Measurement and management of competences by enterprise-social-networking

Abstract

Purpose. Literature describes the transformation process of employees' individual competences into firm specific competences as a great challenge in the performance management and management field. Recently, to favour the transformation of competences, some companies have adopted enterprise social networking (ESN). However, not enough studies support the understanding of its role in performance management and measurement and scant attention is given to the inclusion of competences in a holistic performance measurement and management system (PMMS).

To help close this gap, the research aims to develop knowledge on the role of ESN in measurement and management of competences to favour the development of a holistic PMMS.

Design/methodology/approach. The research adopts a multiple case study methodology using a qualitative meta-analysis. It investigates 32 multinational companies by case studies available in the scientific literature.

Findings. The results highlight the use of ESN as a relevant support for the development of a holistic PMMS based on a high maturity in performance measurement and a democratic and participative approach in performance

management. ESN provides real-time data collection, analysis and reports that encourage a democratic and participative performance management. It facilitates relationships, knowledge sharing and favours a high maturity performance measurement.

Originality/value. The paper provides implications for theory, practice and society. Firstly, the paper rationalizes the impact of ESN usage on performance measurement and management. Secondly, it offers new knowledge supporting practitioners in the development of holistic PMMS. Thirdly, it highlights that ESN favours people in self-expression of own capacity, sharing artwork and knowledge on specific topics.

Keywords. Performance management, performance measurement, intangible assets, competence, social media, enterprise social networking.

1. Introduction

Since Johnson and Kaplan (1987) published their seminal study entitled Relevance Lost − The Rise and Fall of Management Accounting, plenty of studies have been published on the design, implementation and use of a performance measurement and management system (PMMS). The literature describes a PMMS as a holistic, balanced and dynamic system that is able to support the decision-making process by gathering, elaborating and analysing information (Neely et al., 2002). The PMMS allows internal and external communication, rewarding or compensating good behaviour, relationship management and control of "learning and improvement" through feedback, double-loop learning and performance improvement (Franco-Santos et al., 2012). It reflects the procedures used to implement the strategy within the organization and provides the information necessary to challenge the content and validity of the strategy (Ittner, 2008).

Recent studies highlight the need to innovate performance measurement and management (PMM) to answer to new business trends (Bititci et al. 2012; Bourne et al. 2018; Melnyk et al., 2014; Pavlov et al., 2017). Globalization creates a growing and dynamic competitive context, ever changing and challenging the adoption of PMMS (Jääskeläinen and Laihonen, 2013; Poovathingal and Kumar, 2018). One of the main PMM challenges concerns the management of intangible assets such as measuring their value (Kaplan, 2008), understanding how they interact with processes that deliver performance (Rompho, 2017; Smith and Bititci, 2017) and managing employees' competences (Williamson, 2011). Although literature describes a wide number of intangible assets - see for instance organizational climate (Carlucci and

Schiuma, 2012), intellectual capital (Elia et al., 2017; Schiuma and Lerro, 2008) and leadership (Kaplan, 2008) - employees' competences are recognized as one of the main intangible assets (Neely et al., 2005). The competences are defined as a key set of knowledge, skills and abilities (KSAs) that enable a person (or an organization) to act effectively in a job (Boyatzis, 1982). In fact, as highlighted by Kaplan and Norton (2004), if employees' competences are managed properly, they become success factors that contribute to organizational effectiveness.

Some studies underline the need to align employees' competences with strategy through effective performance measurement and management practices (Bourne et al., 2013). However, studies of competences are often focused on individual employee competences and they do not sufficiently investigate competences as applied into a firm-specific context and integrated into a company's strategy (DeNisi and Smith, 2014; Raj Adhikari, 2010). In this scenario, PMMS should support the management of competences by their continuing process of measuring, developing and aligning with the business strategic goals. Consequently, a great measuring challenge is to manage the transformation process by which individual employee competences are converted into firm specific competences (DeNisi and Smith, 2014).

Recent literature highlights that enterprise social networking (ESN) may offer significant support to the measurement and management of competences (Qi and Chau, 2018; Riemer et al., 2015). It should facilitate relationships, knowledge sharing and engage people in conversation about performance (Bititci, 2015) as has often happened in multinational companies (Deloitte, 2013; Sardi and Garengo, 2016). In

fact, more than 90% of Fortune 500 multinational companies have implemented ESN to improve the relationships, knowledge sharing and engagement of their employees (Deloitte, 2013). These large companies need to manage a larger amount of knowledge than small and medium enterprises and, consequently, the managerial processes are more advanced (Davenport et al., 2010).

Although the measurement and management of competences could be supported by the use of enterprise social networking, not enough theoretical and empirical studies support the understanding of its role in performance management and measurement and little attention is given to the effective inclusion of competences in a holistic performance measurement and management system.

In order to contribute to filling this gap, the research aims to develop knowledge on the role of enterprise social networking in measurement and management of competences answering the research question below:

- *How do measurement and management of competences by ESN impact on the development of a holistic PMMS*?

To answer the above research question, it is necessary to identify the main characteristics that typify the process of measurement and management of competences by ESN. Thus, a second research question is stated:

- *What are the main characteristics that typify the process of measurement and management of competences by ESN?*

The paper is organized as follows. Firstly, it reviews recent literature on performance measurement and management, transformation processes of competences and enterprise social networks (Section 2). Consequently, the paper describes the research methodology approach (Section 3), analyses the use of ESN in multinational companies to transform employees' competences (Section 4) and rationalizes its characteristics in measurement and management of competences. It develops conceptual propositions to explain how ESN favours the transformation process of employees' individual competences into firm-specific competences (Section 5). Finally, the last section summarizes the key research contributions and future research opportunities.

2. Literature background

2.1 Performance measurement and management

Recent research highlights that several business trends are affecting operations as well as the way organizations measure and manage performance. In global multicultural networks, where employees, teams and departments collaborate in a social system (Bititci et al., 2012), organizations need to implement PMMS that could support the measurement and management of human resources and capabilities which are hard to imitate thus creating competitive advantage (Pavlov et al., 2017; Melnyk et al., 2014).

As underlined by recent studies, the use of PMMS influences employees' cognitive processes and improves employees' competencies (Bititci et al., 2012; Franco-Santos et al., 2012). The shift from manual work to knowledge-work leads to a continuous exchange of knowledge, skills and abilities (Ployhart and Moliterno, 2011). Consequently, the processes by which individual KSAs are converted into firm-specific KSAs represent a great measuring challenge (DeNisi and Smith, 2014) as it could support increasingly efficient organizational practices.

In order to face to the new business trend, the PMM literature has shifted its focus from performance measurement, i.e., what to measure (e.g., collecting, analysing and reporting), to performance management. i.e., how the measures are used to manage organizations' performance (e.g., behavioural and cultural routines) (Bititci, 2015; Bourne et al. 2018). This change has led the PMM literature developing new theoretical foundations based on PMM that were never theorized as two separate but interdependent dimensions of organizational control (Otley, 2012). Smith and Bititci (2017) have developed an effective theoretical framework for understanding the interplay between performance measurement and performance management (Figure 1).
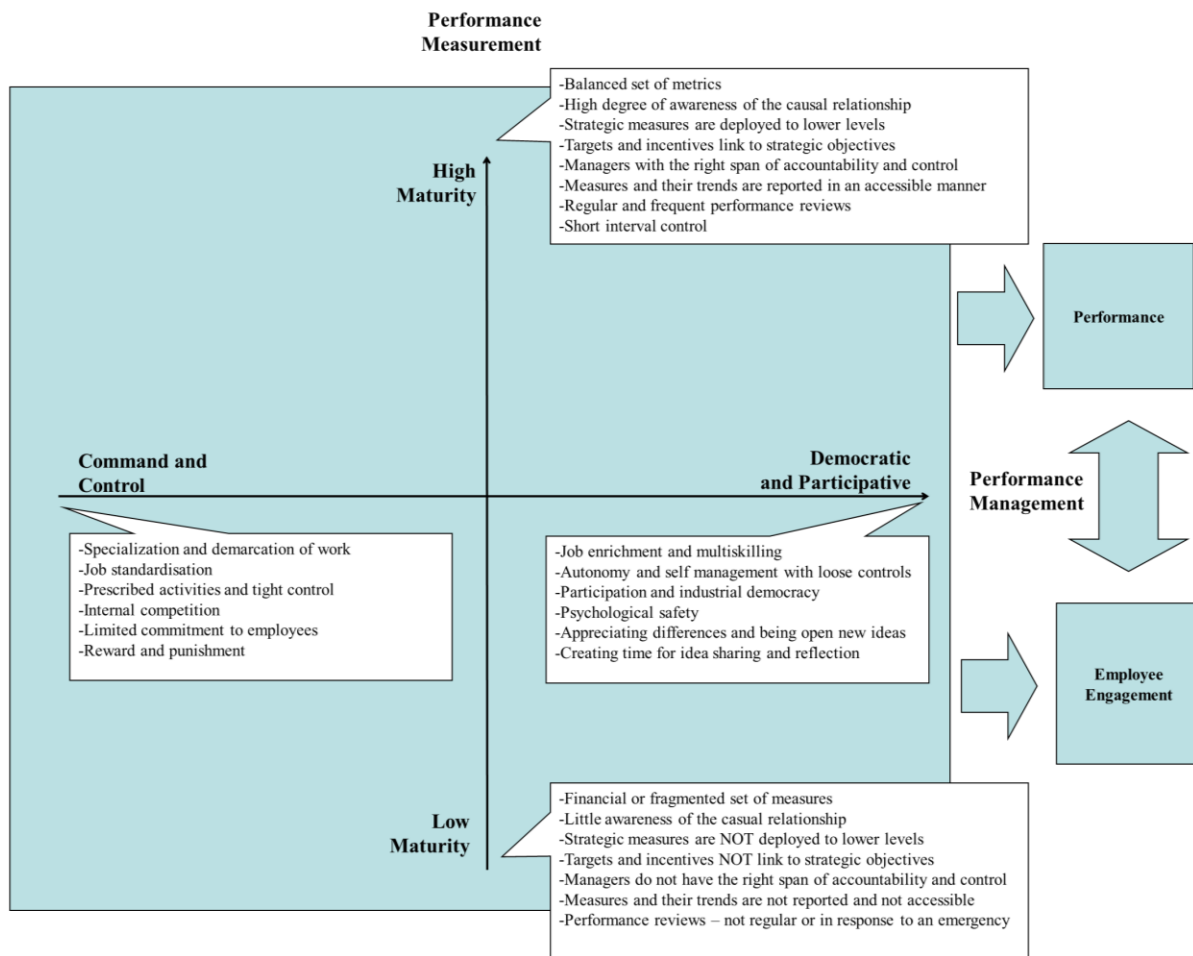
Figure 1. Conceptual PMM framework proposed by Smith and Bititci (2017)

In this theoretical framework, performance measurement shows some characteristics according to the various performance measurement maturity levels (e.g., balance of set of metrics, high degree of awareness of the causal relationship and strategic measures are deployed to lower levels). In turn, performance management highlights the degree of democracy and participation in performance management (e.g., job enrichment and multiskilling, autonomy and self-management with loose controls and participation and industrial democracy). The conceptual framework highlights that a

suitable balance of the PMM's dimensions establishes the roots to the design, implementation and use of effective PMMS and encourages people to discuss performance (Bititci, 2015; Smith and Bititci, 2017). Further research underlines the need of a balanced and co-ordinated PMMS to give a complete, participative and democratic view of organizational performances (Park et al., 2017). Holistic PMMS should be developed using a systems-based approach, recognizing the integrated and concurrent nature of challenges that the practitioners and, consequently, the field, face (Nudurupati et al., 2016).

2.2 Transformation process of competences

Plenty of literature studies how to improve performance at work adopting managerial, organizational and accounting approaches (Wilden et al., 2013; Wilden and Gudergan, 2017). Two main literature streams prevail. One focuses on individual competences and the other on firm competences (Ployhart and Moliterno, 2011).

On the one hand, individual employee competences are defined by literature adopting two different approaches: worker-oriented (North-American approach) and work-oriented (British approach). The first describes employees' individual competences as "competences that a person possesses". According to Boyatzis (1982, p. 97), employees' individual competences are "underlying characteristics of a person, which results in effective or/and superior performance in a job" such as motivation, learning capabilities and general reasoning (Hatch and Dyer, 2004). Competences are also linked with personal characteristics, qualities and social interactions. The second approach focuses on what the outcome should be and which competences are needed

for the worker to reach the goals. On the other hand, firm-context KSAs are specific to a particular job position (Kozlowski and Ilgen, 2006). The KSAs can emerge during the practice of their work (Ployhart and Moliterno, 2011), whilst allowing an employee to become capable of acting.

Despite the proximity of the two streams, the link between them is not clearly established, and there is a clear need to understand how to manage the transformation process by which individual employee competences are converted into firm-specific competences (DeNisi and Smith, 2014).

Ployhart and Moliterno (2011) define the process that transforms employees' individual general knowledge, skills and abilities into firm-specific context KSAs by some key drivers, i.e., behavioural (for instance coordination, communication), cognitive (for instance climate, memory) and affective (for instance acquisition, absorption) (Klein and Kozlowski, 2000). Here, abilities include the mental faculties of an individual, whereas skills are the identifiable expertise learnt during job activities (Meyer et al., 2015). By contrast, knowledge comprehends all the information available to an employee and its expression in a specific work context (Davenport, 1998; Meyer et al., 2015).

The transformation of individual employee competences has been previously discussed by some scholars (Ployhart and Moliterno, 2011; DeNisi and Smith, 2014). The Ployhart and Moliterno (2011) model highlights two theoretical aspects, i.e., the difference of employees' backgrounds and competences as a resource at a team or organization level. This model describes the transformation from individual

competences, i.e., cognitive (cognitive ability, generic knowledge, generic skills and generic experience) and non-cognitive (personality values and interests), through a process into firm competences (specific knowledge and specific experience). This process facilitates the development of firm competences by drivers (e.g., behavioural, cognitive and affective drivers).

DeNisi and Smith (2014) argue that Ployhart and Moliterno's paper studies the team without considering the company's strategic vision. Thus, they propose a multi-level model linking three aspects, i.e., the transformation of competences, the strategic goal of the firm and the improvement of the firm's performance. Moreover, the multi-level model aligns the company's strategic goals, helps the transformation from individual employee KSAs into firm-specific KSAs and supports the development of the firm competences required by the company in order to gain better performance. Notwithstanding the relevance recognized concerning this model, empirical studies of its adoption remain poor and, more generally, empirical investigation of how the transformation of competences could be integrated on a holistic PMMS are rarely investigated by the managerial literature. Moreover, this literature rarely highlights the benefits related to the adoption of simple and interactive indicators to measure and manage the intangible assets (Chang et al., 2013). However, the adoption of intangible asset measures for internal purposes is positively associated with organizational performance (Franco-Santos et al., 2012). In particular, the transformation of competences for internal purposes in a holistic PMMS is not investigated (Franco-Santos et al., 2012). The majority of scholars' efforts focus only on developing models

to help employees meet individual or team goal processes without considering the strategic company vision (Cannon-Bowers et al., 2012).

2.3 Enterprise social networking

In the last few years, social media are used to improve managerial practices and transform individual employee competences into firm-specific competences (Behrendt et al., 2014; Breunig, 2016). Particular attention is given to organizational systems that use Web 2.0 technologies within organizations such as enterprise social networking (ESN) (Behrendt and Richter, 2015; Breunig, 2016; Helms et al., 2017). ESN is described as *"Web-based platforms that allow workers to (1) communicate messages with specific co-workers or broadcast messages to everyone in the organization; (2) explicitly indicate or implicitly reveal particular co-workers as communication partners; (3) post, edit, and sort text and files linked to themselves or others; and (4) view the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time of their choosing"* (Leonardi et al., 2013, p. 2).

The adoption of ESN operates on emotional areas. It permits the sharing of interests, hobbies or activities (Leonardi, 2015; Makkonen and Virtanen, 2015; Recker et al., 2016), supports engagement and, as a result, favours a better organizational performance (Garris et al., 2002). As highlighted by Qi and Chau (2018), enterprise social networking usage has a positive impact on knowledge management processes (particularly knowledge creation and sharing), organizational learning and organizational performance (Qi and Chau, 2018). These authors specify how ESN can

enable hybrid knowledge management strategies linked to virtual collaboration on daily project tasks. Its use involves search, interaction and knowledge transfer, as well as socialization and learning from practice among dispersed teams and individuals. Breunig (2016) underlines that "The learning mechanisms involved in virtual collaboration do not differ much from what is reported on face-to-face workplace learning, however, the context factors are extended beyond the local setting". Moreover, the adoption of an effective visual approach improves the transfer of learning by 89%, increases communication quality (Mayer 2001; Nudurupati et al. 2016) and has numerous cognitive, social and emotional benefits (Eppler and Platts, 2009).

Currently, the main ESN include Yammer, IBM Connection, Jive, Tibbr, and Chatter (Deloitte, 2013) and their implementation has led to gaining business improvement by better communication, collaboration, increased productivity of employees and accelerated problem solving, knowledge sharing, and innovation (Qi and Chau, 2018; Turban et al., 2011). To answer the socializing challenge, some IT departments are exploring the incorporation of ESN as an informal organizational socialization tool. However, as this is a relatively new phenomenon, Leidner et al. (2018) provide insights into the different affordances made possible by ESN in the context of new hire socialization programs and how these affordances have repercussions beyond those experienced by individuals using ESN.

ESN affordance supports the sharing of organizational knowledge. It favours location of expertise, motivation to share knowledge and social capitalization in the form of developing and maintaining social ties with knowledge providers to actualize

knowledge sharing (Fulk et al., 2013). According to Forsgren and Byström (2018), the increasing adoption of ESN may help to share work-related information, improve ambient awareness, as well as being useful for socializing.

However, despite the recognized relevance of ESN, not enough research supports the understanding of how the use of social tools can be incorporated into an actual managerial system, the measurement and management of the competences and its role in PMMS.

3. Research methodology

The research adopts a multiple case study methodology (Yin 2014) using a qualitative meta-analysis. It has been chosen because it supports a better understanding of the researched phenomenon thanks to the opportunity to investigate a large sample of case studies (Finfgeld, 2003; Timulak, 2007). This methodology is considered as the main useful support for the aggregation of data extrapolated by case studies published in different scientific literature in order to use the original results in a new conceptualization of a newly investigated phenomenon (Timulak, 2009). This methodology is also recognized as the main approach suitable to identify innovative trends in a great number of companies hardly reachable by researchers (Timulak, 2009). According to the main purpose of the paper, i.e., to develop new knowledge concerning the role of ESN in the measurement and management of competences, we decided to use a multiple case study methodology adopting a qualitative meta-analysis in order to investigate a great number of best Fortune 500 multinational companies hardly reachable with different methods.

The three main stages of the methodology applied to this research (i.e., selection of the studies, appraisal, preparation of data, and data analysis) are synthetized in Table 1 and described in the sub-section below.

Table 1. Research methodology process

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1. Selection of case studies

Data-Set	Elsevier's Scopus - Google Scholar –Books
Document Source	Keywords
Document type	Article, Conference Paper, Review, Book
Source type	Papers, Reviews, Books, Conference Proceeding, Records, Trade Publications
Subject area	"Business, Management and Accounting" and "Social Science" and "Psychology" and "Engineering" and "Economics, Econometrics and Finance" and "Computer Science" and "Decision Science"
Keywords	"Intangible asset" or "human resource" or "human capital" or "employee" or "firm" or "multinational compan*" or "MNC" or "multi-national compan*"and "competenc*" or "skill" or "capabilit*" or "knowledge" or "abilit*" and or "enterprise social network"

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2. Appraisal of studies

Methodology	Adoption of qualitative research approach based case studies methodology
MNCs' features	- Turnover > 50 Million (€)
	- No. Employees 250 > No
	- Companies that derives a quarter of its revenue outside of its home country

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3. Preparing data

Preparing data	To analyse research findings and context information

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4. Data analysis

Data Analysis	To highlight qualitative evidence results by descriptive interpretative approach

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3.1. Selection of studies

The selection of studies is an essential part of this research approach because it highly influences the research included in meta-analysis (Timulak, 2007). According to Finfgeld (2003) and Timulak (2009), the authors collected primary findings and contextual information by looking for case studies on the investigated topic published on Elsevier's Scopus, Google Scholar and managerial books. The authors limited the search to article, conference paper, review, book, in the English language, published papers, reviews, books, conference proceeding, records, and trade publications. The search was restricted to the following keywords "intangible asset" or "human resource" or "human capital" or "employee" or "firm" or "multinational compan*" or "MNC" or "multi-national compan*"and "competenc*" or "skill" or "capabilit*" or "knowledge" or "abilit*" and or "enterprise social network". The investigation process was restricted to a predefined subject area, i.e., "Business, Management and Accounting" and "Social Science" and "Psychology" and "Engineering" and "Economics, Econometrics and Finance" and "Computer Science" and "Decision Science" (see Table 1). This analysis supported the construction of a research database of about 900 documents.

As suggested by Tranfield et al. (2003), the keywords and all other research criteria were selected after consulting with a team of academics working in the area and practitioners working in the field. The members of the team were carefully selected to provide a major research credibility in all research processes and they formed a review panel that supported the validation of the entire research process.

Regarding the selection of the above keywords, initially the researchers identified a first list of keywords based on the study of the relevant papers and, consequently, they interrogated the team asking keywords related to the investigated topic. All the keywords appearing at least two times (i.e., in the authors' list and/or mentioned by at least one/two scholar or/and practitioner) were used in this research.

3.2. Appraisal of studies

The appraisal of studies is crucial to assess the capability of the selected studies to effectively contribute to the research. As described by Timulak (2009), it should include the choice of some features of research design such as research question, methodology (data collection, data analysis and theoretical framework) and presentation of findings. The inclusion features used by the authors to identify the research sample are described below.

1. Availability of qualitative empirical data that dealt with the transformation process of competences (even if this transformation is implied).
2. Adoption of a qualitative research approach based on case study methodology.
3. Service and manufacturing MNCs as the objective of analysis, i.e., Turnover > 50 Million (€), No. Employees 250 > No. (Loecher, 2000). The authors decided to analyse only MNCs as these companies need to manage a larger amount of knowledge than Small and Medium Enterprises (SMEs) and, consequently, the managerial process should be more advanced (Davenport et al., 2010; Hinkin and Tracey, 2010).

As shown in Table 2, this process identified 32 MNCs.

Table 2. Multinational companies

	Company	Sales (billion $)	No. Employees
	Accenture	33,5	358,000
	Baxter International	10,0	50,000
	Best Buy	39,5	125,000
	BNP Paribas	74,9	189,000
	Capgemini	13,2	180,639
	Capital One	25,0	45,400
	Cisco System	48,6	71,833
	Coca-Cola	43,5	123,200
	Deloitte	35,2	225,000
	Ebay	13,1	11,600
	Facebook	17,9	12,691
	Fiat Chrysler Automobiles	122,7	238,162
	IBM	80,8	377,757
	Kimberly-Clark	18,6	43,000
	Luxottica Group	**9,8**	**78,933**
	Marriott Hotel	14,5	199,929
	Mc Donald's	25,4	420,000
	Microsoft	86,6	118,584
	Novartis	49,4	118,700
	Nucor	15,8	23,700
	Oracle	37,2	132,000
	Pfizer	48,9	97,900
	Procter and Gamble	69,4	110,000
	Royal Dutch Shell	264,9	93,000
	Sanofi	40,5	115,631
	Siemens	85,5	348,000
	Starbucks	20,2	238,000
	Sysco	48,9	51,700
	Tesco	82,3	510,444
	Unilever	59,1	171,000
	Yum Brands	13,1	505,000
	Whirlpool	20,9	97,000

3.3. Preparing data

The case studies have been analysed further, including in-depth reading of the empirical analysis and findings. As prescribed by Finfgeld (2003), the authors

maintain the original "meaning'' of the selected papers for better data analysis and, when useful, further knowledge was added as a result of proper use of secondary data to answer the research questions identified here (Timulak, 2007).

3.4. Data analysis

As highlighted by Pettigrew (1998), the data analysis should adopt a descriptive-interpretative approach to investigate qualitative evidence. This descriptive-interpretative analysis allows the description of a fast-changing area with a broad and complex business context capturing descriptive and interpretative evidence. The collected data from the 32 case studies are analysed and discussed by researchers through two workshops, using categorical aggregation and interpretation techniques (Stake, 1995). In order to valid the analysis, the authors also adopted several safeguards (credibility checks) that ensured its validity by the triangulation (Yin, 2014). In particular, the triangulation facilitated the validation of data through cross verification from two different researchers. These researchers analysed the same database and identified the characteristics that typified the process of measurement and management of competences by enterprise social networking. Thanks to the triangulation, the paper increased the credibility and validity of the results.

The authors identified the main characteristics of the measurement and management of competences by enterprise social networking and built a conceptual framework based on performance measurement literature. After the description of the findings (Section 4), they developed four conceptual propositions to explain the phenomenon observed. The findings allow the creation of robust conceptual propositions based on

"pattern matched" between case evidences and theory (Eisenhardt and Graebner, 2007).

3.5. Data interpretation

As explained by Yin (2014), the authors developed some conceptual propositions to develop new knowledge on the role of enterprise social networking in the measurement and management of competences to favour the development of a holistic performance measurement system. In particular, the conceptual propositions have been developed on the results, independently from the number of the research questions. As suggested by Yin (2014), the conceptual propositions are formulated as a logically and theoretically valid statement that explains relations between the concepts under consideration. In other words, as described below, in section 5, the conceptual propositions will support the understanding of the empirical findings within a theoretical framework based on the interplay between performance measurement and management.

4. Findings

The qualitative analysis of the 32 MNCs support the study of the second research question, i.e., *What are the main characteristics that typify the process of measurement and management of competences by enterprise social networking*? It highlights some important characteristics on the transformation process about KSAs' measurement and management. The authors describe, below, the relevant managerial practices on this process observed in multinational companies; they synthetize how

ESN is used by MNCs to support the transformation of employees' individual competences into firm-specific competences.

In the last ten years, innovative MNCs have implemented their own ESN to improve their internal communications. For instance, SocialBlue was introduced by IBM, "Blue Shirt Nation" by Best Buy and "Oracle Connect" by Oracle (Geyer et al., 2008), whereas other large organizations have adopted internal ESN provided by external suppliers (see for instance "Yammer" by Microsoft, "Salesforce's Chatter" by Salesforce and "Cisco's Jive" by Cisco).

SocialBlue is employed by IBM employees to create their own profile page; it is used to keep in touch with colleagues for both personal and professional interest (DiMicco et al., 2008). Furthermore, they can allow other IBM people to know where they are, what they are thinking and what they are doing. SocialBlue also enables people to post photographs, share thoughts and organize events (Thom-Santelli et al., 2010). In order to transform employees' KSAs, ESN allows employees to create their favourite list. Moreover, they can also share their open projects and receive feedback, suggestions or support. IBM's social networking responds to the challenge of building work-relationships in multinational companies. It helps to discover people with common interests or the right skills for a project, learning more about someone personally or professionally and facilitating relationships beyond their immediate team (Thom-Santelli et al., 2010). It encourages the measurement of KSAs and self-analysis through continuous visual information.

"Connect" is the ESN adopted by Oracle to collect ideas from experts in Applications Strategy giving value to human capital by owning their ESN. Subsequently, this social networking introduces an innovation transforming traditional online messaging (i.e., chat message) into direct tweets ("Oracle tweet") with comments posted on the company network; meanwhile, Blue Shirt Nation (by Best Buy) connects people with common interests, giving them an opportunity for conversations with the online community. As a main innovative approach ESN supports knowledge exchange from different stores (Bernoff and Schadler, 2010; Dunn, 2010).

More than 100,000 organizations (such as EBay, Nationwide and Capgemini) use Microsoft Yammer, resulting in high performance in terms of number of relationships, developed projects and problems solved (Hal and Chua, 2015; Menek, 2012). For instance, Capgemini's consulting employees are required to work at client locations, with consequent difficulties in managing knowledge as a whole; thanks to this ESN, Capgemini has connected employees online, enabling support of the exchange of their own competences for a specific advantage. Also, Deloitte took relevant advantage by implementing Yammer into the company; its implementation has improved information sharing and knowledge management, visibility, employees' productivity, workforce collaboration, creativity, innovation and faster conflict resolution (Leonardi, 2014; Riemer et al., 2015).

Enterprise social networking offers the possibility to propose ideas, projects and new collaborations. By these projects, ESN can transform individual competences into specific services or products giving competitive advantage and valorisation of social

capital (Ellison et al., 2015; Riemer et al., 2015). Employees and organizations could definely innovative open projects and use enterprise social networking to effectively manage them. The investigated case studies have shown that ENS is an innovative management tool able to effectively support the transformation of employee competences into the specific competences necessary to develop open projects (Jensen et al., 2010). It also favours data collection and the measurement process concerning employees' daily activities. In fact, ESN allows the measurement of data in real time and monitors activities logs through analytical dashboards. On one hand, this process creates new knowledge, useful for employees' daily work; on the other hand, it creates useful data to design and implement analytic dashboards (Mäntymäkia and Riemer, 2016).

Finally, users can manage a virtual organization by some key performance indicators (KPIs), manage production, employees and other managerial processes. In this way, ESN encourages employees in self-training as they can "play" anywhere, at any time and, at the same time, increase the use of KPIs to measure and manage own process of transformation of competences and, consequently, organizational performance. In fact, it favours the self-monitoring of own activities as they are always connected to online analytical dashboards (Noe et al., 2016).

In conclusion, to answer to the second research question, the authors synthetize the collected data by two dimensions, KSA management and KSA measurement. As shown in Table 3, the management of competences encourages relationship-building, gives continuous feedback, shares interests and activities in order to favour open

projects that support the process of transformation of employees' KSAs. In turn, the measurement of competences allows the monitoring of data collection and analysis in real time. It favours the use of an analytical dashboard and encourages the use of KPIs to support self-measurement.

Table 3. Characteristics that typify the measurement and management of competences by ESN

	Characteristics of measurement and management of competences
KSA management	Provides continuous feedback, suggestions and support
	Facilitates relationship, knowledge sharing and discussions
	Allows open projects to be opened on favourite topics
	Encourages self-management of own KSAs
	Impacts on emotions and behaviours
KSA measurement	Provides real time data collection, analysis and reports
	Allows self-monitoring of activity reports
	Encourages the use of KPIs
	Favours a self-performance measurement

5. Discussion

The analysis of the 32 MNSs highlights the key role of ESN in supporting the transformation process of KSAs based on the opportunities of social relations between employees who share interests, hobbies or activities (Makkonen and Virtanen, 2015; Recker et al., 2016; Richter and Riemer, 2013). ESN is largely used by employees to manage their competences, create their own profiles, connect themselves with other workers, communicate messages and post files in real time. Moreover, using ESN people can host forums on their own favourite topics concerning work questions and informal talk (Mäntymäkia and Riemer, 2016). The use of ESN improves the learning and knowledge of everyone (Mäntymäkia and Riemer, 2016) and generates numerous benefits for organizations (Turban et al., 2011). ESN creates the opportunity to improve knowledge sharing in the workplace; an intermittent, centralized knowledge management process is transformed into continuous online knowledge. This online knowledge circulates very quickly as it could easily be shared in vertical and horizontal communications (Davison et al., 2014); it is transferable and managed by the whole network, i.e., knowledge of "who knows what" and "who knows whom" (Majchrzak et al., 2013; Leonardi, 2015).

As summarized in Table 3, the meta-analysis highlights some ESN characteristics that typify the process of measurement and management of competences and that may support the transformation of employees' knowledge, skills and abilities.

To answer the overall research question, i.e., *How does measurement and management of competences by enterprise social networking impact on the development of a holistic PMMS?*, the authors identified Smith and Bititci's theoretical framework (2017) as a useful reference to represent the characteristics that typify the measurement and management of competences by ESN previously synthetized in Table 3. As shown in Figure 2, the adapted framework represents the performance measurement maturity level (see y axis – Figure 2) and the degree of democratic and participative approach in performance management (see x axis Figure 2).
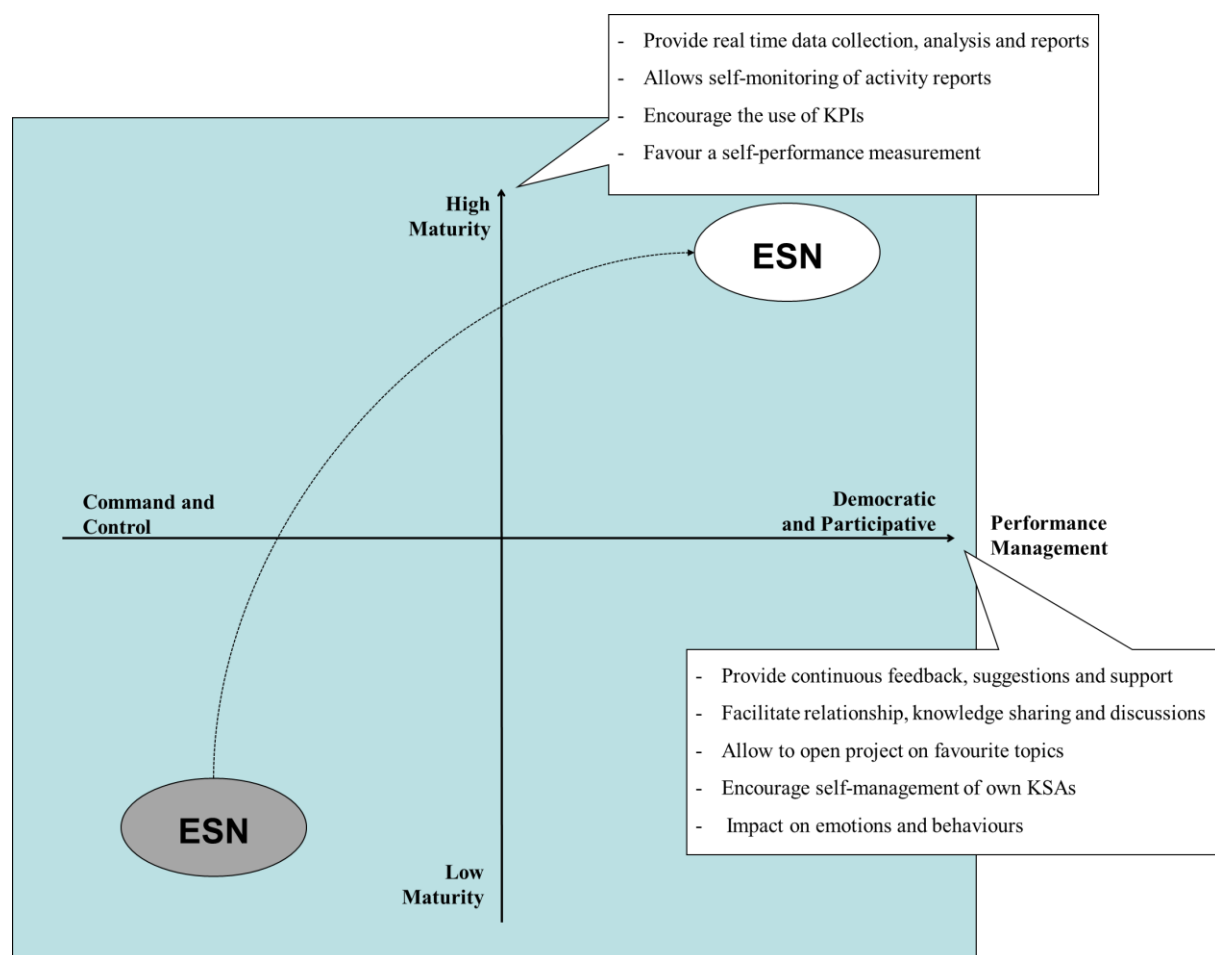
Figure 2. Conceptual framework with characteristics that typifying the ESN in PMM (adapted by Smith and Bititci, 2017)

Its adoption supports the rationalization of how the 32 companies use their ESN to measure and manage the competences in two different time-periods (i.e., 2007 and 2016), and the analysis of the changes in the measurement and management of competences by ESN impact on the development of a holistic PMMS.

As shown in Figure 2, the 32 MNCs highlight a significant increase in the adoption of ESN in the transformation of competences. The use of ESN encourages the development of a holistic PMMS with distinguishing characteristics that typify the performance measurement and management dimensions. In terms of performance measurement dimension, the growing use of ESN highlights an increase in real time data collection, analysis and reports; self-control of activity reports; and the major use of KPIs. Considering the performance management dimension, the increasing use of ESN shows the growing relevance of continuous feedback, relationships, discussions and the need to encourage the self-management of employees' knowledge, skills, and abilities.

The analysis of how measurement and management of competences by ESN influences the adoption of a holistic PMMS supports the definition of the four conceptual propositions illustrated below.

Proposition 1 – The use of enterprise social networking in the transformation of competences provides real time data collection, analysis and reports that encourage a democratic and participative performance management.

The literature suggests the adoption of specific types of simple and interactive indicators to measure the transformation of competences (Chang et al., 2013), according to specific business contexts, i.e., customized measures to answer specific business needs. These measures can often be calculated by average, variability or an aggregate of both (Ployhart and Moliterno, 2011; Wright and McMahan, 2011). In this way, the study highlights that ESN provides easier real time data leading to major self-management and, consequently, democratic and participative performance management. As underlined by Franco-Santos et al. (2012), the use of intangible asset measures for internal purposes is positively associated with organizational performance. Given paper evidence, the inclusion of ESN in PMM practices can support better management of competences and, consequently, improve holistic PMMS design.

Proposition 2 – The use of ESN encourages a performance management that facilitates relationships, knowledge sharing and discussions and, as a consequence, favours a high maturity performance measurement.

The findings highlight the key role played by ESN in order to promote innovative ideas, projects or activities. ESN encourages chatting, collaboration and engagement (Leonardi, 2015). By online communications, it facilitates relationships, knowledge sharing and open projects. These activities answer a key holistic PMMS need, i.e., they engage people in conversation about performance (Smith and Bititci, 2017). In

this way, ESN can improve performance management and, in the same way, lead to more awareness about the use of key performance indicators and, consequently, it increases the maturity of performance measurement.

Proposition 3 – The self-management of employees' competences by ESN favours the use of strategic KPIs to monitor KSAs.

The literature describes the transformation of employees' competences as strictly related to the complexity of the company, employee characteristics and context. However, the majority of scholars' efforts focus on developing models to help employees meet individual or team goal processes without considering the strategic company vision (Cannon-Bowers et al., 2012). The analysis of the 32 case studies highlights the strong relationship of company strategy and the use of ESN. These applications support the self-management of intangible assets more accurately and objectively than a traditional approach, improving the management of monitoring effects from actions, translating business strategy into action and enhancing the whole management of the company business.

Proposition 4 – The adoption of enterprise social networking supporting KSA management allows continuous visual measures and impacts positively on employees' learning, emotions and behaviours leading to democratic and participative performance management.

In the case studies, the use of ESN also operates on affective and cognitive dimensions using the visual aspects. As underlined by the literature, the use of effective visual measures improves the transfer of learning by 89% (Mayer, 2001). Nudurupati et al. (2016) argue that the use of visual support in the communication process improves the perceived information quality. Eppler and Platts (2009) identify cognitive, social and emotional benefits related to the use of effective visual tools. These factors are also described by recent PMM literature as a key new line of development for PMM research (Bititci et al., 2016; Smith and Bititci, 2017) and, consequently, they are essential for the development of holistic PMMS. In turn, the visual approach of enterprise social networking favours the development of cognitive and affective domains. In fact, enterprise social networking operates on emotional areas, gaining better engagement and, consequently, favouring better performance (Garris et al., 2002).

6. Conclusion

The paper contributes to knowledge on measuring and measuring competence adopting a structured and systematic approach. Firstly, the research identifies the main characteristics that typify the process of measurement and management of competences by ESN such as real time data collection, self-monitoring of activity reports, continuous feedback and knowledge sharing.

Secondly, adapting the Smith and Bititci (2017) conceptual framework, based on the interplay between performance measurement and management as proposed, the

research rationalizes how companies use their ESN to measure and manage competences. Thirdly, four conceptual propositions are developed to explain how the use of ESN favours the transformation process of employees' individual competences and the adoption of holistic PMMS.

To fill the research gaps previously described, i.e., the scant availability of theoretical and empirical studies on the role of ESN in measurement and management of competences in a holistic PMMS, the paper has developed knowledge on ESN in measurement and management of competences. This knowledge should favour the development of a holistic PMMS. Specifically, the study highlights that the use of ESN in the transformation of competences provides real time data collection, analysis and reports that encourage a democratic and participative performance management. It also encourages a performance management that facilitates relationships, knowledge sharing and discussions and, consequently, favours a high maturity performance measurement. Moreover, the study highlights that the adoption of ESN supporting of KSAs' management allows continuous visual measures and impacts positively on employees' learning, emotions and behaviours leading to democratic and participative performance management. Furthermore, it supports a self-management of employees' competences that favours the use of KPIs to monitor KSAs.

The study also has important implications for practice and society.

Concerning the main implications for practice, it underlines how the use of ESN may create a great opportunity for increasing managerial development and competitive

advantage. In particular, it may valorise the employees' individual competences and support the measurement and management of competences in a holistic PMMS based on a high maturity in performance measurement and a democratic and participative approach in performance management.

Concerning the main implications for society, the paper illustrates some important social benefits. In particular, the use of ESN may allow employees a self-expression of own capacity by providing a creative virtual space useful to express themselves, share their artwork and share their knowledge on specific topics. Being able to express themselves in a healthy way is a very important part of the human experience, and ESN can be a great outlet for people.

According to the main results of this study, future research may be useful to investigate, empirically, the outcomes of this research. In particular, the research should encourage further case studies to explore, test, or improve the main characteristics that typify the process of measurement and management of competences and the identified propositions.

Moreover, the study highlights two main future research opportunities. Firstly, it suggests further research to investigate how PMM practices may be advantaged with the use of innovative technological tools (like enterprise social networking and social collaboration) and how these tools can improve performance measurement and management practices. In fact, the findings highlight the use of innovative technological tools as a new research opportunity in the performance measurement

literature. However, the effective use of these tools is poorly investigated and its main conceptual and practical determinants are not fully covered.

Secondly, the study suggests further research opportunities relative to the relationship between PMM practices and the use of new technological tools such as social media. Currently, these tools are quickly being implemented in many companies and they are increasing the role of young people. The new employees' generation is evolving rapidly and employees around the world are becoming multi-skilled; they have a high propensity to innovation and live in a multicultural environment (Gavino et al., 2012; Nasurdin et al., 2012). They increasingly use innovative technological tools like social media and social collaboration and most of their daily activities are based on the use of such new technological tools (Sartorius et al., 2011). According to recent literature, the current performance measurement and management practices should be aligned to needs, knowledge and preferences of the current employees' generation. However, the performance measurement literature rarely investigates the relationship between PMM, the adoption of new technological and new employees' generation.

The main limitation of this research is the broad criteria in selecting case studies. In fact, some of the identified papers are weakly related to the performance measurement fields, and mainly focused on knowledge management, psychology and human resource management areas. Although these broad criteria may represent a potential weakness, they are also the strength of this research. In fact, they favoured the inclusion of numerous contributions belonging to different research streams and,

consequently, they supported the identification of a wide range of characteristics useful to the development of a holistic conceptual framework.

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