The Use of Social Software during the phases of the Business Process Management (BPM) Lifecycle.

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Dissertation submitted in fulfilment of the requirements for the degree Master of Commerce in Computer Science and Information Systems at the

North West University

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Graduation ceremony: October 2019

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DECLARATION

I, Patience Mavetera, hereby declare that this research report is my own, unaided work, other than where specifically acknowledged. It is being submitted for the Master's degree in Computer Science and Information Systems at the North West University. It has not been submitted before for any degree or examination at any other university.

Signature ... *PMavetera*

Patience Mavetera

Acknowledgements

Foremost, I would like to praise the Almighty God who granted me the strength, wisdom, knowledge and understanding to carry out this study.

There are countless people who deserve my sincere gratitude for their contribution to the success of this study. To my supervisor, Prof. Sam Lubbe; for the continuous support during my Honour's study and research - for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped me in all the time of research and writing of this dissertation. I could not have imagined having a better supervisor and mentor for my study.

My sincere gratitude also goes to my parents (Prof N Mavetera and Mrs C Mavetera) for being my role models, supporting me throughout my life and being my number one supporters. To my mother Dzidzai, for the constant reminders of what education can do for my life. To my siblings Kudzai, Tinotenda, Farai and Kudzanai for pressurising me to lead by example. Without you I would be nothing. I love you till forever ends.

Mpumi, Tshedza, Sisipo, Tshego, Tshireletso and Thatoyaone for constantly asking about the progress of the study, stimulating discussions, for the sleepless nights we were working together before deadlines, and for all the fun we have had in the last few years. I would not have finished this study if it was not for your competitiveness and encouragement.

I want to use this final paragraph to remind myself there was a time I could've dropped my thesis to pursue different passions. I am glad I didn't.

DEDICATION

To my loving parents Chipo and Nehemiah.

Abstract

Business Process Management (BPM) provides support for managing organisations' processes and facilitates their adaptation to changing market conditions. Although various BPM solutions have been successfully applied in industry, there are still open issues to be addressed (for example, ensuring commitment of employees in process modelling and re-engineering or enabling automation of the business processes lifecycle). Researchers are currently investigating the use of Social Software technologies to overcome the existing problems. Based on a conducted study, the researcher argues that although semantics and Social Software technologies focus on different problems, they may be combined, as utilised together, they enable organisations to advance their processes and adapt faster to changing market conditions.

For this purpose, an extensive study of the literature on existing types of Social Software and the phases of BPM lifecycle were conducted. As much as social software has a positive impact on the BPM lifecycle, no one really knows which of these software are used in which phases of the lifecycle. As organisations do not know 21st century socio-technical work and the impact they have on the organisation in a way that nobody fully explained, they do not know what business processes are impacted and this needs to be addressed as it can be wrongly managed and incorrect business processes would be used.

In this study, the researcher aims to investigate which of these types of social software are used in specific phases of the BPM lifecycle and which types of social software can be used in which phases of the BPM lifecycle and the ways in which social software can be used to support BPM lifecycle.

Keywords: Social Software, Business Process Management, Semantic Business Process Management, BPM lifecycle, Weak tiers, Web 3.0, Web 2.0

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Chapter One
Introduction of the study

1.1 Introduction

According to AIIM (2015), Business Process Management (BPM) is a way of looking at and then controlling the processes that are present in an organisation. It is a methodology to use in times of crisis to ensure that the processes are efficient and effective. This will result in a cost-efficient organisation. The BPM lifecycle consists of five (5) phases that are: design, configuration, execution, control and diagnosis (van der Aalst, Netjes & Reijers, 2007).

Social software seems like a special form of networked media. It is a set of tools, applications and/or services that enable its users online interaction, information (or knowledge) sharing and exchange of opinions (Matešić, Vučković & Dovedan, 2009). The types of social software are classified as social networks, media sharing services, Wikies, blogs, microblogs and content discovery. These different types of social software are used in different phases in the BPM lifecycle.

The purpose of this research is to investigate which types of social software can be used in which phases of the BPM lifecycle. In the book by Tuten, (2010), McAfee envisioned the importance of social media to organisations, naming that it has the potential to "knit together an enterprise and facilitate knowledge work in ways that were simply not possible previously". In this instance; focus is placed on social media combined with business processes. Several links between social media and business processes can be identified when exploring this topic in the literature.

In this research, the reader will find the introduction, problem statement, literature review, aims, objectives and purpose of the study, contribution to the body of knowledge, research questions, research methodology and finally a conclusion.

1.2. Background of the Study

In preceding decades, the World Wide Web has transformed from an information medium to an interaction and collaboration medium (McAfee, 2006). A plethora of software has grown, enabling easy and abundant sharing of information, communication and collaboration among individuals. Bachle (2008) and Perez (2010) studied the element that individuals may actively create, publish and share content and do not necessarily need to have a technical background. Content is largely independent of the underlying type of hardware and software technology; rather, it may ubiquitously re-used and modified by anyone having access to the Internet.

As a result, the strict distinction between consumers and producers of web content has largely faded. Blogs, Wikis, social media network sites, messaging and sharing services are exemplary classes of such software that follow different purposes in content creation, but have a certain kind of openness to foster the creation of communities around a topic of interest in common and enable the interactions among members of a community. The use of social software like Wikis, blogs, social networks and instant messaging are common practice in organisations. This was a result of large business software manufacturers such as SAP, IBM, Oracle, Microsoft and management consultancies recognise the development.

They started to include social software in their product and service portfolios and in turn addressed many issues that had impeded organisations in adoption and use of such technology (Bachle 2008; Perez, 2010). The world is facing a growing interest in social networks and social interactions inside and outside organizational boundaries which can represent an opportunity for organisations. This was the basis for the emerging of a new discipline called Social BPM, which merges BPM with social software (Brambilla, Fraternali, & Vaca Ruiz, 2012) and as Schmidt and Nurcan (2009) highlights, helps overcoming deficiencies of classic BPM approaches.

Business Process Management (BPM) is not a new concept as Social Networks and Social BPM that are starting to get as much attention, both on academic contexts and in organisations (Vieira & Jaklič, 2013). Social Networks are evolving and, although there is recognition of the importance that they have in people's lives, there is not much information or analysis that seek to interpret and show the reality of Social Networks in organisations. Organisations are discovering that Social BPM can also help them to achieve competitive advantage. So, relating these is relevant, since it can help organisations understand how they can use the knowledge from its stakeholders to improve their business processes (Vieira & Jaklic, 2013).

The Social BPM, whose main purpose, according to Brambilla *et al* (2012), is to improve organizational performance through a measured participation of external stakeholders, in order to process design and execution. Lee, Jang and Kim, (2011) considered Social BPM a promising tool to improve the performance of an organization by providing extensible communication tools, informal data handling functions and knowledge-based decision support. Bruno, Dengler, Jennings, Khalaf, Nurcan, and Prilla, (2011) wrote that merging a gathering of experiences lead to the best results and to collaboration among stakeholders. This is by allowing them to communicate; using their own perceptions and languages is a way to achieve organizational integration. Stakeholder's experiences can be a prised resource for organisations and Social Software can help with the collection of this knowledge. Duipmans (2012) also highlights that offering BPM as social software has been identified as a promising approach in which improvement of

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communication and collection of knowledge have been identified as its main benefits, since it allows multiple users to work on the design, operation and improvement of a business process simultaneously.

1.3 Problem Statement

According to Filipowska, Kaczmarek, Koschmider, Stein, Wecel, and Abramowicz, (2011), social software is attracting high interest within academia and related circles. It supports different types of collaboration of peers and fosters sharing of content and knowledge (Alexander, 2006). It can be generally classified in four applications, namely: Wikis, social networks, social apps and blogs (Schugat et al., 2007). In turn, Schmidt and Nurcan, (2009) classifies social software by the following three domains:

- Identity Management: ability to represent aspects of a person (oneself) in the Internet,
- Relationship Management: ability of sharing interests and building communities,
- Information Management: ability to find, rank, and manage online available information.

McAfee (2006) revealed that initial applications of social software can also be found in a business context implementing Enterprise 2.0. However, in most of the existing cases, these applications are used mainly as information sharing frameworks (Komus & Wauch, 2008) and not as an advanced support for the BPM area. Despite the potential that Social Software applications have already demonstrated (O'Reilly, 2007), enterprises are still struggling with the challenge of how to benefit from Social Software within the BPM field.

As much as social software has a positive impact on the BPM lifecycle, no one really knows which of these software are used in which phases of the lifecycle. As organisations do not know 21st century socio-technical work and the impact they have on the organisation in a way that nobody fully explained, they do not know what business processes are impacted and this needs to be addressed as it can be wrongly managed and incorrect business processes would be used.

In this study, the researcher aims to investigate which of these types of social software are used in specific phases of the BPM lifecycle and which types of social software can be used in which phases of the BPM lifecycle and the ways in which social software can be used to support BPM lifecycle.

1.4. Research Objectives and Questions

1.4.1 Objectives
The objectives below will assist in answering the research question:

- Determine how social software interacts with business process management.
- Determine which categories of business processes can profit from social software.
- Determine which phases of the BPM lifecycle are affected the most by social software

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- Identify which social software is mostly used to profit businesses.

1.4.2 Research Questions

The main research question that will be examined in this study is as follows:

- **Which types of social software can be used in which phases of the BPM lifecycle?**

The research topic will be addressed in three steps, by answering the following research questions:

1. Why are social software being used in BPM?
2. What social features are actually used in BPM practice?
3. How can existing social software solutions benefit from an extension with process management experiences?

1.5. Research Aim

This section briefly discusses the aims and objectives that the research study endeavoured to achieve in order to solve the problem posed in the previous section. The main aim of this paper is to fully understand which types of social software exist and which of these software are being used in specific processes of the five phases of the BPM lifecycle.

1.6 Significance of study

Organisations often implement BPM for a variety of reasons. The main motivation is to be more competitive in today's intense competitive economy. Social Software was primarily designed to provide an environment of interaction between users without any goal-oriented intentions. From the BPM viewpoint, the most important feature of Social Software technologies is that they aim at enhancing sharing of information by communities within organisations as well as development alliance. As a result, they are suitable to solve the problem of knowledge sharing and its application within various stages of the process lifecycle. Social software can bridge the gap between process models and reality. Process participants are empowered to ensure a high connection of designed models with "their" reality, independently and collaboratively. This leads to a higher acceptance and ensures that business processes no longer run past their definition. Furthermore, Social BPM allows collecting and implementing participant ideas, which were previously not considered. Improvements for business processes can be considered much more than before, thanks to the use of the collective intelligence.

Since it has already been established by researchers (Filipowska *et al*, 2011) that social software indeed does bring an added value to the BPM field. Keeping this in mind, the significance of this study is easily formulated. With the use of social software increasing drastically in organisations, the researcher

distinguished the social software that is being used in the BPM lifecycle phases. This research is important to the organisations in business. After finding out which social software is being used, the business can implement said software to ensure optimal result.

1.7. Research Design and Methodology

1.7.1 Methodology

The researcher used a quantitative research method while conducting this study, which was based on the measurement of quantity or amount. A quantitative research method is applicable to phenomena that can be expressed in terms of quantity (Kothari, 2004). An inferential research approach was used to form the base from which to infer characteristics or relationships of population.

The primary data collection technique conducted is an online survey-based questionnaire. By gathering information, the researcher used the questionnaire as a method to collect data, carried out in a structured way where output depends upon the ability of the interviewer to a large extent. A questionnaire was used as data collection method as it allows the researcher to gather responses in a standard and systematic way, hence objective. Every respondent was presented with the same set of questions, and measurements were done and analysed objectively. The questionnaire was pilot tested on a group of peer researchers to ensure that it accurately captures the intended information. The researcher employed a combination of open-ended and closed-ended questions. Open-ended questions gave the respondents room to fully express their views and closed-ended questions narrowed down the choices for easier analytic purposes.

The research variables included in the questionnaire are the background information of the respondents in terms of the roles they assume at their workplaces, the highest qualification attained and personal experience in business processes (this will be classified in years ranging from none to more than 10 years). The size of the respondents' organisation's Information Technology department and also the business area of the organisations. The respondents were asked to indicate whether they are using social software or not. If the respondents make use of social software, they were asked to indicate the intensity, how widely they are using the social software, the strictness of use and their expected future use of social software. Respondents were provided with a list of questions on social software offering support as a control technology and they had to indicate whether they totally agree or not, with the provided statements.

1.7.2 Data Analysis

Descriptive statistics, reliability analysis, factor analysis, regression analysis, t-test and correlation analysis were performed as data analysis elements. Since the researcher wanted to analyse the relationships between components, that is, power and the use and success of social software, regression analysis was the ideal tool

to analyse the relationships between these variables. Using regression analysis, the researcher also saw the relative strength of the independent variable's effects on the dependent variables and with all these findings the researcher was able to make predictions. The data is analysed using Statistical Package for the Social Sciences (SPSS). The data is presented in user friendly format, expressed in the form of graphs, tables, percentages and statistical analysis.

1.8 Research Scope

Knowledge: This research study mainly focuses in the field of Management of Information Technology.

Geographical: This research was conducted in the North West Province of South Africa. This geographic area was selected because there is a lot of entrepreneurships and businesses that are being erected. Within these businesses, social software is being used unknowingly of the benefits they have on the businesses. North West Province being an upcoming and establishing province, is suitable for the research as it also implements BPM phases.

Time: This research study is supposed to elapse a total of three years and six months.

1.9 Ethical Considerations

The researcher has read the ethical policy of the North West University and has been advised of cases of plagiarism. The supervisor and the researcher have conceded and discussed them. Respondents participated in the survey voluntarily did so and will be fully informed about the aims and objectives of the study. The texts belonging to other authors that were used in any part of this study have been fully referenced using the Harvard Referencing System.

The questionnaire does not contain any degrading, discriminating or any other unacceptable language that could be offensive to any members of the sample group. The questionnaire was designed to collect information directly related to the research questions, and no private or personal questions were asked to respondents.

1.10. Report structure

The results of this research are presented in five main chapters. A brief overview of these chapters and general structure of the research is summarized in the following paragraphs.

Chapter 1: Overview of Study

An introduction of the research topic was given in the first chapter. The problem statement and motivation for the research are discussed, as well as its aims and objectives, questions and how the research was carried out. The chapter summary concludes the chapter and introduces the next one.

Chapter 2: Literature Review

The background of social software and Business Processes Management is given in Chapter 2. Overview of the literature — the literature review is concerned with information on what research has been done on the topic as well as other new information available. The gap in the relevant literature is discussed in this chapter.

Chapter 3: Research method and design

Chapter 3 discusses the research paradigm within which the study is done and the research methods that were used to collect and analyse data. The methods are discussed according to their advantages and disadvantages. Those applicable to the research are chosen and reasons are given as to why they were necessary for perusal.

Chapter 4: Data analysis and results

This covers the extracting of information or converting collected data into valuable information.

Chapter 5: Research conclusion and future work

Chapter 5 concludes the research study and it shows how the problem was solved. Research contributions, future work and conclusions are also discussed.

1.11. Conclusion

In summation, the developments in business processes using social media are promising; as can be seen from the reference list besides this academic contribution, interest has also risen among organisations on the effect of social media on their businesses. The results from this study can be used to determine which social software is being used in which phase of the BPM lifecycle.

This chapter added value in clear understanding of social software and the business process management lifecycle and framed the road map of where the entire study has to go in an in-depth investigation. In the second chapter, the literature review (overview of the literature), other authors' articles with regard to the research topic are discussed.

Chapter Two
Overview of the Literature

2.1 Introduction

In this chapter, reviews of the literature regarding key topics in the research are explained in a brief manner. First, general definitions, importance and perspectives associated with social software and Business Process Management will be expounded on.

2.2 Business Process Management

Business Process Management (BPM) is not a new concept as Social Software or Social BPM that is starting to get as much attention as prior both on academic environments and in businesses, (Erol, Granitzer, Happ, Jantunen, Jennings, Johannesson, Koschmider, Nurcan, Rossi and Schmidt, 2010). Smart, Maddern and Maull (2009) stated that the concept of 'process' has repeatedly emerged in many of the prominent thematic initiatives in the post-reengineering era. Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Six Sigma, and more recently Business Process Management (BPM), for example, all utilise the concept of 'process'. In addition to transcending these initiatives, 'process' can also be found in multiple sectors, and as key element of performance improvement frameworks (Smart et.al., 2009). According to Underdahl (2011), better processes produce lower cost, higher revenues, motivated employees, and ultimately, happier customers.

Research on BPM is gradually working on a developed flexibility of workflow management systems in order to adapt to the continually changing business processes. According to van der Aalst *et al* (2007), BPM is defined as supporting business processes using methods, techniques and software to design, enact, control and analyse operational processes involving humans, organisations, applications, documents and other sources of information. It is an approach that's designed to produce better processes. BPM is a collaborative effort between business units and the IT world, and this effort fosters a new paradigm of efficient and logical business processes.

ABPMP (2009) defines BPM as a set of structured methods and technologies for managing the operations of an organization. Mathiesen, Watson, Bandara and Rosemann, (2011) cited Goeke and Antonucci (2009) who went further to say that the goal of BPM is to create a process-centric, customer-focused organization that integrates management, people, process and technology for both operational and strategic improvement. BPM encompasses methodologies and technologies for process definition (e.g. process modelling), process analysis (e.g., Six Sigma, Lean Management), process improvement (e.g., BPR, Process Innovation), process execution (e.g., Process-aware Information Systems) and process monitoring & control (e.g., Business Activity Monitoring).

On a larger scale, BPM has also been described as a holistic approach to the management of a business (Schönthaler, Vossen, Oberweis, and Karle, 2012) that addresses the entire business layer and consists of six core elements (Rosemann, & vom Brocke, 2015) which are: strategic alignment, governance, methods, information technology, people, and culture. Once executed effectively, BPM allows companies to "create high-performance processes, which operate with much lower costs, faster speeds, and greater accuracy, reduced assets, and enhanced flexibility," (Rosemann, & vom Brocke, 2015)

Business processes are at the heart of what makes or breaks a business and what differentiates it from the competition. Its purpose is, therefore, the non-stop enhancement of business procedures through incremental or thorough change of business processes (Rosemann and vom Brocke, 2015). Activities allied to business process management are normally prepared as an iterative lifecycle. Most BPM lifecycles are very similar and implement a basic 'Plan-Do-Check-Act' approach with steps such as design, engineering, enactment, monitoring, and re-engineering (Schönthaler *et al*, 2012).

Thus, BPM is a management methodology that applies theories of incorporating fundamental and incremental change, therefore resulting in various definitions; however, within all those definitions there are words like support, assist and continuous improving and strategic alignment which are common, but BPM is a process that must be implemented and executed inside an organisation and as a process it has its own lifecycle (Kettenbohrer and Beimborn, 2015).

Sarang (2005) states that the focus of BPM is to improve organisational productivity and responsiveness, reduce costs, and to accelerate cycle times which makes profitability a key driver. The focus of BPM is a key driver for profitability (Ultimus, 2016). The benefits of BPM include converting paper-based business process into electronic processes that eliminate paper forms, file folders, documents and the inefficiencies associated with these; completely automate steps by integrating with enterprise applications; add intelligence to forms to reduce errors of omissions or inaccurate data; provide real-time feedback about the status of processes and measure the time and cost of processes so that the processes can be measured (Ultimus, 2016).

2.3 Importance of Business Process Management

Due to factors like globalisation, the opportunities of e-businesses, deregulation and political instability lead to an unsettled market in which an organisation has to constantly adapt. If an organisation does not change and adapt to its environment, it faces the risk of being put out of the market (Nkirote, 2014). Therefore, organisational change is important for an organization's survival. Business Process Management (BPM) is a method that facilitates both types of organisational change (Elzinga, Horak, Lee and Bruner, 1995). It gives organisations the opportunity to manage (and thus change) their business processes, by making the business processes explicit and flexible, as opposed to the fixed process logic supported in most

information systems. Moreover, it gives the organisation the opportunity to change their business processes from a business expert's process point of view, rather than from a technical viewpoint.

Oracle outlined in a White Paper (2009) that BPM can provide the agility needed in today's rapidly changing business environment. Process automation is one way that BPM can help an organisation become more nimble. Business processes organised within a BPM framework are well-documented with clearly defined steps. Furthermore, there is a clear understanding of the underlying systems and data supporting each step of the process. Changes to existing processes can be made quickly within a BPM framework because the downstream effects on people, systems, and data are already known and factored (Ko, Lee and Wah Lee, 2009).

Automated processes within a BPM framework also help in providing speed to compliance as well as transparency and consistency in the execution of the business processes. In this fast-paced world, executives need information in real time. Without automated processes, it is very difficult to gain real time insight into the execution of business processes. BPM technology not only provides the ability to automate the processes but also provides the ability to monitor the performance of the processes in a real-time manner. This ability allows management access to fast and accurate reporting so that they can make informed decisions about the business (Ko, Lee and Wah Lee, 2009).

Oracle (2009) went on to say that BPM can bring tremendous cost savings and cost avoidance to an organization. Optimizing and automating business processes can lead to a reduction in redundancies. Most manual tasks can be eliminated and thus considerably decrease the risk of errors and rework in the process.

2.4 Business Process Management (BPM) Lifecycle

BPM is mainly a cross-discipline "theory in practice" open to many views, definitions and perspectives. As it has a multi-disciplinary nature, it is often easy to find business process research materials across many subjects' databases. The researcher described the BPM lifecycle as supported by current BPM systems. This BPM lifecycle will serve as the basis for requirements in the following chapter. In the literature there is no uniform view on the number of phases in the BPM lifecycle. It varies depending on the chosen granularity for identifying the phases. There are many views of the generic BPM lifecycle (Havey, 2005; van der Aalst, 2004a, b, c; van der Aalst *et al*, 2003, to name a few) but the researcher adopted Weske's (2012) view. Weske (2012) provides an overall understanding of the concepts and technologies that are relevant in business process management, using a business process lifecycle. The lifecycle shows the logical dependence; therefore the cycle is in a cyclical structure.
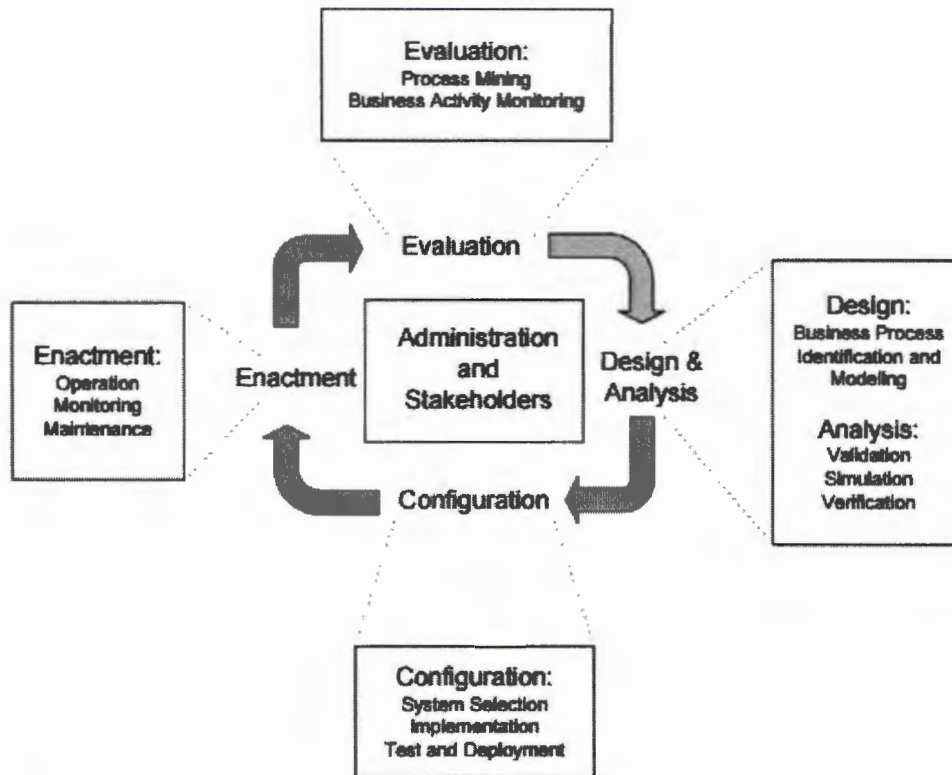
Figure 2 Error! No text of specified style in document.-**1: Business process lifecycle (Weske, 2012).**

2.4.1 Design and Analysis

According to Del-Río-Ortega (2012), "if no process exists, the goal of this phase is to define a new one; but if there is already an existing process, then the goal is to create an alternative for the current process." BPM lifecycle is in a circular structure, therefore there is no fixed beginning phase of the process, but just like any lifecycle, it is often common to start from analysing the business processes (Yeshanew & Muhochi, 2010). The first phase of the cycle consists of design and analysis. In this phase, business process identification and modelling form part of the initial task. Business process identification is not considered an easy task because the business administrators of the company do not properly relate the organisation's business operations with the processes that involve doing so (Lewis & Slack, 2003).

2.4.2 Configuration

In the configuration phase, the process model which was created during the first phase has to be implemented. The configuration phase focuses on the detailed specification of the selected design. The design phase places emphasis is on the performance of the process, while in the configuration phase the emphasis shifts to the realization of the corresponding system. The configuration phase specifically includes tasks like system selection, implementation, testing and deployment (Yeshanew & Muhochi, 2010). This can be done in two different ways; it can be implemented without any software support by a set of policies

and procedures which the personnel need to abide by, or it can be using a dedicated software system (Melcher, 2014). After an enactment platform is selected and the process model is improved with technical information in order to enable the enactment of the process by the BPM system (Van Der Aalst, 2013). This phase helps improve the effectiveness of the implementation process.

2.4.3 Enactment

According to Weske (2007), the enactment phase is the main section in the Business Process Lifecycle. The implementation of this phase is controlled while it is involved in actual tasks. This is where the execution of the business process encompasses. This phase consists of activities like operation, monitoring and maintenance (Lu, 2012). The enactment phase includes the actual run time of the business process. The dedicated infrastructure is used to handle individual cases covered by the business process. Weske (2007) wrote: "During business process enactment, valuable execution data is gathered, typically in some form of log file. These log files consist of ordered sets of log entries, indicating events that have occurred during business processes. Start of activity and end of activity is typical information stored in execution logs. Log information is the basis for evaluation of processes in the next phase of the business process lifecycle."

2.4.4 Evaluation

During the evaluation phase, the available log data, which was gathered in the enactment phase, is used to evaluate and improve the process model and its implementation. This stage monitors, analyses and validates the "actual" process and feeds the results back to the design stage (Kannengiesser, 2008).

2.5 Social Software

Social software is a new paradigm that is spreading quickly in society, organisations and economics (Schmidt & Nurcan, 2008). It provisions social interaction and social production. Social software has been well-defined by Schmidt and Nurcan (2009) as "software that supports the interaction of human beings and production of artefacts by combining the input from independent contributors without predetermining the way to do this". Filipowska, Kaczmarek, Koschmider, Stein, Wecel, and Abramowicz, (2011) cited Bouman (2007) who wrote that "Social Software is —software that triggers mechanisms of sociality by providing support for social practices, experiences, identity and production." The purpose of Social Software, according to Boulos et al. (2007), is to enable joint composition of more complex entities as well as addition of personal and social aspects. The most important feature of Social Software technologies is that they aim to enhance sharing of information by communities within organisations as well as fostering collaborations. Social software offers new opportunities to enhance business processes by improving the interchange of knowledge and information, this leads to speed up results and decisions. It facilitates new communication patterns between customers and the business.

Definitions	References
"Software that supports group interaction"	Clay Shirky in Allen (2004)
"Social software can be loosely defined as software which supports, extends, or derives added value from human social behaviour" Farkas specifies social software as a tool that must meet at least two of the three following conditions: 1) it allows people to communicate, collaborate, and build community online; 2) it facilitates syndication; 3) it lets people learn easily from and capitalize on the behaviour or knowledge of others."	Tom Coates in Farkas (2007)
"Social software is any software that supports group communications. The dynamics of social software are significantly different from traditional interactions. Social software allows emergent behaviour to control the content of the information created."	(Green & Pearson 2005)
"Web 2.0 is the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them."	(O'Reilly 2008)
The key concepts related to Web2.0 are: individual production and user generated content; harness the power of the crowd; data on an epic scale; architecture of participation; network effects; openness.	(Anderson 2007)
"Social computing describes any type of computing application in which software serves as an intermediary or a focus of a social relation."	(Schuler 1994)
"Several common characteristics may be observed among social computing platforms that differentiate them from traditional organizational computing and content sharing. All of these are decentralized to varying degrees. They are all dynamic with continual refinement in the content and online activity, as well as refinement in how different units of content are tagged and rated."	(Parameswaran & Whinston 2007)
"Social computing is computational facilitation of social studies and human social dynamics as well as the design and use of ICT technologies that consider social context."	(Wang, et al. 2007)
"Social computing is a social structure in which technology puts power in communities, not institutions."	(Charron et al. 2008)
"Social media is best understood as a group of new kinds of online media, which share most or all of the following characteristics: participation, openness, conversation, community, and connectedness. Basic forms of social media include social networks, blogs, wikis, podcasts, forums, content communities, and microblogging."	(Mayfield, A 2008)

Figure 2-2: Definitions of Social Software (Vie, 2007).

Social software is changing the ways in which people communicate and cooperate. Physical location, temporal constraints, and face-to-face communication are becoming less important. The impact and the development wave of social software make significant sense to the society since the industrial revolution. It changes the way to make a deal, to travel, and especially to learn (Alexander, 2006).

Digital social networks are networks reflecting the social structures, while social structures are created by the usage of digital media. Hence, media and communities are equally involved. Social software is thus innovative as it bridges media and communities in a seamless way. The status quo of the Internet's development trend is "Smarter, Simpler, Social", which features social software (Bryant, 2003) and the Web 2.0 technologies (O'Reilly, 2005). The terms Social Software and Web 2.0 are often used together or even synonymously. Although we do not understand these terms as synonyms, they are closely related to each other. Basically, the term Web 2.0, which was coined by O'Reilly in 2003 and has since then been widely adopted, refers to a new way of how the World Wide Web is used.

According to O'Reilly (2006), "Web 2.0 is the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform."

Generally speaking, Social Software employs Web 2.0 technologies. Users of social software often act on a global stage. Each weblog entry, each uploaded video, each shared bookmark can be viewed, commented, modified and re-distributed by every other user if published on the Internet. The complexity induced by this universe of possible interactions is threatening. It is far beyond the computational efforts of a single person.

Schmidt and Nurcan (2009) classified Social software into two categories. It can be classified in either according to the artefact created or whether the social software blends or groups the artefacts. This will be elaborated on later in the chapter.

2.6 Challenges of Social software

Despite increasing importance and attention paid toward the use and adoption of social software platforms/enterprise 2.0, only few researchers so far have focused on the concerns and challenges in deploying social software tools. Some of the concerns mentioned in the literature are fear of losing control, risk of losing information, security issues, and trust issues regarding employees (Pressley, 2006; Gilchrist, 2007; Bennett, Owers, Pitt, & Tucker, 2010; Razmerita, Kirchner, & Nabeth, 2014). Aula (2010) argued that when social media is used for corporate communication, it increases the reputation risk of the company.

Lack of social software literacy amongst workers is highly the biggest challenge many organisations have to deal with. Anecdotally, many organisations are not part of or directly linked to the technology industry which in turn makes their employees less likely to be familiar with the latest software innovations (Aula, 2010). The workers who haven't been maintaining blogs, updating Wiki sites, using social networks, and sharing information & knowledge socially will require more training than the workers who are erudite in the field of social software (Mukkamala, and. Razmerita, 2014). Social software requires some literacy efforts in most organisations to achieve effectiveness. Newer digital tools in the workplace are often hard to find and/or understand in terms of the best application for a given purpose (Hinchcliffe, 2016). With advancements in technology, many organisations are unable to develop the most effective software which attracts users and are user friendly.

Social software is still perceived as too risky to use for core business activities. There are concerns that social software is not for operations or key business capabilities (Mukkamala, and Razmerita, 2014). This is mainly due to variously fears about irregularity, or uncertainties of introducing potential distractions to activities that directly and immediately affect the business environment (Hinchcliffe, 2016). Knowledge and information hoarders are likely to exist in every organisation. However, their knowledge is likely to be one-dimensional, potentially very specialised and limited to their own small network. These knowledge hoarders are less likely to share their thoughts and ideas so they stay relevant to the organisation (Hinchcliffe, 2016).

2.7 Characteristics of Social Software

Although social software can include a variety of tools, certain characteristics distinguish it from other technologies. Traditional communication software tools such as e-mail, instant messaging, and discussion forums can to a certain degree, be classified as social interaction tools. Organisations have been using these software tools for communication and collaboration for quite some time. Recently, Web 2.0 tools commonly referred as social media have also been labelled as social software (Avram, 2006; Adamic, Zhang, Bakshy, and Ackerman, 2008; Cook, 2008; Von Krogh, 2012) because these tools support and encourage collaboration, communication, knowledge sharing, and social interactions.
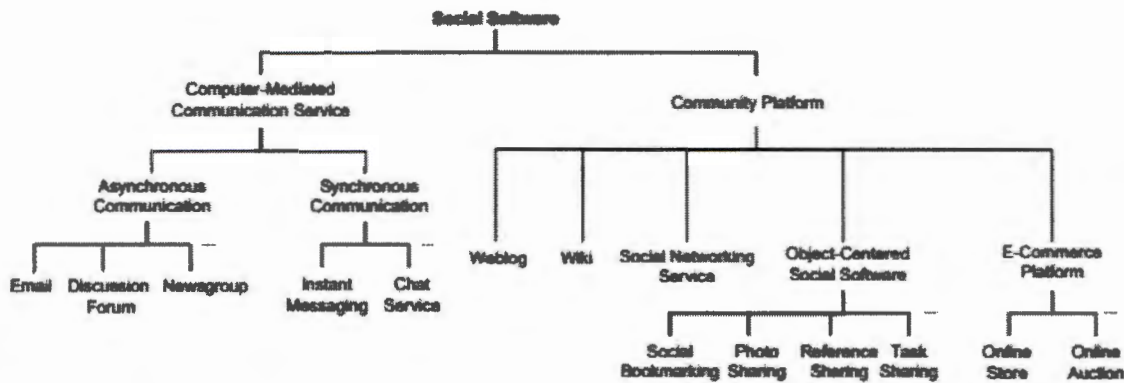
Figure 2-3: Classification of Social Software (Lehel, 2008).

2.8 Types/ Classification of Social Software

Social software comprises a wide range of different types. The popular ones include Internet discussion forums, social networking sites and dating sites. However, applications like massively multiplayer online games and Internet messaging can also be seen as social software, as could group e-mails and tele-conferencing. Newer applications such as weblogs, Wikis and social bookmarking have seen a recent increase in popularity and growing mainstream interest (Owen, Grant, Sayers and Facer, 2006).

According to Schmidt and Nurcan (2008), social software can be classified into two dimensions according to the artefact created and it can be differentiated whether it fusions or aggregates the artefacts. Social software is used to create two kinds of artefacts: content and context (Schmidt and Nurcan, 2008). Content may be of different types such as text or multi-media. Context can be further differentiated into three sub-types: annotation, reputation and social links. Annotation is information that helps to understand, find, and evaluate objects. These objects may be content in the social software or real objects. Reputation is a substitute for trust in social software (Schmidt and Nurcan, 2008). Because most users of social software do not know each other, it is necessary to provide reputation information. The third sub-type of context in social software is social links. They provide information about connection between human beings.

It is important to note that the creation of open source software and the formation of prices show a tight relationship with the ideas of social software. Open Source Software such as Linux is developed by a large number of independent developers (Schmidt and Nurcan, 2008). The association of price formation to social software may surprise at first sight. However, the formation of a price in a market is nothing else than putting together the offers and bids from many individuals to create a new piece of information. Based on these considerations, we can identify a spectrum based on the complexity of artefacts created. On one side is the formation of prices in a market with a very low complexity of the artefact created: the price formed is a number. On the other side there is the creation of open source software, a very complex artefact. Between before mentioned artefacts, are content and context provided by social software (Schmidt and Nurcan, 2008).

The second dimension for the classification of social software differentiates the integration of the inputs from the contributors. Some types of social software fusion the information contributed in a way that a new artefact is created and the contributions merge with one another. An example is the fusioning of information in a Wiki (Schmidt and Nurcan, 2008). Other types of social software only aggregate the contributions. For example, a blog only juxtaposes information and links it.

Based on the considerations above, some popular types of social software shall be discussed and classified. However, it should be noted that popular implementations often mix different types such as the use of tagging in Wikis.

Wikis

Wikis are used to create both content and context information. Authors create text and multimedia and add links to create the context. The core of a Wiki is a collaborative editing mechanism combined with an optimistic locking and access mechanism (Schmidt and Nurcan, 2008). The access of many Wikis is completely unrestricted. This appears incautious, but is not so relevant, because Wikis have an elaborate versioning mechanism which makes every change from every user distinguishable and resettable. Changes may be easily detected by comparing two versions. Thus, malicious users do not have the chance to create a huge damage. The versioning mechanism also allows resigning on locking and check-in / check-out mechanisms to coordinate the user's changes (Schmidt and Nurcan, 2008).

In a Wiki, not only textual content is generated but also the context related information is provided using links and categories. Thus, relationships between information may be easily edited collaboratively. Important extensions of Wikis are Semantic Media Wikis (Granovetter, 1983). They allow creating typed links.

Blogs

Contrary to Wikis, blogs do not allow to fusion content. Instead, the contributions of the user stay as separate entities. However, the blog entries can be used to annotate other entries or content. Therefore, blogs are primarily used as interaction mechanisms documenting the thread of communication (Schmidt and Nurcan, 2008).

Tagging and Social Bookmarking

Tagging exists to provide context to information related to objects by the association of tags. The tags may be freely chosen and are not part of hierarchy. Therefore, tagging creates a flat world from an uncontrolled vocabulary, contrary to hierarchical classification systems, taxonomies etc. Objects are not exactly classified by terms from a controlled vocabulary, but by a cloud of tags; the tag cloud. A tag cloud is the weighted set of tags associated with an object (Schmidt and Nurcan, 2008). The tag cloud is also used to indicate the usage of tags for tagging and searching in a tagging environment.

Due to the lack of a controlled vocabulary and a hierarchy of terms, there is no control of synonyms and homonyms. On the contrary, this fuzziness also implies an extensibility that allows catching semantic differences that would have been ignored by a pre-defined vocabulary. Social bookmarking is the collaborative collection of bookmarks. It often overlaps with tagging because the collected bookmarks are organised using a tagging mechanism.

Recommender and Reputation Systems

The principles of social software are more and more applied in recommender systems. Both aggregation and fusioning can be found. Many recommender systems for books, hotels etc. aggregate individual reviews. Additionally, said systems compose an evaluation from a multitude of contributions from users. Evaluations may be created from explicit statements from users or by observation of their behaviour. For example, tripadvisor.com collects the explicit evaluations of hotels. Amazon.com shows the percentage of visitors who bought a book (Schmidt and Nurcan, 2008).

However, social recommendation systems are susceptible to camouflage. Therefore, they are combined with reputation systems that allow weighting a user's contribution with its reputation. An example would be reviewers at amazon.com are annotated with information expressing their reputation, for example the number of their reviews (Schmidt and Nurcan, 2008). Reputation systems may also be used on their own. For example, the rating mechanism of eBay or the evaluation mechanism of the amazon.com marketplace determines the reputation of a seller or buyer by using the independent contribution of their business partners.

2.10 Features of Social Software

Social software is based on four principles: weak ties, social production, egalitarianism and mutual service provisioning (Schmidt and Nurcan, 2009).

2.10.1 Weak Ties

Relationships that are based on hierarchy or team structure, called strong ties (Granovetter, 1983), are the core of an enterprise/organisation and are probably appropriate for well-defined and repetitive business processes. However, they are less able to provide new perspectives on problems. Therefore, so called weak ties (Granovetter, 1983) are very important for enterprises to innovate. As argued in Nurcan (1998) and Dengler, Lamparter, Hefke and Abecker, (2009) "An unstructured process cannot be represented in terms of flow of tasks. Then the proposed generic model allows to represent it associated to a set of resources that it uses and produces and a set of participating roles. The key concept of unstructured processes is the information and knowledge sharing in the work group".

Weak ties are spontaneously established contacts which create new views on problems and allow combining competencies. They are contacts not imposed by management but by individuals. Before the internet, weak ties happened to be created, for example in the smokers' corner. Social software supports the creation of weak ties by allowing the spontaneous creation of contacts between non-predetermined individuals by a search mechanism on the profiles of registered members. Social software sites such as LinkedIn demonstrate these capabilities quite impressively (Schmidt and Nurcan, 2009).

2.10.2 Social Production

Social Production breaks the paradigm of centralised a-priori planning of production. By this means it is possible to integrate unforeseen and innovative contributors and contributions. "Many social and organisational factors play an important role in the working of any organisation ... a useful cooperative work model must capture much more than the steps of procedures... The concept of goal expresses an intention, this is what must be achieved'." (Nurcan, 1998). In other words, it is not always possible or even appropriate to freeze the way of reaching it. Important results of social production are Wikipedia and the Linux operating system. Furthermore, social production is based on a posteriori approach for assuring quality of production. The collective evaluation by all participants aims to reach and to keep a high degree of quality (Schmidt and Nurcan, 2009). An important precondition for such a collective evaluation is the independence of the participants. Influences biasing the participants have to be avoided.

2.10.3 Egalitarianism

Social software realises egalitarianism by abolishing hierarchical structures, merging the roles of contributors and consumers and introducing a culture of trust. Social software relies highly on the idea of giving all participants the same rights to contribute. This is done with the intention of encouraging a maximum of contributors and of getting the best solution by fusing a high number of contributions. In the same way, all participants have the right to contribute; they also have the duty to contribute. It is no longer possible to delegate tasks which the participant could do themselves (Schmidt and Nurcan, 2009).

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2.10.4 Mutual Service Provisioning

Social software changes the cooperation model from a client-server model to a model based on the exchange of services. This thinking is closely related to Service Dominant Logic (SD-Logic) where a "service is defined as the application of specialised competences (knowledge and skills) for the benefit of another entity, rather than the production of units of output" (Vargo and Lusch, 2008). The cocreation of value and not the output of production should be the centre of interest. Thus, service is regarded as a process of interaction with the customer and not as an interface to the customer. Value is co-created in a service process by a service provider and its customer, instead of producing goods and delivering it to the customer (Schmidt and Nurcan, 2009).

2.11 How are social software applications currently used in distributed working environments

Use of information and communication technology in organisations is self-evident these days. Several communication technologies, such as e-mail and instant messaging, have been used in organisations for over a decade (Wellman & Hampton 1999). The novel tools in the field, social software technologies, have emerged to support knowledge and information sharing, and we can see a tremendous jump in the use of and interest in them.

These new technologies and services benefit from the wisdom of crowds (Surowiecki, 2004), which simply means that the many can be smarter than the few. The role of users changes from passive consumers to active producers that generate content and form social networks. Some experts even speak about "collective intelligence" that is quicker, more up to date, deeper, and wider than the traditional models based on authorities and that derives from innovation mechanisms as differentiation and integration, competition and collaboration. This collective intelligence is "emergent" as a self-controlled network knowledge. As O'Reilly states (Spiegel Special, 2007), the point is to make collective intelligence useful – it is not just about expression of opinions, but about distributed data development and real time intelligence.

If we focus now on the corporate world and their distributed working environments, let us consider how this collective intelligence can be supported by Social Software. As an example, I would like to mention a tool for social bookmarking developed by IBM which is called "dogear" and has been implemented in the enterprise (Millen, Feinberg and Kerr, 2005). Generally, applications for shared bookmarking have certain common features:

- Individuals can create personal collections of bookmarks and share them with others,
- Users can assign keywords or tags for each bookmark – it can belong to more than one category,
- Social nature of their use – social browsing according to user names or tags.

Whereas social bookmarking has already been successfully used within the academic world for many years, the company was interested in whether large enterprises would also benefit from social bookmarking systems. As the authors of the experiment claim, it shows great potential for using the application to improve sharing, expertise location, and support of communities of interest within the enterprise.

2.12 Summary

Social software is software that supports the interaction of human beings and production of artefacts by combining the input from independent contributors without predetermining the way to do this. The artefacts created may be content or context information concerning abstract or physical objects. Social software is based on the principle of self-organization that also applies to the structuring of information. Information is not classified, structured or organized by a specialist, but by the community of users. It does not differentiate between the contributor and the consumer of content and context information. All contributions are fusioned and aggregated continuously and become immediately visible and effective; thus, a continuous assessment is possible.

Social software enhances business processes by improving the exchange of knowledge and information to speed up decisions and so forth. Thus, new communication patterns between customers and the enterprise appeared. However, Social software can also be used to overcome deficiencies of classic BPM approaches. It can at least narrow the model-reality divide which manifests in the falling apart of process models and real occurrences of these models. Social software also offers a better information fusioning by lowering the threshold to contribute. During design, social software allows to better integrate the needs of all stakeholders in a more complete way. Using the aggregation mechanisms of social software, constraints for implementation and deployment are captured in finer detail. The aggregation and fusioning of knowledge to cope with incidents are also facilitated by social software. During the evaluate and improve phase, social software highly enhances the collection of suggestions for improvements as each collection can be instantly evaluated by all stakeholders.

In summary, social software allows to integrate nearly all users into the design and implementation of business processes. Social software facilitates the administration of information that contains multiple perspectives, which cannot be linearized, homogenized etc. Information can be approached from different perspectives. Links allow directing from different sources to the information while tagging allows associating meta-info from different perspectives. Thus, the divide between abstract processes models, lifecycles, evaluations and the executed processes, procedures etc. can be narrowed or even completely avoided. However, there are also disadvantages, which originate primarily from the lack of hierarchy. Often overheads for the self-organization of the contributors increase.

Chapter Three
Research Methodology

3.1 An overview of the chapter

This chapter discusses the research methodology and research philosophy which underpins this research. It follows on Chapter 2 which reviews the literature available on the subject being researched. This has enabled the researcher to understand the subject better and to identify areas that have been researched while also, in turn, identifying the areas that still need to be researched. This chapter discusses the methodology used, which is part of the research undertaking. It is important to design a research method, in order to respond to the research questions that were developed in the previous chapters.

3.2 Purpose and objectives of the research

With Social Software technologies improving, the sharing of information by communities in organisations and by their clients; it is only suiting that the purpose of this research is to fully understand which types of social software exist and which of these software are being used in the five phases of the BPM lifecycle. Taking into account the literature, Social Software can bring added value to the field of BPM (Filipowska *et al*, 2011). The objectives that will assist in answering the research question are:

- Determine how social software interacts with business process management.
- Determine which categories of business processes can profit from social software.
- Determine which phases of the BPM lifecycle are affected the most by social software.
- Identify which social software is mostly used to profit businesses.

3.3 Why this research study is important

Organisations often implement Business Process Management for a variety of reasons. The main motivation is to be more competitive in the intense competition of today's economy. Social Software was primarily designed for providing an environment of interaction between users without any goal-oriented intentions. From the BPM viewpoint, the most important feature of Social Software technologies is that they aim at enhancing sharing of information by communities within organisations as well as development alliance.

As a result, they are suitable to solve the problem of knowledge sharing and its application within various stages of the process lifecycle. Social software can bridge the gap between process models and reality. Process participants are empowered to ensure a high connection of designed models with "their" reality, independently and collaboratively. This leads to a higher acceptance and ensures that business processes no longer run past their definition. Furthermore, Social BPM allows collecting and implementing participant ideas, which were previously not considered. Improvements for business processes can be considered much

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more than before, thanks to the use of the collective intelligence. Since it has already been established by researchers (Filipowska *et al*, 2011) that social software indeed does bring an added value to the BPM field. Taking this in mind, the significance of this study is easily formulated. With the use of social software increasing drastically in organisations, the researcher wants to distinguish the social software that is being used in the BPM lifecycle phases. This research will be important to the organisations in business. After finding out which social software is being used, the business will be able to implement these software to ensure optimal outcome.

3.4 Types of research

3.4.1 Quantitative Research

The two main research methods are quantitative and qualitative research. Quantitative research is evidence or data-based research which is numerical in nature to generate data (Oates, 2008). Quantitative research is mainly used in a positivist research environment. Data collected through quantitative research is summarised in the conclusion. There are different ways or techniques used in analysing quantitative data shown in tables or graphs (Oates, 2008). The quantitative research method is applicable to phenomena that can be expressed in terms of quantity (Kothari, 2004). Inferential research approach will be used to form the base from which to infer characteristics or relationships of population.

Numerically, data collection is always excluded by many researchers because it involves mathematics (Oates, 2008). Presently, software packages like Minitab, Statistical Package for the Social Sciences (SPSS) and many more are available that can help to calculate the mathematical aspect of quantitative data, but finally SPSS was used to analyse the data gathered. (Chukwuere, 2013). According to Denscombe (2003), the use of quantitative data has gained ground in academic research because it uses numbers to represent the outcome in the form of tables and graphs which in turn are objective in nature. According to Henning, Rensburg and Smit (2004), the quantitative paradigm works with pre-prepared administered questionnaires that guide and control respondents with a list of questionnaires. Participants are controlled by the research with instruction on the questionnaire. Respondents are not free to direct their own will but are guided by the predetermined instructions as designed (Henning, Rensburg & Smit, 2004). Quantitative technique is suitable in a small study. Quantitative research is used in this study because it is rich in characteristics that help to achieve the study objectives. In summary, quantitative research has the ability to demonstrate or contradict a theory and is focused to deliver answers to a given question (Greener, 2011).

3.4.2 Research Method used in this Research

The researcher will use a quantitative research method which will be based on the measurement of quantity or amount. Quantitative research is a predetermined or predefined scenario which is standardised (Durrheim & Blanche, 1999). Quantitative data is numeric in nature, based on numbers and evidence. It is suitable in

experiments, surveys and in questionnaires, which are used in positivist research and can also be used in interpretive and critical research (Oates, 2008). Quantitative research works in descriptive studies. This study deployed a quantitative research methodology because the study was focused on which software is being used in the five phases of the BPM lifecycle and which Social Software can bring added value to the field of BPM.

The survey will be constructed on primary data collection to identify and analyse. In gathering of information, the researcher will use the questionnaire as method to collect data carried out in a structured way where output depends upon the ability of the interviewer to a large extent.

3.4.3 Data required: Primary and Secondary data

According to Adams, Khan, Raeside and White (2007), there are a number of approaches used to gather original data. Data can be either primary data or secondary data. Primary data can be defined as data observed or collected directly from first-hand experience. Bopape (2008) cited Lubbe and Klopper (2005), who stated that sources of primary data include interviews, questionnaires, research data, letters and speeches while published data and the data collected in the past or other parties is called secondary data. Secondary data is usually used to validate primary data.

3.5 Data collection method

3.5.1 Methods for collecting primary data

A questionnaire will be used as a data collection method because it allows the researcher to gather responses in a standard and systematic way, hence objective. The questionnaire is commonly used as a quantitative method to collect quantifiable data (Oates, 2008). Questionnaires are a set of prearranged order of questions to address phenomenon and can be answered (self-administered) without the presence of an interviewer/ a researcher (Oates, 2008; Bless, Higson-Smith & Kagee, 2006). It can be distributed and gathered when participants have filled it in. It can also be distributed by e-mailing copies to participants, with participants sending them back after completion. This is known as mail questionnaire (Bless *et al*, 2006). Basically, questionnaires can have two types of questions. Open and closed questions; in open questions participants are required to give or write their own inputs/answers and closed questions are pre-designed standardised questions where participants are required to choose a possible answer from a given list of answers by the interviewer (Greener, 2011; Oates, 2008).

3.5.2 The questionnaire

Every respondent will be presented with the same questions, and measurements will be done and analysed objectively. The questionnaire will be pilot tested on a group of peer researchers, to ensure that it accurately captures the intended information. The researcher will employ a combination of open-ended and closed-

ended questions. Open ended questions give the respondents room to fully express their views and closed-ended questions narrow down the choices for easier analytic purposes.

The research variables to be included in the questionnaire are the background information of the respondents in terms of the roles they assume at their workplaces, the highest qualification attained and personal experience in business processes (this will be classified in years ranging from none to more than 10 years), the size of the respondents' organisation's IS department and also the business area of the organisations. The respondents will be asked to indicate whether they are using social software or not. If the respondents are using social software, they will be asked to indicate the intensity, how widely they are using the social software, the strictness of use and their expected future use of social software. Respondents will be provided with a list of questions on social software offering support as a control technology and they'll have to indicate whether they totally agree or not with the provided statements.

3.5.3 Types of variables

Dillman (2000) cited by Saunders *et al* (2007), distinguishes between the three types of data variables that can be collected through questionnaires: opinion variables record how respondents feel about something or what they think or believe is true or false, behaviour variables contain data on what people or organisations did on their past, do now and will do in the future and attribute variables contain data about respondent's characteristics. There are different forms of data used in quantitative research: some authors call them variables and others data. According to Gray (2009), variables are elements that make a difference in values. According to Bless, Higson-Smith and Kagee (2006), variables are research entities that differ from one observation to another, within a sample population, their age group and understanding of participants varies. The following are the variables that apply to this study:

Nominal variables: These variables show categories that have no numeric value. Examples of questions in these categories are gender (male and female) and participants have to select one (Oates, 2008). According to Denscombe (2003), nominal data or variables count and allocate numbers in sections in a questionnaire and compare with other sections like Black/White/Indian/Coloured.

Ordinal variable: in this variable, numbers are assigned to questions in the questionnaire scales (Oates, 2008). Rather than nominal variables that allocate numeric values in the question categories, it can have a distinction in percentage. For example, students' marks can be arranged according to their performance. It also counts and place numbers to values, for example, 1 for male and 2 for female (Denscombe, 2003).

Ratio variable: it can place participants' categories from 0 ranges.

Discrete variable: Questionnaires are categorised as whole numbers. Discrete values believe that certain data must be presented as a whole number without remainder, for example, age cannot have a remainder (Denscombe, 2003).

3.6 Population and Sampling

In quantitative research the aim is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. Quantitative research designs are descriptive or experimental. Descriptive subjects are usually measured once and experimental subjects are measured before and after treatment. A descriptive study only establishes associations between variables (Hopkins, 2008). The population consists of students who make use of the Internet and different individual websites.

The survey was constructed on primary data collection to identify and analyse. With the gathering of information, the researcher will use the questionnaire as method to collect data carried out in a structured way where output depends upon the ability of the interviewer to a large extent. A questionnaire will be used as a data collection method because it allows the researcher to gather responses in a standard and systematic way, hence objective. Every respondent will be presented with the same questions, and measurements will be done and analysed objectively. The questionnaire will be pilot tested on a group of peer researchers, to ensure that the questionnaire accurately captures the intended information. The researcher will employ a combination of open-ended and closed-ended questions. Open-ended questions give the respondents room to fully express their views and closed-ended questions narrow down the choices for easier analytic purposes.

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3.7 Data Analysis

Data handling is the process of ensuring that research data is stored, archived or disposed of in a protected and safe manner throughout and after the conclusion of a research. This includes the expansion of policies and procedures to supervise data handled none electronically (Taskakkori and Teddlie, 2003). Data handling

is important in ensuring the reliability of research data since it addresses concerns related to confidentially, security and protection of research data.

For data analysis, descriptive statistics, reliability analysis, factor analysis and regression analysis, t-test and correlation analysis will be performed. Since the researcher wants to analyse the relationships between components, that is, power and the use and success of social software, regression analysis would be the ideal tool to analyse the relationships between these variables. Using regression analysis, the researcher can also see the relative strength of the independent variable's effects on the dependent variables and with all these findings the researcher will be able to make predictions. The data is analysed using Statistical Package for the Social Sciences (SPSS). The data is presented in user friendly format expressed in the form of graphs, tables, percentages and statistical analysis.

3.8 Trustworthiness and Authenticity

The questions asked in the questionnaire will be simplified for the respondent to understand and every effort to eliminate any ambiguity will be taken. This is done to ensure that respondents answer to their best knowledge without being forced to answer in a way that they feel the researcher would like them to. It is further explained to respondents why this research is important and that their contribution is very important in its success. This motivates them to answer honestly and freely.

3.9 Conclusion

In conducting this research, time is devoted to the research methodology used as this is the central thrust for the success of the research. The research tool used to collect primary data is a questionnaire. This approach allows respondents to freely express their views without physical interviews. Although this approach limits the responses to the given choices, it is an adequate and relevant approach for a study of this nature, considering the researcher's minimal expertise in research projects. The questionnaire takes approximately 10 minutes to complete.

The next chapter is the data analysis and interpretation chapter. It presents and discusses the demographic outline of each question; the results of the research questions were answered. Where necessary, the required statistical analysis is undertaken to investigate possible relationships between variables.

Chapter Four
Data Analysis and Interpretation

4.1 Introduction

The purpose of this chapter is to present the research findings that provide evidence towards answering the research questions and exploring the research objectives. This chapter provides the basis for discussion and statistical analysis of the research findings that is presented in Chapter 5. An overview of the research findings is presented in the following section of this chapter.

This chapter presents and discusses the overview of each of the questions that respondents had to answer in the questionnaires. It is based on analysing and interpreting the data that was gathered from the respondents though the use of questionnaires. The data comprised is expressed in the form of graphs, tables, and statistical analysis. The statistical analysis will help the researcher in making concrete conclusions about which types of Social Software can be used in the respective phases of the BPM lifecycle.

4.2 Respondents Information

This section outlines information as obtained from the questionnaires that were administered online using the Google Forms platform. Working from the research objectives outlined in the previous chapter, a series of questions were developed and pre-tested. The survey was in field between September 11th and October 25th, 2017. A total of 75 questionnaires were started, but only 50 were considered complete and viable for analysis. The target number of completed questionnaires was achieved quickly, and as a result, the survey was closed shortly. A copy of the questionnaire is included in the Annexure, and the following sections present the summary findings for each question, along with relevant cross-tabulations and an analysis of the responses.

4.3 Analysis and Interpretation of data

As described in the methodology chapter 3, the key statistics that were chosen to analyse the data were descriptive in nature. Frequencies and cross-tabulations were the predominant methods used to summarize the results of the Likert scale questions. In order to more clearly present the results of the Likert scale questions, the middle neutral value was suppressed in order to highlight the levels of agreement and disagreement with the question statements.

4.3.1 Gender of participants in the study
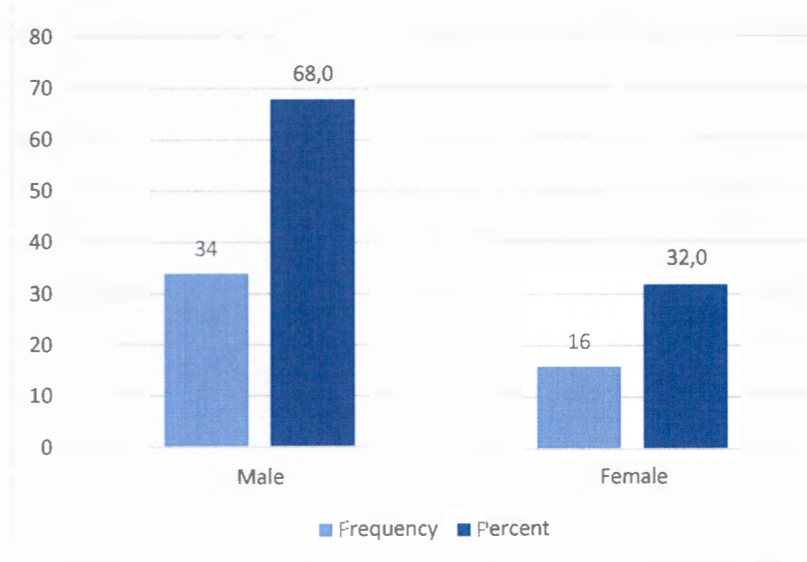
Figure 4-1: Gender Group

Figure 4.1 above indicates the percentages of gender of the respondents that participated in the study. The findings of this research show that 32% of the respondents are female and 68% are male. The chart above indicates that there are more males in the Technology and BPM fields, than female. It further reflects that the participants in this study are respondents with a different perception on social software usage. There is a preponderance of male users in the sample versus female, but since both genders were given equal opportunity to undertake the survey, there does not appear to have been any systematic bias favouring male respondents.

4.3.2 Age and participation to the study

		Count
	21-30	25
	31-40	15
Age Group	41-50	10
	Over 50	0

Table 4-1: Age Group

The ages of the respondents were grouped in four classes as indicated in Table 4.1 above; however, it appears that target sample fell into three of these classes.
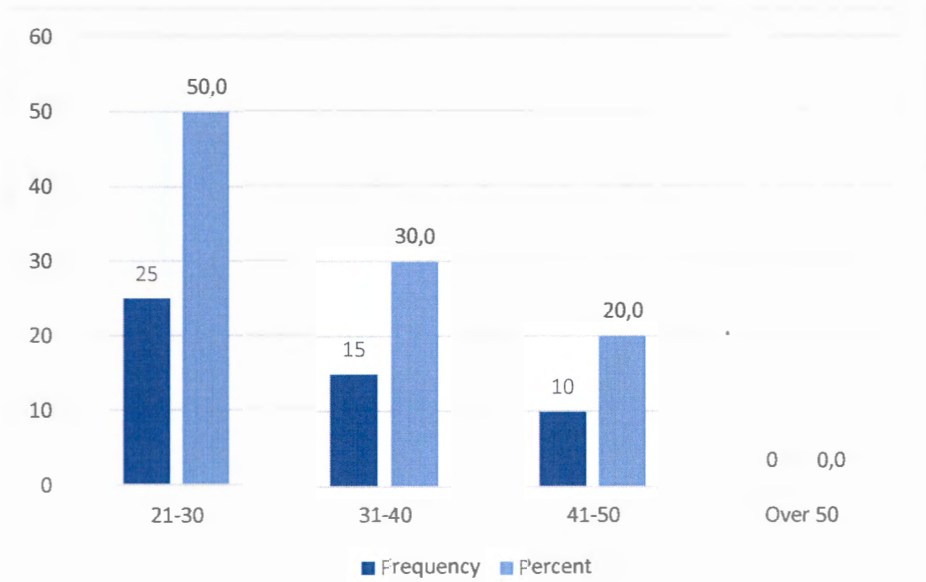
Figure 4-2: Age Group

The age of the respondents was tested using the age breaks divided into four. The largest age group is the 21-30 range (50%) followed by the 31-40 range (30.0%) and the 41-50 group (20%). Amongst the respondents there were no participants that fell in the range above 50 years. These findings are revealing of the fact that the respondents were very much a young adult medium, with a tendency toward adult aged groups and above.

4.3.3 Work Experience
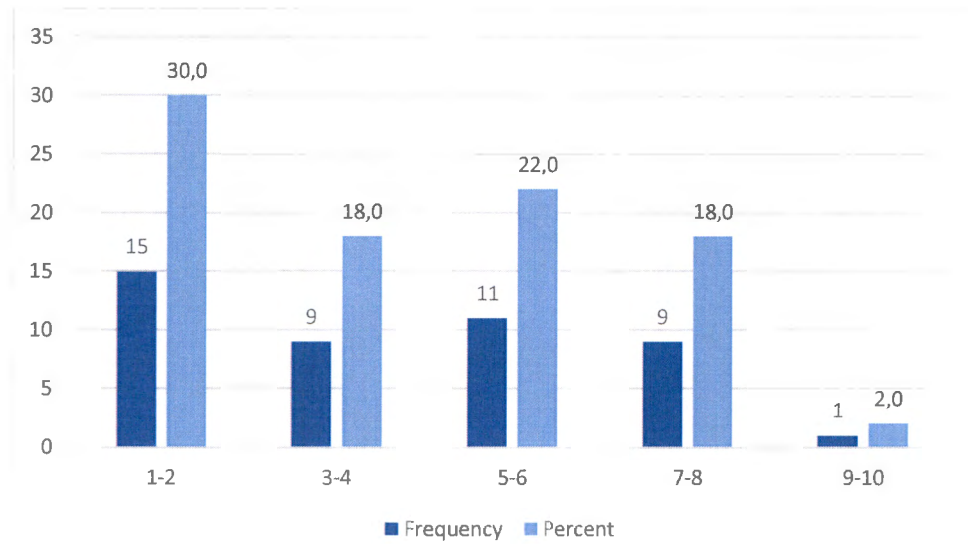
Figure 4-3: Work Experience

The work experience findings review that 30% of the respondents indicated that they are recently employed with 1-2 years' work experience. The medium experience, which is in line with the earlier finding, shows a preponderance of smaller firms reflected in the sample.

4.3.4 Role in the Business
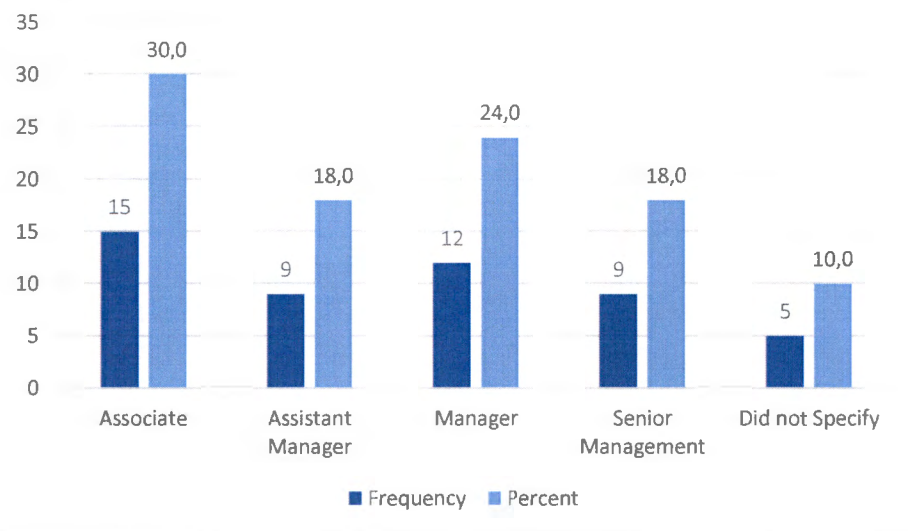
Figure 4-4: Role in the Business

The respondents' position title profile indicates that the respondents are in fairly senior or professional job categories. One interesting finding is that 30% of the respondents indicated that they are associates in their businesses. There also is a spread of management roles ranging from assistant manager (18%) through manager (24%), to senior management (18%). The presence of an extensive number of very senior

managers is helpful to this study as their level and scope of responsibility may help provide useful insights into the policies and practices of their firms in terms of social network usage. With the large number of associates, them being the young employees, they are more exposed to social software and make use of it on a regular basis.

4.3.5 Understanding of Business Process Management
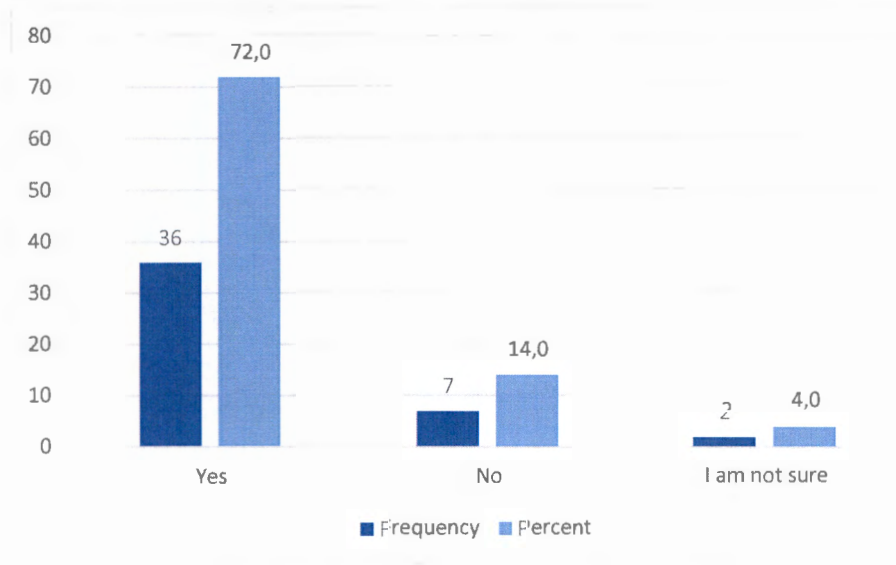
Figure 4-5: Understanding of BPM

Figure 4.5 above indicates the percentages of the respondents that participated in the study, that have an understanding of what BPM is and its role in the business. Four percent (4%) of the respondents indicated that they were not sure of what BPM was and 14% did not have an understanding of it. Most of the respondents (72%) have an understanding of what BPM is. This indicates that the targeted audience was reached.

4.3.6 BPM lifecycle phase respondent is involved in

31
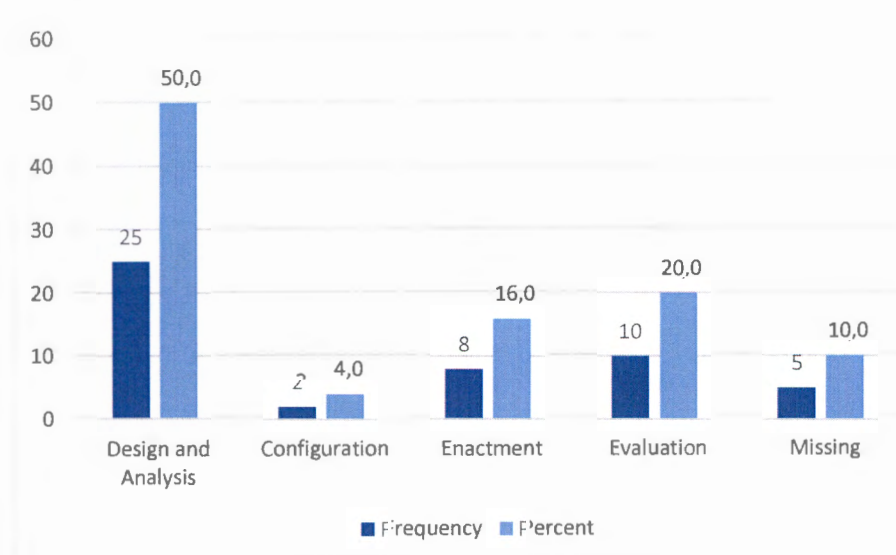
Figure 4-6: BPM lifecycle phase respondent is involved in

Figure 4.6 above indicates that the majority of respondents (50%) fall in the first phase of the design and analysis phase of the BPM lifecycle. The Configuration phase has the least involvement by respondents with 4%. There is no even distribution in the phases and this is because most of the newly employed respondent start in the Design and Analysis phase as they work their way through the phases with experience.

4.3.7 Social Software Usage
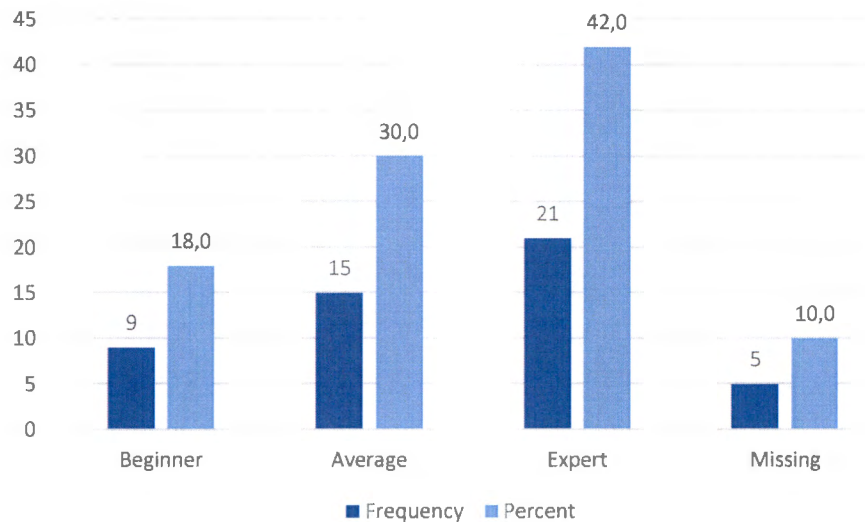
Figure 4-7: Social Software Usage

Social software, also known as Social Media, appears as a special form of networked media. It is a set of tools, applications and/or services that enables its users online interaction, information (or knowledge) sharing and exchange of opinions. Figure 4.7 above reflects the usage of Social Software of the participants that responded to the questionnaire. Forty two percent (42%) of the respondents are experts in using Social Software. This means that the respondents are proficient in using a wide variety of social media. The types of social software used are given in Figure 4.8.

4.3.8 Technologies used to collaborate with colleagues
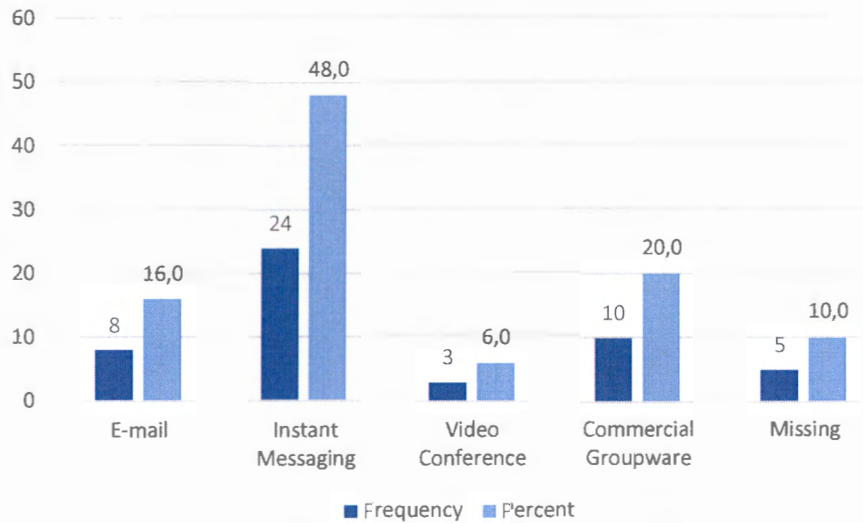
Figure 4-8: Technologies used to collaborate with colleagues

Figure 4.8 above reflects the technologies of Social Software used to collaborate with colleagues. The questionnaire distributed listed the following as technologies used:

- Face-to-face meeting
- Personal Telephone Call/Voice Mail
- E-mail
- Instant Messaging (IM)
- Group Telephone Conference
- Video Conference
- Shared Web space (including discussion forum; group weblog; group wiki)
- Commercial Groupware (e.g. Microsoft SharePoint; IBM Lotus Notes)

The data reviewed that out of the eight technologies listed, the respondents mostly collaborate or make use of the technologies listed in the graph above. Forty two percent (42%) of the respondents mainly make use of Instant Messaging, for example Skype, WhatsApp, Slack, to name a few. The next mostly used technology was the Commercial Groupware with 20% of the respondents. E-mail and video Conference technologies received 16% and 6% respectively. Most businesses make use of e-mail as a form of communication although they are mostly formal - most teams in BPM resort to IM to collaborate with colleagues.

4.3.9 Daily Usage to communicate with co-workers in order to perform tasks
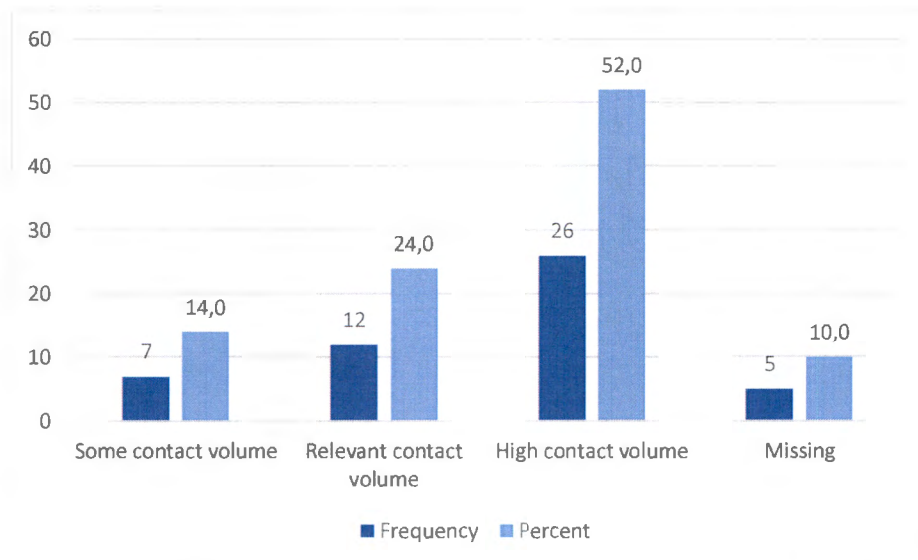
Figure 4-9: Daily Usage to communicate with co-workers in order to perform tasks

Figure 4.9 above shows that every respondent has some contact with technology and they use it to a certain extent to perform tasks in the business. The majority of the respondents (52%) have indicated that they have high contact volume with Social Software for their communication with co-workers. This reflects that the influence of adoption of social software in business process improvement. With the usage being high, it is possible to conclude that this variable will directly impact the importance of enterprise social technology in the workplace.

4.3.10 Use of social software technology in the workplace

The responses from this research question will further extend the value proposition and benefits of integrating social media with business process management. The responses below (Figure 4.10) reveal that 86% of the respondents use social software technology in the workplace and 4% were not sure if they used it. This can be concluded by saying the 4% are not knowledgeable of what social software is.
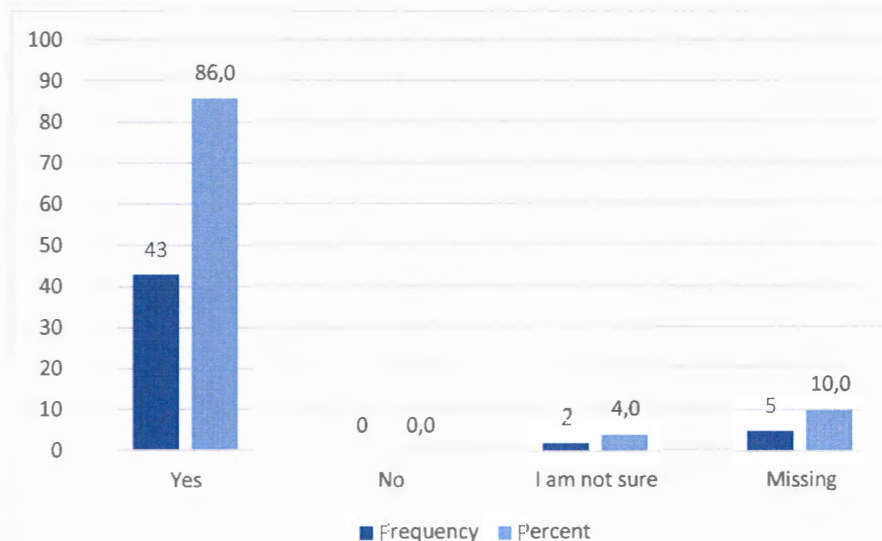
Figure 4-10: Use of social software technology in the workplace

4.3.11 Advantages of Social Software in the Workplace

Figure 4.11 below focuses on understanding the advantages that employees possibly believe to benefit from having this technology available in their workplace to help achieve their tasks. A set of advantages were posed in the questionnaire and Figure 4.11 illustrates the top advantages selected by respondents. The respondents (32%) believe that "improves connection among teams" is the most common advantage. Twenty percent (20%) of the respondents also chose "Increases team engagement and quality of engagement" and "Allows to communicate remotely and access corporate content" (20%), as advantages. This shows that the respondents in this research mostly make use of social software to communicate with co-workers.
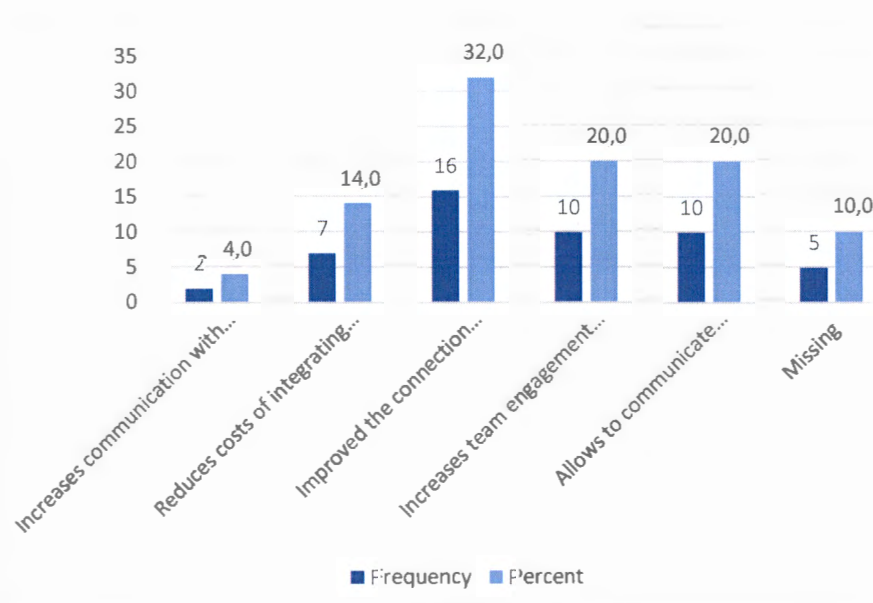
Figure 4-11: Advantages of Social Software in the Workplace

4.3.12 Formal Policies or Guidelines on the Appropriate Usage of Social Software

This question aims to gain insights into the current policy and practice landscape in the respondents' organisations. The question attempts to measure the level of formality of the policies and guidelines in the respondent's organization surrounding the appropriate usage of Social Software. Figure.4.12 below shows that 48% of the respondents agree that there are formal policies or guidelines on the appropriate usage of social software in their organisations. Thirty eight percent (38%) strongly agree with the statement while 4% have no opinion to the statement.
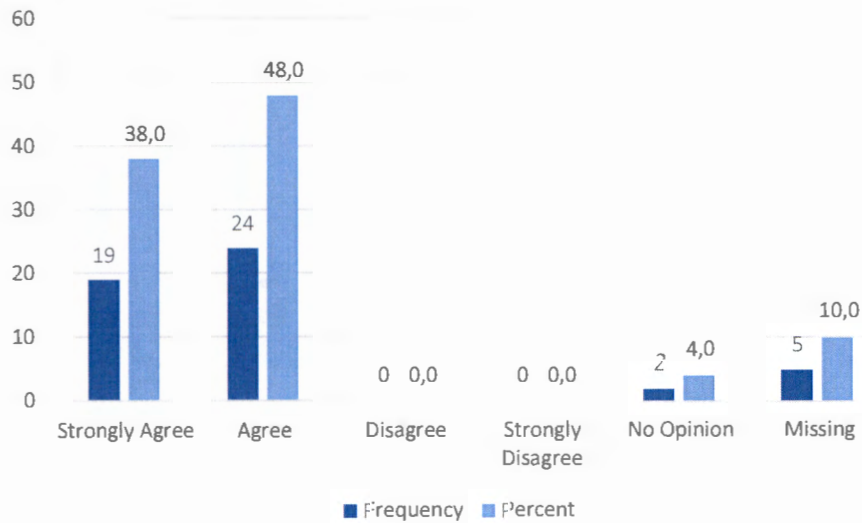
Figure 4-12: Formal Policies or Guidelines on the Appropriate Usage of Social Software

4.3.13 Formal Policies or Guidelines about what kind of Information can and cannot be distributed via social software
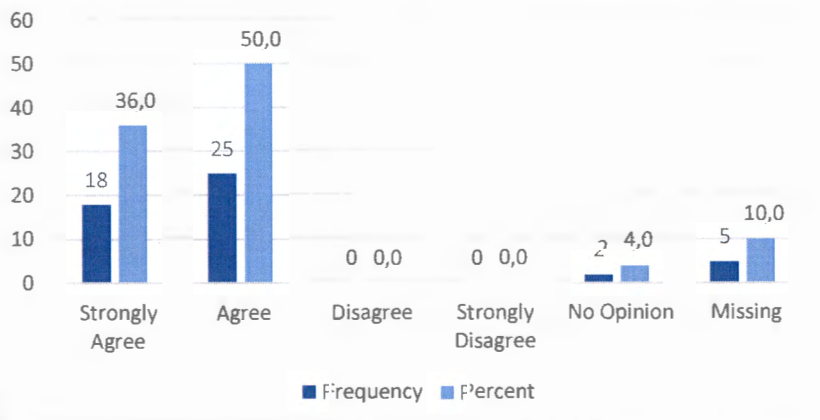
Figure 4-13: Formal Policies or Guidelines about what kind of Information can and cannot be distributed via social software

This question is a follow up on the previous question. This one is to investigate if organisations have formal policies or guidelines on what kind of information can and cannot be distributed via social software. Figure

4.13 above indicates that 50% agree and 36% strongly agree that there are some restrictions or guidelines on what to share via social software. There has to be some control order to prevent possible misuse of information; there must therefore be secure information.

4.3.14 Training on the Appropriate Use of Social Software
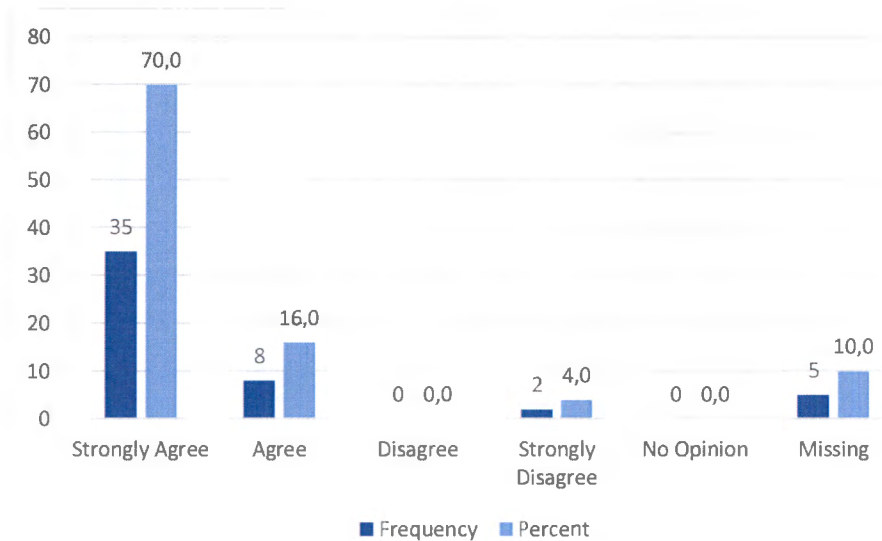
Figure 4-14: Training on the Appropriate Use of Social Software

If an organisation has formal policies or guidelines regarding the kind of information to be distributed via Social software, the organisation has to provide appropriate training in order for the employees to be knowledgeable of the policies. The graph above (Figure 4.14) indicates that 70% of the respondents strongly agree and 16% agree that their organisations provide training.

4.3.15 Important Role in the Strategies of my Organisation
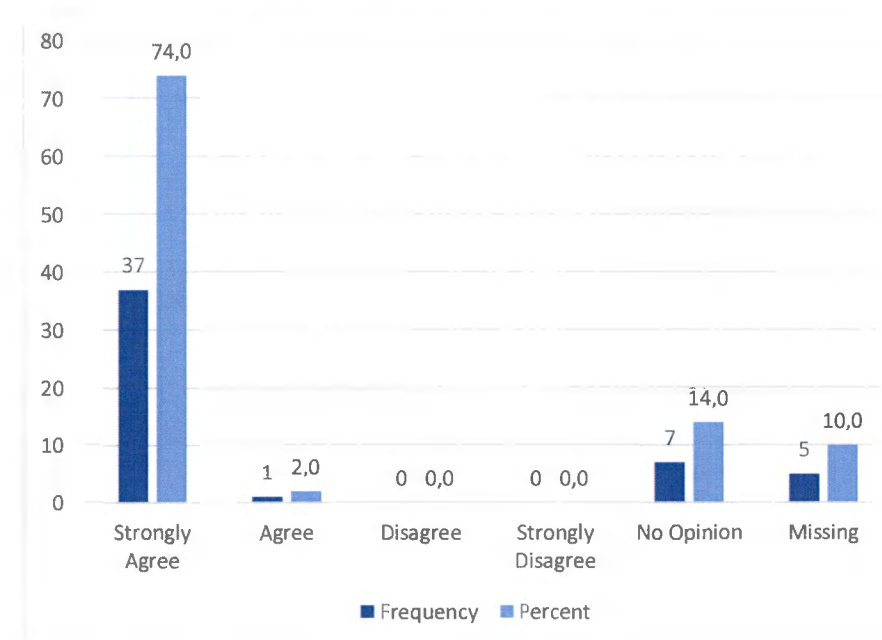
Figure 4-15: Important Role in the Strategies of my Organisation

With reference to the advantages stated above, social software clearly plays an important role in the strategies in the respondents' organisation. The respondents strongly agree (74%) with this statement. This question focuses on understanding the impact of having employees using social software (or demonstrating necessity or desire) and how that reflects on the likelihood of a manager implementing or proposing the implementation of this technology to their IT department in the future in their own companies.

4.4 Correlation

4.4.1 Definition

The definition of correlation was given in Chapter 3, but is as follows a statistical technique that can show whether and how strongly pairs of variables are related. It was used for the purpose of this study. It has been chosen because it is basic and understandable to readers without the statistics background.

4.4.2 Correlation between gender and age group

		Gender	Age Group
Gender	Pearson Correlation	1	.231
	N	50	50
Age Group	Pearson Correlation	.231	1
	N	50	50

Table 4-2: Correlation between gender and age group

The correlation between gender and age group was calculated and it reflects that more males participated in this research than the females. The correlation as shown in the table above is 0.231, indicating a positive correlation. The researcher found that gender and age group are independent of each other. This means that whether a person is male or female that will not reflect the age group he or she belongs to.

4.4.3 Correlation between age of participants and work experience

		Age Group	Experience
Age Group	Pearson Correlation	1	.902**
	Sig. (1-tailed)		.000
	N	50	45
Experience	Pearson Correlation	.902**	1
	Sig. (1-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-3: Correlation between age of participants and work experience

It is understandable that Table 4.3 above illustrates that the experience of the respondents is dependent on the age of the participants. The statistics show that the correlation is 0.902, which indicates a strong positive correlation and this implies that the correlation is significant in this case. There is a strong relationship between age and experience of the participant.

4.4.4 Correlation between work experience and role in the business

		Experience	Role
Experience	Pearson Correlation	1	.953**
	Sig. (1-tailed)		.000
	N	45	45
Role	Pearson Correlation	.953**	1
	Sig. (1-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-4: Correlation between work experience and role in the business

The researcher calculated the correlation between the experience of participants and the role in their business, to find out whether there is a relationship. Table 4.4 above shows 0.953 which is a strong positive correlation. This implies that there is significant correlation between the measured variables. From this table (4.4) it can be said that the more the experience the participant has, the higher they are in the business. With more experience comes more responsibilities in the business.

4.4.5 Correlation between role in the business and understanding of BPM

		Role	BPM_ Understanding
Role	Pearson Correlation	1	.012
	Sig. (1-tailed)		.468
	N	45	45
BPM_ Understanding	Pearson Correlation	.012	1
	Sig. (1-tailed)	.468	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-5: Correlation between role in the business and understanding of BPM

The Table 4.5 above shows that there is a correlation between the role in the business and the understanding of BPM of the respondent. The correlation is a positive correlation of 0.012. The role of the respondent does not imply that the respondent has an understanding of BPM.

4.4.6 Correlation between understanding of BPM and the BPM lifecycle phase the respondent is involved in

		BPM_ Understanding	BPM_Lifecycle _phases
BPM_Understanding	Pearson Correlation	1	-.392**
	Sig. (1-tailed)		.004
	N	45	45
BPM_Lifecycle_phases	Pearson Correlation	-.392**	1
	Sig. (1-tailed)	.004	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-6: Correlation between understanding of BPM and the BPM lifecycle phase the respondent is involved in

Table 4.6 above shows that there is a correlation between the understanding of BPM and the BPM lifecycle phase the respondent is involved in. The correlation is a negative correlation of -0.392. Although a negative correlation exists, it is not strong enough to suggest that there is linear dependency. There are obviously other factors that might have led respondents' opinion on this issue.

4.4.7 Correlation between the BPM lifecycle phase respondent is involved in and Social Software usage.

Table 4.7 below shows that there is a correlation between the BPM lifecycle phase respondent is involved in and Social Software usage. The correlation is a positive correlation of 0.859, which indicates a strong positive correlation and this implies that the correlation is significant in this case. The researcher found that the two variables are independent of each other.

		BPM_Lifecycle_phases	Social_Software_usage
BPM_Lifecycle_phases	Pearson Correlation	1	.859**
	Sig. (1-tailed)		.000
	N	45	45
Social_Software_usage	Pearson Correlation	.859**	1
	Sig. (1-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-7: Correlation between understanding of BPM and the BPM lifecycle phase respondent is involved in

4.4.8 Correlation between Social Software usage and the technologies used to collaborate with colleagues.

		Social_Software_usage	Technologies Used
Social_Software_usage	Pearson Correlation	1	.566**
	Sig. (1-tailed)		.000
	N	45	45
Technologies Used	Pearson Correlation	.566**	1
	Sig. (1-tailed)	.000	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-8: Correlation between Social Software usage and the technologies used to collaborate with colleagues

The researcher calculated the correlation Social Software usage and the technologies used to collaborate with colleagues to find out whether there is a relationship. Table 4.8 above shows 0.566 which is a positive correlation. This implies that there is significant correlation between the measured variables. From this table it can be said that the usage of the social software is not sufficient and that the technologies used may seem sufficient but it may not be of the right quantity.

4.4.9 Correlation between technologies used to collaborate with colleagues and daily usage to communicate.

		Technologies Used	Daily_Usage_of_ SS
Technologies Used	Pearson Correlation	1	.098
	Sig. (1-tailed)		.262
	N	45	45
Daily_Usage_of_SS	Pearson Correlation	.098	1
	Sig. (1-tailed)	.262	
	N	45	45

**. Correlation is significant at the 0.01 level (1-tailed).

Table 4-9: Correlation between technologies used to collaborate with colleagues and daily usage to communicate.

It is understandable, as Table 4.9 above illustrates, that the technologies used to collaborate with colleagues and daily usage of social software to communicate, are dependent. The table shows a positive correlation of 0.098 between the two variables.

4.4.10 Conclusion

Chapter 4 presented the research findings of the collected data for the research study and illustrated descriptive statistics of the respondent data for each question in the questionnaire. In a nutshell, this research shows the potential of social software for BPM. Social-software tools open up specific opportunities in the different phases of the BPM lifecycle.

The next chapter will provide the conclusions based on the discussion of these results, including the answers to the research questions. Complementing these results, the next chapter also highlights some limitations and offers future fields of research around social software and BPM.

Chapter Five
Summary, Conclusions and Future Study

5.1 Introduction

This chapter presents the overall summary of the entire study. The chapter is structured to present the conclusion and future study according to the research objectives and question layout. It makes inferences, draws conclusion and makes recommendations based on the findings in Chapter 4 as well as the literature study. The research questions will be answered and recommendation for future studies will be made.

The chapter presents the following format; summary of the study, answers to the research questions, limitations, and the conclusion.

5.2 Summary of the study

Social software enhances business processes by improving the exchange of knowledge and information to speed up decisions, etc. Thus, new communication patterns between colleagues appeared. However, Social software can also be used to overcome deficiencies of classic BPM approaches. Social software also offers a better information fusioning by lowering the threshold to contribute. During design, social software allows to better integrate the needs of all stakeholders in a more complete way. Using the aggregation mechanisms of social software, constraints for implementation and deployment are captured in finer detail. The aggregation and fusioning of knowledge to cope with incidents are also facilitated by social software. During the evaluate and improve phase, social software highly enhances the collection of suggestions for improvements because each collection can be instantly evaluated by all stakeholders.

In summary, social software allows to integrate nearly all users into the design and implementation of business processes. Social software facilitates the administration of information that contains multiple perspectives, which cannot be linearized, standardised, etc.

5.3 The main findings

The study was undertaken to investigate the types of social software used in the different phases of the BPM lifecycle and ways in which social software can be used to support BPM lifecycle. Lately, businesses are speeding up business processes to enhance the performance of organisations to ultimately increase their efficiency and effectiveness and lead them to achieve their goals. BPM is based on three main benefits: efficiency, effectiveness and agility and often productivity and workflow are hampered by the use of e-mail, instant messages and telephone calls. Synchronous or real time communication (such as telephone calls and meetings) can be time consuming, interruptive and cause decreased productivity, while asynchronous or delayed communications (such as e-mail) are often misused and overused (van Zyl, 2009). The use of

asynchronous communication methods, such as blogs and Wikis, can increase productivity and workflow efficiency.

According to the results studied in the previous chapter, the majority of respondents are using any social software technology fully focused on the business context or business contents. The data reviews that the respondents mostly collaborate or make use of Instant Messaging, for example Skype for Business, WhatsApp and Slack, to name a few. Most businesses make use of e-mails as a form of communication although they are mostly formal - most teams in BPM resort to IM to collaborate with colleagues.

Successful BPM also helps organisations to become more capable of adjusting to constantly changing business environments.

5.4 Research Questions

The main research question of this research was: "Which types of social software can be used in which phases of the BPM lifecycle?" This research question is answered by answering a number of sub-questions. The sub-questions and their answers are presented below.

- **Why is social software being used in the BPM lifecycle?**

Social software has already eclipsed e-mail as one of the most popular online activities in the consumer world. Along the way, it has sparked an "age of participation," in which people have more power than ever before. Today, through other social software, employees can ask questions and solve a work problem, can help employees when dealing with a difficult work-related problem, strengthen and build personal relationships with co-workers, enhance information discovery and delivery, and improve employee recognition and retention.

Social software offers a platform that enables contribution from various users of the community during all the stages of the BPM lifecycle. Social software has also integrated all stakeholders into the BPM lifecycle (Fleischmann, Schmidt & Stary, 2013), making the information available to all participants without additional efforts. This is mainly because social software also supports the creation of weak ties, a concept that is crucial to improve the agility and innovations of the enterprise. While strong ties are imposed by the corporate hierarchy or team membership, weak ties represent the connections between individuals.

With social software enabling rapid communication between participants, getting all the necessary information on time will have a positive effect on all the changes in the business environment. This is one of the more important opportunities that social software offers to BPM. The next opportunity is addressing communication between participants, for example, monitoring an e-mail thread can be confusing at times, especially if we are not the initial recipient. Social software offers many more advanced solutions for this

kind of communication. Participants can use one of the group chats available, where every individual can instantly recognize the sender of the message. This opportunity of social BPM enables transparent communication, which is required for effective work. Even if an individual wants to browse the previous talks, the search is usually simple and rapid (Kocbek, Jošt, & Polančič, 2015).

- **Which social features are actually used in BPM practice?**

Social software is based on four principles: weak ties, social production, egalitarianism and mutual service provisioning

5.4.1 Weak Ties and Strong Ties

5.4.1.1 Strong ties

Strong ties mainly exist among actors that know very well about each other. As compared to weaker connections, it generally comprises of a small group of people that functions inside the network to provide information and other benefits. These individuals possess close relations due to some common interest and therefore rely more on each other and have frequent interaction. Concerning the quality of information exchange via strong ties, strong relationships are reliable and offer a quality information that is useful for the organisation. Hence, it facilitates in creating awareness for future business development in BPM (Shaikh, 2017).

The development of strong ties plays a vital role in providing a huge amount of information and knowledge in the organisation. Strong relationships aid in providing diverse market knowledge by showing current trends and products introduced by new companies in the market. They act as a medium in showing the things happening around and hence resulting in increasing the current knowledge base. Simultaneously, the strong connections are not always efficient and therefore lead to provide information that is not useful for the business (Shaikh, 2017).

5.4.1.2 Weak ties

The weak ties comprise of random and /or specific entities in a crowd of the big social network, who have little knowledge about each other's position and work. In comparison with the strong ties, weak ties contacts do not possess any common interest and hence interact less frequently with each other (Shaikh, 2017). As these weak connections are dispersed in various social hubs, they provide the benefits only by linking back to them with the help of strong connections. Therefore, the more a person is involved in an interaction, the more it becomes useful in obtaining new information in BPM. However, the quality of information provided by weaker contacts need to be rechecked through other sources.

As the organisation and their networks operate in a small town, all of them are interconnected to each other. This may influence the quality of information or provide repeated information, but it also depends on what an individual is looking for. The purpose of social networking is not concerned to extract specific information or to identify business opportunities through weaker connections, it is rather more focused on the open discussion to get any information that is useful (Shaikh, 2017).

5.4.3 Egalitarianism

Social software realises egalitarianism by abolishing hierarchical structures, merging the roles of contributors and consumers and introducing a culture of trust. Social software relies highly on the idea of giving all participants the same rights to contribute. This is done with the intention of encouraging a maximum of contributors and of getting the best solution by fusing a high number of contributions. In the same way, all participants have the right to contribute; they also have the duty to contribute. It is no longer possible to delegate tasks which the participant could do themselves.

5.4.4 Mutual Service Provisioning

Social software changes the cooperation model from a client-server model to a model based on the exchange of services. This thinking is closely related to Service Dominant Logic (SD-Logic) (Vargo and Lusch, 2008), where a "service is defined as the application of specialised competences (knowledge and skills) for the benefit of another entity, rather than the production of units of output" (Vargo and Lusch, 2008). The cocreation of value, rather than the output of production, should be the centre of interest. Thus, service is regarded as a process of interaction with the customer and not as an interface to the customer. Value is co-created in a service process by a service provider and his customer, instead of producing goods and delivering it to the customer.

5.5 Limitations of the study

Every research has its limitations and so has this study. The first limitation that was encountered during the circulation of the study questionnaires was the fact that the study background was not provided; this led to some of the participants finding it difficult to understand what BPM and the overall aims and objective of the study is. Most of the participants confused the term BPM with Business Analysis. Since there is no official definition for social BPM, the concept can seem vague and is usually not fully understood. This might be one of the main reasons that many business owners hesitate to incorporate BPM and social software or do not give the concept a try.

Despite the hard work, the researcher only managed to get positive responses from three companies that agreed to participate in the study. This narrows the dimensions of the study. Due to this limitation, it

becomes difficult to generalize the research findings. Another limitation experienced by the researcher which possibly made an impact on the findings/ results of the study was identified under research methods.

Some of the participants may also have very limited skills. In addition, the study was mainly founded on the views and knowledge of the respondents. These views could be subjective and cannot be generalized. This study was limited by resource constraints.

5.6 Future Study and Conclusion

The social software provides new opportunities for more efficient and flexible design of business processes. It can integrate stakeholders' needs in a more comprehensive way by enabling better integration of all stakeholders in the validation and modelling. Social software can also help to more easily create reference models and can enhance the exchange of knowledge and predict decisions. It is important to emphasise that the development of social software has made institutional and communication processes increasingly more networked, dialogic and interactive, and thus future research on organisation studies should pay special attention to the nature of these organisational dynamics that affect stakeholders' perceptions of organisations and their judgments.

As social software continues to become an ubiquitous part of our lives, it is not just another tool in the toolbox of BPM. Rather, entire BPM processes and tools are becoming social. This paradigm shift will democratize processes by lowering the boundaries between software organisations as well as between BPM and their customers. It has the potential to provide new ways for the various stakeholders in BPM to collaborate and it can enhance and improve processes by addressing the many challenges facing collaborative BPM. Finally, the researcher would like to recommend that further studies consider the limitations of this research.

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Annexure

ANNEXURE A: Ethics Clearance

NORTH-WEST UNIVERSITY
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NOORDWES-UNIVERSITEIT

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Web: http://www.nwu.ac.za

Institutional Research Ethics Regulatory Committee
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Email: Ethics@nwu.ac.za

ETHICS APPROVAL CERTIFICATE OF PROJECT

Based on approval by the Human Sciences Research Ethics Committee (HSREC) on 02/11/2016, the North-West University Institutional Research Ethics Regulatory Committee (NWU-IRERC) hereby approves your project as indicated below. This implies that the NWU-IRERC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the project may be initiated, using the ethics number below.

Project title: The use of social software in the phases of the Business Process Management (BPM) life cycle.	
Project Leader/Supervisor: Prof S Lubbe & Dr ME Jantjies	
Student: P Mavetera	
Ethics number:	N W U - 0 0 4 7 6 - 1 6 - A 9
	Institution Project Number Year Status
	Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation
Application Type: Master's application	
Commencement date: 2016-10-26 **Expiry date: 2019-10-26**	**Risk:** N/A

Special conditions of the approval (if applicable):

- Translation of the informed consent document to the languages applicable to the study participants should be submitted to the HSREC (if applicable).
- Any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the HSREC. Ethics approval is required BEFORE approval can be obtained from these authorities.

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following:

- *The project leader (principle investigator) must report in the prescribed format to the NWU-IRERC via HSREC:*
  - *annually (or as otherwise requested) on the progress of the project, and upon completion of the project*
  - *without any delay in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.*
  - *Annually a number of projects may be randomly selected for an external audit.*
- *The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the project, the project leader must apply for approval of these changes at the HSREC. Would there be deviated from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.*
- *The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date, a new application must be made to the NWU-IRERC via HSREC and new approval received before or on the expiry date.*
- *In the interest of ethical responsibility the NWU-IRERC and HSREC retains the right to:*
  - *request access to any information or data at any time during the course or after completion of the project;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process.*
  - *withdraw or postpone approval if:*
    - *any unethical principles or practices of the project are revealed or suspected,*
    - *it becomes apparent that any relevant information was withheld from the HSREC or that information has been false or misrepresented,*
    - *the required annual report and reporting of adverse events was not done timely and accurately,*
    - *new institutional rules, national legislation or international conventions deem it necessary.*
- *HSREC can be contacted for further information via Estie.Emtoch@nwu.ac.za or 018 289 2873.*

The IRERC would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the IRERC or HSREC for any further enquiries or requests for assistance.

Yours sincerely

Prof LA Du Plessis

Digitally signed by
Prof LA Du Plessis
Date: 2016.11.18
08:24:14 +02'00'

Prof Linda du Plessis
Chair NWU Institutional Research Ethics Regulatory Committee (IRERC)

ANNEXURE B: Language Editing Certificate

To whom it may concern,

With this letter I, Simonete Munro, BIS Publishing Honours graduate and member of the Professional Editors' Guild (membership number: MUN002) and South African Translators' Institute, confirm that the paper titled *"The Use of Social Software during the phases of the Business Process Management (BPM) Lifecycle"* by Patience Mavetera, was edited by myself in a professional capacity.

Attention was given to sentence structure, spelling and other common language matters in all parts of the document. References were also looked at, both in-text and list of references.

For further information, please contact me at simonete@wol.co.za.

Kind regards,

Simonete

Professional
EDITORS'
Guild

Simonete Munro
Associate Member

Membership number: MUN002
Membership year: March 2018 to February 2019

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The Use of Social Software during the phases of the Business Process Management (BPM) Lifecycle

ANNEXURE C: Questionnaire

Voluntary Questionnaire For

"The Use of Social Software in the phases of the Business Process Management (BPM) Lifecycle"

North West University

Researcher: Patience Mavetera

Supervisor: Prof S Lubbe

Note to the respondent

- We need your help to understand the Use of Social Software during the phases of the Business Process Management (BPM) Lifecycle.

- Although we would like you to help us, you do not have to take part in this survey.

- If you do not want to take part, just hand in the blank questionnaire at the end of the survey session.

- What you say in this questionnaire will remain private and confidential. No one will be able to trace your opinions back to you as a person.

How to complete the questionnaire

1. Please answer the questions as truthfully as you can. Also, please be sure to read and follow the directions for each part. If you do not follow the directions, it will make it harder for us to do our project.

2. We are only asking you about things that you and your fellow researchers should feel comfortable telling us about. If you don't feel comfortable answering a question, you can indicate that you do not want to answer it. For those questions that you do answer, your responses will be kept confidential.

3. You can mark each response by making a tick or a cross, or encircling each appropriate response with a PEN (not a pencil), or by filling in the required words or numbers.

Thank you very much for filling in this questionnaire.

Part 1: Permission to use my responses for academic research

I hereby give permission that my responses may be used for research purposes provided that my identity is not revealed in the published records of the research.

Initials and surname _____. Contact numbers:
Home: _____Cell: _____ _

Demographical Data (Please mark with an 'X')

1. **Please tick your age group in the appropriate block:**
   ☐ 21-30 yrs.
   ☐ 31-40 yrs.
   ☐ 41-50 yrs.
   ☐ 51-60yrs
   ☐ Over 60 yrs.

2. **I am a:**
   ☐ Female
   ☐ Male

3. **How long have you been working presently?**
   ☐ 1-2 years
   ☐ 3-4 years
   ☐ 5-6 years
   ☐ 7-8 years
   ☐ 9-10 years
   ☐ More than 10 years

4. **What is your role and main duties within your organization?**
   ☐ Associate
   ☐ Assistant Manager
   ☐ Manager
   ☐ Senior Management
   ☐ Other (Please specify) _____

Questions 5 and 6.are aimed at determining the respondents' understanding of Business Process Management. BPM is a discipline where Information Technology and management intersect, to ensure the smooth running, monitoring, designing and improving of business processes.

5. **Do you understand what BPM is?**
   ☐ Yes
   ☐ No
   ☐ I am not sure

6. **Which BPM lifecycle phase are you involved in?**
   ☐ Design and Analysis
   ☐ Configuration
   ☐ Enactment

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☐ Evaluation

Questions 7 till 12 are aimed at determining the respondents' capability of using social software. Social software, also known as Web 2.0 applications or social apps, include communication and interactive tools often based on the Internet.

7. **How would you describe your ability in respect to the various levels of social software usage? Mark and 'X' next to the level that best describes you.**

1	Unfamiliar	I have no experience with social media
2	Newcomer	I have attempted to use social media, but I still require help on a regular basis.
3	Beginner	I am to perform basic functions on a limited number of social media applications.
4	Average	I demonstrate a general competency in a number of social media applications
5	Advanced	I have acquired the ability to competently use a broad spectrum of social media applications.
6	Expert	I am proficient in using a wide variety of social media

8. **Do you use technologies to collaborate with colleagues?**
   ☐ Face-to-face meeting

   ☐ Personal Telephone Call/Voice Mail

   ☐ E-mail

   ☐ Instant Messaging

   ☐ Group Telephone Conference

   ☐ Video Conference

   ☐ Shared Web space (including discussion forum; group weblog; group wiki)

   ☐ Commercial Groupware (e.g. Microsoft SharePoint; IBM Lotus Notes)

   ☐ Other (Please specify) _____

9. **How often do you need to communicate with your co-workers on a daily basis in order to perform your tasks?**
   ☐ Low contact volume

   ☐ Some contact volume

   ☐ Relevant contact volume

   ☐ High contact volume

10. **Are you currently using any social networking technology in your workplace? For this question, please disregard any email client you might be using at work.**
    ☐ Yes

    ☐ No

    ☐ I am not sure

11. **Considering your managerial task requirements, please select, in your opinion, the top four advantages of social networks in the workplace? Please rate Assuming which advantages would be more important to impact your performance**

☐ Increases communication with your team

☐ Increases quality of messages and broadcasted information

☐ Reduces costs of integrating communication technology with currently used technology

☐ Improves the available contents of expertise knowledge

☐ Increases speed of access to expertise

☐ Improved the connection between co-workers

☐ Increases team engagement and quality of engagement

☐ Allows to communicate remotely and access corporate content

☐ Increases productivity of team

12. **Do employees of your administrative unit use different forms of internet communication (blogs, forums, chat rooms etc.)?**

☐ Yes

☐ No

☐ I am not sure

Questions 13 till 17 are aimed at determining the respondents' organisation's view on Social software.

13. **My organisation has formal policies or guidelines on the appropriate usage of social software.**
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ No Opinion

14. **My organisation has formal policies or guidelines about what kinds of information can and cannot be distributed via social software.**
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ No Opinion

15. **My organisation does NOT place restrictions on the personal use of social software during work hours.**
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ No Opinion

16. **My organisation provides training on the appropriate use of social software.**
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ No Opinion

17. **Social software will play a more important role in the strategies of my organisation.**
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ No Opinion

18. **Please indicate if there are any other ways in which the company measures the effective use of social media.**
   1. ....
   2. ....
   3. ....
   4. ....
   5. ....

ANNEXURE D: Questionnaire Development Matrix

Questionnaire Development Matrix

©Rembrandt Klopper (rklopper@gmail.com) and Sam Lubbe (sam.lubbe@gmail.com)

1. Read this document in conjunction with Klopper & Lubbe 2012. Using Matrix Analysis to Achieve Traction, Coherence, Progression and Closure in Problem-Solution Oriented Research, in *Conference Proceedings, 2012 International Conference on Information Resources Management* (Conf IRM 2012), Vienna University, Austria. Editors: Roman Brandtweiner & Lech Janczewski. ISBN: 978-0-473-21262-9. The CM article explains how one should conduct a literature survey. This document explains how, subsequent to one's literature survey, one should develop a questionnaire to conduct a quantitative empirical research survey.

2. At the end of your literature survey, you have to decide whether to implement a quantitative or a qualitative or a dual mode empirical data gathering procedure. If you decide on a quantitative procedure, you have to develop a *Questionnaire Development Matrix*, like the one shown below, which decomposes your research questions into questionnaire questions.

Procedure: 1. Formulate a general research problem. 2. Decompose it into subproblems. 3. Formulate a research question that is properly aligned with each subproblem. 4. Decompose each research question into a section containing thematically interrelated questionnaire questions. 5. Determine the appropriate quantification scales for each question. 6. Determine the data type of each set of response options. 7. Determine the appropriate data measure for each question. 8. Determine the appropriate statistical test for the specific data types. This procedure is based on the same alignment principles as the literature survey procedure of Klopper & Lubbe (2012).

Development Matrix

Questionnaire Section	Types of Research Question	Question Nr.	Survey Question/ Statements	Response Options	Data Type	Appropriate Data Measure	Appropriate Statistical Test
Section 1		1.1	Please tick your age group in the appropriate block:	21-30, 31-40, 41-50, 51-60, 60+	Discrete	Ordinal	Basic descriptive statistics, single group t test, the z proportions test the X² test. (Use demographic data to characterise your respondents)
		1.2	I am a:	Male - Female	Dichotomous	Nominal	
		1.3	How long have you been working presently?	1-2, 3-4, 5-6, 7-8, 9-10, 10+	Discrete	Ordinal	
	Demographic Questions	1.4	What is your role and main duties within your organization?	Associate - Assistant Manager – Manager - Senior Management - Other (Please specify)	Dichotomous	Nominal	

Section 2	**Business Process Managem ent Questions**	2.1	Do you understand what BPM is?	Yes- No- I am not sure	Continuu m (= Cline)	Scalar (Likert Scale)	Any member of the X^2 family or correlation tests, e.g., Phi co-efficient, the contingency coefficient and Cramer's V, the lambda co-efficient or the un-certainty coefficient (U) or the Pearson significance test.
		2.2	Which BPM lifecycle phase are you involved in?	Design and Analysis – Configuration – Enactment - Evaluation	Continuu m	Scalar (Likert Scale)	(Continuous data reveal attributes of whatever one studies, allow one to determine general trends and establish significant correlations = co-relation trends between two attributes)
Secti on 3		3.1	How would you describe your ability in respect to the various levels of social		Continuu m	Scalar (Likert Scale)	Any member of the X^2 family or correlation tests …

	3.2	software usage? Mark and 'X' next to the level that best describes you. Do you use technologies to collaborate with colleagues?	Unfamiliar – Newcomer – Beginner – Average – Advanced – Expert	Dichotomous	Nominal
			Face-to-face meeting - Personal Telephone Call/Voice Mail - E-mail - Instant Messaging – Group Telephone Conference - Video Conference - Shared Web space (including discussion forum; group weblog; group wiki) - Commercial Groupware (e.g. Microsoft SharePoint; IBM Lotus Notes) - Other		
	3.3	How often do you need to communicate with your co-workers on a daily basis in order to perform your tasks?	Low contact volume - Some contact volume - Relevant contact volume - High contact volume	Dichotomous	Nominal
	3.4	Are you currently using any social networking technology in your workplace? For this question, please disregard any email client you might be using at work.	Yes – No - I am not sure	Dichotomous	Nominal
Social Software Questions	3.5	Considering your managerial task requirements, please select, in your opinion, the top four advantages of social networks in the workplace? Please rate Assuming which advantages would be more important to impact your performance	Increases communication with your team - Increases quality of messages and broadcasted information - Reduces costs of integrating communication technology with currently used technology - Improves the available contents of expertise knowledge - Increases speed of access to expertise - Improved the connection between co-workers - Increases team engagement and quality of engagement - Allows to communicate remotely and access	Dichotomous	Nominal
					Basic descriptive statistics, single group t test, the z proportions test the X^2 test.

Section 4 — Social Software and the Organisation

#	Statement / Question	Options	Dichotomous	Nominal / Scalar	Analysis
3.6	Do employees of your administrative unit use different forms of internet communication (blogs, forums, chat rooms etc.)?	corporate content - Increases productivity of team Yes – No – I am not sure	Dichotomous	Nominal	Any member of the X^2 Any member of the X^2 family or correlation tests, e.g., Phi co-efficient, the contingency coefficient and Cramer's V, the lambda co-efficient or the un-certainty coefficient (U) or the Pearson significance test.
4.1	My organisation has formal policies or guidelines on the appropriate usage of social software.	Strongly Agree -Agree-Disagree-Strongly Disagree	Continuum	Scalar (Likert Scale)	
4.2	My organisation has formal policies or guidelines about what kinds of information can and cannot be distributed via social software.	Strongly Agree -Agree-Disagree-Strongly Disagree	Continuum	Scalar (Likert Scale)	
4.3	My organisation does NOT place restrictions on the personal use of social software during work hours	Strongly Agree -Agree-Disagree-Strongly Disagree	Continuum	Scalar (Likert Scale)	(Continuous data reveal attributes of whatever one studies, allow one to determine general trends and establish significant correlations = co-relation trends between two attributes)
4.4	My organisation provides training on the appropriate use of social software.	Strongly Agree -Agree-Disagree-Strongly Disagree	Continuum	Scalar (Likert Scale)	
4.5	Social software will play a more important role in the strategies of my organisation	Strongly Agree -Agree-Disagree-Strongly Disagree	Continuum	Scalar (Likert Scale)	