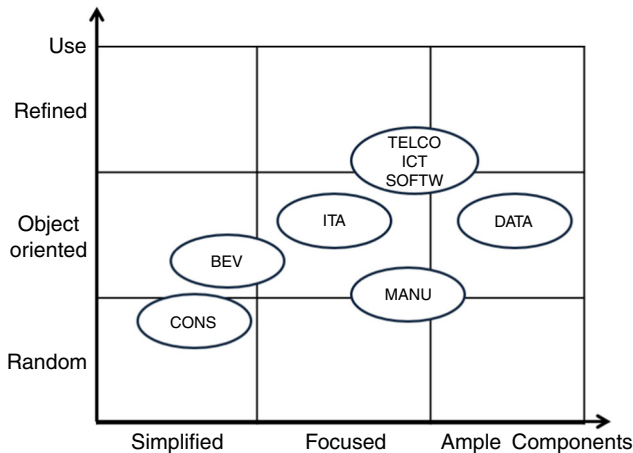

Figure 1.
Company/case
use of SM

specific attention from users of this source, and this requires the company to carry out additional work and investment in order to acquire the necessary skills and knowledge related to SM, and define clear SM objectives for the company. In both cases, the interviewees underlined that, for younger generations, SM are among their main sources of information and communication, and they have to be on board. Companies start from observation and quantitative analysis to acquire a better understanding of the source and its functions in terms of their needs. MANU, for selective cases, and TELCO and DATA, for transversal cases, named this as an initial stage in the adoption of SM.

Selective use (cases MANU and ITA) is defined by an object-oriented use of SM, mostly in marketing, human resources and sales. Each department treats SM information and indicators according to their requirements and lack an overall view of the companies' performance. The interviewees highlighted that they use specific measures for particular company objectives, but some of the results must be shared with other departments, so that they can be aware of market trends in issues regarding the company's reputation. The approach followed by these companies quite common in the current market, but any subsequent development depends both upon the results achieved and business strategy, as adopting elaborated metrics and complex techniques requires specific analytical programmes and technical expertise.

The transversal use of SM information and tools (cases TELCO, ICT, SOFTW and DATA) is highly correlated to the core business of the company, which is why these include IT developers and communication companies, both having the necessary knowledge to use SM, as well as the capacity and instruments to analyse and manage SM platforms. The processes of communication within and without the company have been established during the companies' development based both on listening and analysing what is happening on SM, and direct responses according to customer and stakeholder needs. The management of these companies is particularly attentive to SM and performance, focusing on their core activities and direct use of SM data.

7. Conclusions

The aim of this paper is to analyse how SM information impacts on PMS, addressing two main aspects: PMS technical features, in terms of indicators and measurement processes; and the use of indicators within business processes. This research responds to the theoretical calls (Schoen *et al.*, 2013, Raybourn, 2013) and proposes an evolutionary image of SM adopted in a systematic way to align measures and their possible uses on different levels within SM implementation. Our findings suggest that at this early stage companies can adopt a variety of approaches of SM employment within the scope of a PMS. Nonetheless, companies underline that SM have become an important variable of PMS even if not directly included within the systems. The case studies confirm that SM indicators provide additional information with respect to the traditional sources used in PMS, helping to mitigate drawbacks of traditional indicators and improve companies' performance, because of SM indicators timeliness and long-term orientation. Therefore, the holistic framework proposed in this study helps to assemble different metrics, measurements and indicators based on SM information in order to complement traditional PMS.

This study provides a theoretical contribution to the discussion on new information use within PMS and it highlights the necessity of adapting the existing wealth of performance management system theory and improving specific elements in the cross-use of SM information, which provides new indicators aligned to SM and requires specific measurement and calculation procedures. In our research, this was achieved by structuring the indicator metrics and developing a complete measurement method based upon a variety of steps proposed in literature (Wang and Lin, 2011; Ceron *et al.*, 2013; Doerflinger and Dearden, 2013).

From the practitioners' point of view, this research provides a rich background of indicator construction procedures, measurement methods and the general adoption of SM as a new variable within a company. The proposed taxonomy can help practitioners to identify their current position in SM use and further actions required to strength it. In particular, what type of technologies and methodologies for data analysis could be adopted for the improvement of SM data collection and analysis aligned with usage focus of these metrics within a company. This research provides a roadmap that clearly states the main benefits of SM information in controlling cycle operations: flexibility and time to react to changes. The study stresses the benefits of SM indicators and highlights the necessary conditions to use such innovative instruments for achieving companies' objectives.

The concluding remarks of the research are completed by stating the limitations of the research and proposing future studies. One of the most important limitations concerns our company selection process, and specific studies by industry may provide very interesting results. Among these case studies we observed that information technology companies led the way in the use of SM information for both internal and external management systems. Another interesting area is that of telecommunications, which here was presented in only one case. As well as the above, other companies worthy of deeper study could include consumer product companies, especially those selling products closely associated to human emotions. In-depth research by industry can provide different visions, and group the different approaches used by companies, to address this situation within their performance management systems. These results can provide several models of how to adopt SM within a particular industry, taking into account each sector's requirements, providing benefits and improving performance.

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